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CHARACTERISTICS OF RURAL SETTLEMENT
IN THE CORN BELT OF THE NORTH
AMERICAN MID-WEST

B.P. Birch, B.A. (Dunelm), M.A. (Indiana)

A thesis submitted for the degree of Doctor of Philosophy in the
University of Durham.

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INTRODUCTION

This dissertation was made possible as a result of spending the period between September 1959 and January 1961 at Indiana University where most of the background reading and the preliminary census examinations were completed. Much of 1961 was spent in Iowa from where it was possible to conduct fieldwork in several parts of the Corn Belt.

The writer would like to acknowledge the help of Professor W.B. Fisher, Department of Geography, University of Durham who supervised the work, provided facilities in 1961 - 1962 and gave much encouragement; Professor G.H.T. Kimble, Department of Geography, Indiana University and Professor D.F. Howard, Department of Social Science, State College of Iowa, who provided facilities in their departments between 1959 - 1961; The University of Durham for the award of the Durham - Indiana Exchange Scholarship, 1959 - 1960; the United States Educational Commission who provided a Fulbright Travel Grant and the Ministry of Education who awarded a State Studentship. Dr. J. Fraser Hart and Dr. D.C. Bennett of Indiana University gave advice in the early stages and many agricultural extension officers, farmers, geographers, and other persons supplied information.

Three characteristics of the rural settlement of the Mid-West are

readily apparent to the geographer and the further study of these was the primary aim of this work. These characteristics are:

- 1) The distinctive type of farm settlement in the Mid-West which is mostly made up of dispersed farmsteads in contrast to the nucleated settlements of the nonfarm rural service centres and the towns.
- 2) The neat, geometrical form of this dispersed settlement with most farm units of a square or rectangular shape and the road network forming a mesh across the landscape.
- 3) The uniformity of the farmsteads and the farmhouses within this pattern of settlement over very wide areas.

The Corn Belt, as the core area of the Mid-West, was selected as a regional unit in which the nature and variety of these characteristic features of settlement could be considered against a fairly uniform physical and agricultural background.

Any attempt to understand the nature of the settlement necessarily involves, in the first instance, an historical viewpoint since the features of settlement have largely evolved by a process of evolution over a period of about 150 years. This approach suggests that certain ideas on, and features of, settlement were transferred into the Corn Belt from outside, or from one part of the region to another which

experienced later settlement by pioneers working under different environmental conditions. In particular, the Federal attitude towards the disposal of its lands for settlement and the pioneers' views upon methods of settlement were ideas partly imported from outside and partly innovations to suit the particular environments. Other ideas such as nucleated farm settlement, known to many of the Corn Belt settlers, failed to become accepted. Still other attitudes, such as the settlers' evaluation of prairie land, were modified as techniques of farming and transport improved.

The writer is aware of the greater difficulty of dealing adequately with the whole scope of the transference of ideas and techniques from one area of settlement to another, but this complements the more straightforward description and analysis of settlement features which is the basic purpose of the work carried out. The processes of importing, innovating and modifying features of settlement to meet changing population needs have relevance at the present time. They help to explain the dynamic nature of settlement, part of the study now termed Ekistics.

Some of the variety of Corn Belt rural settlement is undoubtedly due to varying rates and directions of settlement evolution rather than marked differences in the original settlements. One example of this is the growth of rural nonfarm settlement in parts of the eastern

Corn Belt which is creating settlement forms and features quite different from those in parts of the central and western Corn Belt which are still experiencing rural settlement losses. Little work has previously been done on either the detailed description and analysis of rural settlement features in the Corn Belt or on these other aspects of the settlement process.

The dissertation divides into two sections. In the first section Chapter I gives a background geographical description of the Corn Belt and its subregions in terms of their physical, agricultural and rural settlement characteristics. Chapter II outlines the policy and means by which Federal land was disposed of to settlers. Chapter III presents a background account of the progress of settlement by the northward and westward movement of the frontier and the changes which went on behind the frontier. Certain aspects of relevance to the evolution of the settlement patterns such as new land laws, the origins of the settlers and their changing attitudes and techniques are also discussed. The events of settlement in the last century have already been fully dealt with by Mid-Western historians but the writer has used additional contemporary materials and concentrated upon the transference and development of techniques and ideas which helped to shape the settlement patterns and features in different parts of the Corn Belt.

Section II is concerned with the forms and features of the rural settlement at the present time which owe much to the historical factors considered in the first section. Chapter IV deals with the nature of the various patterns of dispersed settlement in selected Corn Belt counties. Chapter V considers the farmsteads which are the basic units within these patterns. A discussion of regional variations in farmsteads and house types leads on to Chapter VI where certain farmhousing characteristics are considered in more detail with reference to Housing Census data, a source of material so far unused by geographers. The last chapter assesses the variety of rural settlement in the region by means of brief county studies as an indication of a line of approach towards a more thorough understanding of the rural landscape.

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March, 1965.

SECTION I THE GEOGRAPHICAL AND HISTORICAL BACKGROUND
TO RURAL SETTLEMENT IN
THE CORN BELT

CHAPTER I. A DEFINITION OF THE CORN BELT AND ITS REGIONS

Several writers have described the Corn Belt as the core area of the Mid-West but it is not easy to find agreement either on the extent of the core area or of the larger region in which it lies. Each worker has made his own criteria for setting off the one from the other and the Mid-West from the adjacent regions of the United States.¹

It is not surprising that the limits of the Corn Belt are hard to define. Topographic variety is limited and the systems of agriculture which have made corn the dominant crop have only evolved during the past eighty years. The area in which this crop is dominant has tended to expand and corn-growing has spread into regions which had already developed sectional interests and characteristics on the basis of other economic activities. The Corn Belt was not so termed by the Census of Agriculture until 1910 although the term had been used earlier in other literature.² It is

1. The standard text on the Mid-West defines the area in terms of the Central Lowlands with its main node at Chicago. See Garland, J.H., The North American Midwest. Wiley, New York 1955, p.5. Attempts at a cultural definition of the Mid-West include Hutton, G., Mid-West at Noon, University of Chicago Press, Chicago, 1946 and Brownell, J.W., "The Cultural Midwest". Journal of Geography, 59 (1960), pp. 81 - 85. For the Corn Belt itself see Bryan, P.W., "Natural Environment in Relation to Human Activity in the Corn Belt of North America". Geography, 15 (1929), pp. 18 - 19.

2. Warntz, W., "An Historical Consideration of the Terms 'Corn' and 'Corn Belt' in the United States". Agricultural History, 31 (1957), p. 43. The term was used earlier as, for example, in Appleton's Higher Geography, New York, 1881, p. 36.

important to note, therefore, that the settlement of the region evolved against a far less uniform agricultural background than now exists.

Apart from the problems of definition created by the relatively recent development of the Corn Belt, there is the tendency for the single term to be made to convey the impression of more regional homogeneity than is actually present. There is considerable diversity in farming types and economic conditions within the Corn Belt even though corn is the major crop throughout and the region should be viewed as a group of similar farming areas covering about 270,000 square miles rather than one farming area to be set off from other regions in the peripheral Mid-West.

The first attempts at defining the Corn Belt centred upon the setting up of criteria with an agricultural basis which could separate the region from the surrounding areas. Among these early attempts was that of Spillman who demarcated the types of farming areas for the whole nation in 1908.¹ Baker considerably improved upon this scheme.² His main criterion for delimiting the region was to include areas where corn controlled the form of farm operations rather than simply including all areas where corn was the main crop. A delimitation based on the latter

1. Spillman, W.T., "Types of Farming in the United States". in U.S. Department of Agriculture Yearbook, Washington, 1908.

2. Baker, O.E. "Agricultural Regions of North America, Part IV, The Corn Belt". Economic Geography, 3 (1927), pp. 446 - 465.

principle would have spread the Corn Belt much further south into the Corn and Winter Wheat Belt where farming conditions are different. Even so, Baker did not keep rigidly to his rule as Buchanan has pointed out.¹ In parts Baker uses a quantitative definition of corn production per acre to draw the boundary of the region but seems to use a qualitative definition to make the south-eastern border coincide with the glacial tills laid by the Wisconsin ice sheet.²

Elliott produced the first comprehensive regionalization of American agriculture in the 1930's using criteria such as the relative importance of each main source of farm income and the amount of land under different crops. At this time many states were producing their first maps of types of farming in order to take account of the rapidly changing conditions in agriculture. The growth of this source of data and further changes in agriculture since the 1930's, led the Department of Agriculture to revise Elliott's regionalization in 1950. The outcome was a publication

1. Buchanan, R., "Some Reflections on Agricultural Geography". Geography 44 (1959), pp. 1 - 13.

2. The Agricultural Adjustment Act, 1938, set up a quantitative definition of the main corn producing areas of the United States. In 1938 these consisted of 566 counties in the Mid-Western Corn Belt. But by the same definition 932 counties were included in 1958, many along the eastern seaboard and not part of the 'traditional' Corn Belt. Sheperd, G., "Is Corn Production Leaving the Corn Belt"? Iowa Farm Science, 13 (1958) pp. 12 - 14.

which combined state farming areas into intra-state generalized "type of farming areas" where combinations and intensities of farming enterprises are fairly uniform.¹ These areas were further combined into "type of farming subregions" of similar farm enterprises but where physical and economic conditions differed across each subregion. In the case of the Corn Belt, sixteen subregions went to make up the region known in this context as the Cash Grain and Livestock (Corn Belt) Region. The sixteen farming subregions are shown in Fig. 1.

More recently, Weaver has created crop areas in the Corn Belt on a more exact statistical basis but he makes it clear that his crop combination regions are based on the single criterion of the areal dominance of certain crops.² Such regions are no substitute for agricultural regions which need to take into account a complex of related factors. Weaver shows that corn, which shapes operations on Corn Belt farms, is associated with different crops, crop combinations and livestock units across the Corn Belt and that these variations create further difficulties in trying to draw up a satisfactory set of subregions.³

1. Elliott, F. "Generalized Types of Farming in the United States". Agricultural Information Bulletin 3, U.S. Department of Agriculture, Washington, 1950.

2. Weaver, J.C., "Crop Combination Regions in the Middle West". Geog. Rev., 44 (1954), pp. 175 - 200.

3. Weaver, J.C., "Livestock Units and Combination Regions in the Middle West". Economic Geography, 32 (1956), pp. 237 - 259.

In view of the generalized nature of existing agricultural regionalizations of the Corn Belt and because much of the data pertinent to rural settlement studies is not presented in terms of these agricultural subregions it has been found necessary in this study to employ another system of regional division which does, however, bear a marked similarity to that created by the Department of Agriculture. This second system of regionalization was first used in the 1950 Population and Housing Censuses and employs the concepts of State Economic Areas and Economic Subregions.

State Economic Areas (S.E.A.) are made up of groups of counties within a state which have great similarity of physical, economic and social characteristics.¹ Economic Subregions (E.S.), of which there are thirteen in the Corn Belt, are created by combining two or more adjacent State Economic Areas which have similar characteristics. These subregions are intended to preserve much of the homogeneity of S.E.A.'s and yet provide census regions which are not necessarily bounded by state borders. Each contains many counties which have similar physical, agricultural, commercial, industrial, demographic and cultural characteristics. The use of these subregions allows the easier tabulation and

1. State Economic Areas were first delineated in detail by Bogue, D.J. State Economic Areas, A Description of the Procedure Used in Making a Functional Grouping of the Counties of the United States. Department of Commerce, Bureau of the Census, Washington, 1951.

handling of data than would be possible for each of the 500 counties in the Corn Belt. The boundaries of all S.E.A.'s and E.S.'s follow county lines.

The successful application of these areal concepts in the 1950 censuses led to their use in the 1960 census tabulations. Bogue and Beale divided the whole national area into major regions by grouping together Economic Subregions.¹ The North Center (Corn Belt) Region was formed out of the thirteen subregions and it was the only region which they recognized as lying entirely within the usually accepted Mid-Western area. Nearly all the census data presented in this study has been calculated for these subregions or for the whole Corn Belt area which Bogue and Beale have outlined.² The layout of this regionalization of the Corn Belt is shown in Fig.2. Basic data on these subregions is given in Tables I and II.

Economic Subregions have been defined on a broader basis than the agricultural characteristics used to create the farming regions referred to earlier and a greater volume of data is therefore available for them. Apart from this the writer feels justified in using the economic rather than the farming subregions in view of the fact that rural settlement,

1. Bogue, D.J., and Beale, C. Economic Areas of the United States. Free Press of Glencoe, Chicago, 1961.

2. Some of the maps, where noted, are based on county or State Economic Area data.

TABLE I. The Economic Subregions of the Corn Belt

E.S.	Area	Sq. Miles
	Eastern Corn Belt	
47	W. Central Ohio - Central Indiana	13,022
48	Michigan - Ohio - Indiana Tri - State	21,057
51	Lower Wabash and Ohio Valley	10,249
	Central Corn Belt	
63	E. Central Illinois	17,642
70	E. Iowa and W. Illinois	20,683
86	N. Central Iowa and S.W. Minnesota	18,189
	Central Corn Belt Borders	
71	S. Iowa, N. Missouri and W. Central Illinois	33,172
84	Kansas - Missouri Corn Belt Border	12,853
69	Northern Corn Belt - Dairy Transition	22,722
	Western Corn Belt	
85	Central Missouri River Valley	40,340
87	Minnesota and S. Dakota Corn Belt Margin	13,690
92	Nebraska and S. Dakota Corn Belt Margin	27,335
93	Kansas - Nebraska Corn Belt and Winter Wheat Transition.	20,842
	Total Corn Belt	272,796

Source: Bogue and Beale, op.cit. p.131.

TABLE II The Population of the Corn Belt by Economic Subregions, 1960

E.S.	Total Population 1960	% Rural	Total Rural Farm	Total Rural Non Farm
Eastern Corn Belt				
47	4,044,505	29.8	287,125	917,217
48	2,034,938	50.1	335,066	721,981
51	808,668	48.5	112,828	279,358
Central Corn Belt				
63	1,487,707	39.3	175,517	408,701
70	1,349,200	41.7	245,759	317,124
86	854,136	47.1	209,783	193,079
Central Corn Belt Borders				
71	973,156	62.0	284,998	318,416
84	317,130	62.3	93,188	104,467
69	1,310,510	49.5	317,686	331,442
Western Corn Belt				
85	3,056,394	29.5	391,297	508,739
87	269,247	74.6	111,169	90,420
92	383,479	68.7	138,666	124,848
93	280,869	73.8	100,902	106,357
Total	17,169,930	42.1	2,803,984	4,422,149

Source: Calculated from Bureau of the Census, Census of Population, 1960, Characteristics of the Population, various tables.

much of which is no longer farm-oriented, is influenced by many non-agricultural factors.¹

A comparison of the Corn Belt as defined by Economic Subregions and Type of Farming Subregions shows that differences between the two are not considerable. Fig. 1 shows the outer boundaries of the thirteen Economic Subregions superimposed on the subregions of the Cash Grain and Livestock (Corn Belt) Region. Comparing the outer boundaries of the two Corn Belts, one can see that only nine counties which are included in the latter are excluded from the former. These divergences are marked a to f on Fig. 1. Eleven counties are included in the Corn Belt based on Economic Subregions but are not in that based on farming regions. These divergences are marked at 1 and 2 and include a strip of ten counties in southern Minnesota which combine corn growing with dairy farming and are included in the Minnesota Dairy Belt in the farming regionalization. Most of the internal divergences are where a farming area crosses from one Economic Subregion to include a few counties in an adjacent one. In other cases one Economic Subregion contains two type of farming subregions.

1. Much of the data in the 1954 Census of Agriculture have been tabulated for State Economic Areas rather than for the regions set up by the Department of Agriculture but comparable data was not published in the 1959 census. At least one Department of Agriculture publication on the Corn Belt presents its statistical data in terms of Economic Subregions rather than Type of Farming Subregions. See Strand E.G. Farmers and Farm Production in the United States, Chapter VII, Cash Grain and Livestock Producers in the Corn Belt. U.S. Census of Agriculture, 1954, Department of Agriculture, Washington, 1956.

In view of the work already done in delimiting the Corn Belt and its various parts, it was not considered worthwhile to create a new set of areal divisions for the purposes of the present study. It was more profitable to examine the ways in which the landscape of the Corn Belt varied from one subregion to another in order to better comprehend the seen and unseen historical, economic, social and physical factors which provide a setting for the rural settlement in the region. The rest of this chapter outlines these regional variations.

A Regional Division of the Corn Belt

The purpose of this section is to give a geographical description of the Corn Belt and its constituent Economic Subregions as background material for the study of the dispersed rural settlement which follows in later chapters. This appraisal is not intended to be exhaustive since several useful texts and articles can readily provide further detail.¹ A description of each Economic Subregion is given since it is not considered necessary to try to create a further set of regions within the Corn Belt when the existing divisions are already complex and must, in any case, be used where relevant Census data is called upon for supporting evidence.

1. Most useful of these sources are: Bogue and Beale, op.cit. pp. 130 - 178 and Garland op.cit. pp. 93 - 120, 229 - 242. Other sources are referred to at appropriate points in the text. The writer has also been able to add his own observations as a result of visits to each of the subregions.

The Corn Belt is most obviously a regional unit in terms of its physical and agricultural characteristics, the second being largely dependent on the first. The gently rolling topography, the fertile soils and the warm, moist growing season all suit corn and livestock production although this is not to deny the existence of considerable variation in these physical factors across the 1100 miles of latitudinal extent of the region. The degree of variation is seldom beyond the tolerance of successful corn growth so that this crop tends to get priority in the choice of land within the limits of crop rotations and other considerations of soil management.

Large areas of gently undulating or nearly level land are dominant in the Corn Belt and only narrow strips of land have steeper slopes where large streams have cut into the glacial materials which cover most of the region or where moraines were irregularly laid down. These thick deposits of drift upset the pre-existing drainage which has since only become fully re-established in areas not affected by the most recent (Wisconsin) ice advances. Many of the level prairie areas needed artificial drainage before they could be settled and farmed. The glacial deposits which can vary from a few feet to several hundreds of feet in thickness are mainly composed of locally derived materials but a significant proportion come from greater distances to give a varied composition to the primary materials from which soils have formed.¹

1. Odell, R.T. and others, Soils of the North Central Region of the United States. North Central Regional Publication 76, Bulletin 544, University of Wisconsin Agric. Experiment Station, Madison, 1960. p.8.

Consolidated and semi-consolidated sedimentary rocks and some which are crystalline, underlie the whole region but these only affect topography and soil formation beyond the limits of the glacial advances or where the glacial cover has been removed. Some rivers have cut deeply enough to expose several strata and the mixing of materials by mass movement can create more diverse soil conditions than in the flatter areas. South of the glaciated areas, which form the major part of the Corn Belt, more dissected land with exposures of bedrock are common. This includes southern Ohio and Indiana, the major part of Missouri as well as the Driftless Area of Wisconsin and northwestern Illinois further north. Soils are shallower but well-drained in such areas and more liable to erosion. These are in marked contrast to the soils of the level prairies, many of which are derived from loess laid down over glacial materials after the retreat of the Wisconsin sheets. These deposits are usually thickest in the level areas of Illinois, Iowa and Kansas especially near to valley trains and wider stream bottoms, some of which acted as glacial sluiceways. Soils developed on these loess deposits are generally silty and moist. With level terrain there is no erosion danger but depressions are liable to be damp and to have consequent restrictions on their use. Lacustrine, outwash and recent alluvial materials are also widespread.

Most of the Corn Belt had either a broadleaf forest cover or a prairie grass form of vegetation before white settlement commenced.

A forest with deciduous associates including species such as oak and hickory, beech and maple covered most of Ohio and Indiana in the eastern Corn Belt. Grey-brown and red-yellow podzolic soils were associated with these forests. Much of this forest was early cleared for settlement and cultivation and its relics and secondary growth are restricted to land not suited to crops or where farmers have retained woodlots. In the central parts of the Corn Belt, the forest cover was more patchy with prairie areas between. Woodland formed narrow tongues on the valley sides and on more rolling upland areas, with tall grasses occurring on the interstream areas and becoming predominant westwards. Settlement in this type of country tended to concentrate at first on the wooded podzolic soils and expand out into the grassland at a later stage. In the western parts of the Corn Belt woodland areas decreased in size. The bluestem and Indian tall grass prairies were associated with chernozem and brunizem soils of considerable inherent fertility although these areas did not quickly attract settlement because of their western location and the early difficulties in farming them.

The whole Corn Belt has a continental climate which gives a well-distributed precipitation regime with an annual average of 25 to 30 inches and increasing to 40 inches in the south-eastern part. A spring and summer maximum becomes more pronounced westwards as the total amount of precipitation falls off where natural prairie replaced forest growth. This precipitation regime, together with hot summer days and warm humid

nights, induces rapid crop growth. Apart from the smaller and less regular rainfall regime in the west, which further west sees the replacement of corn by small grains, the main climatic variety affecting agriculture is the difference between microthermal conditions on the northern fringe and the mesothermal climate in the south.¹ Summer and winter temperature differences are much more marked in the north so that domestic and other farm housing has to be more substantial. Prairie farmsteads commonly have a surrounding windbreak of trees to ease working and living conditions in mid-winter.

There were 862,000 farms in the Corn Belt in 1954 with an average size of 192 acres. 93 per cent of the land area was in farms and 71 per cent of this farmland was under crops. Corn took up 43 per cent of the cropland. Publicly-owned land formed less than 5 per cent of the area of the main states with more in the north where state forests are common. The remaining 95 percent of the land was held by individuals, by husband-wife partnerships or other small groups of persons with about 1 per cent in the hands of companies.²

1. Corn requires about 130 frost-free days to mature but maximum yields can generally only be obtained if day temperatures in this period remain over 75 F. and there is fairly frequent rain in the early and middle part of the growing season. Corn growing decreases in prominence at the northern edge of the Corn Belt where these conditions cannot be fulfilled. On the southern edge of the Corn Belt the frost free season is about 180 days long.

2. Timmons, J.F. and Barlow, R., Farm Ownership in the Midwest. North Central Regional Publication 13, Ames, 1949, p. 848.

The suitability of the physical conditions for livestock and grain farming has led to high land values with farm production per acre about twice the national average.¹ Land values and farm incomes are steadily rising. Capital investment in farm operations, mechanization and livestock are also high so that tenant-operated farms account for about a third of all commercial farms in the region in spite of the original guidelines to settlement which favoured farm ownership.² At the same time farm prosperity is nearly everywhere readily apparent and even in its poorer parts Corn Belt farmers have average living standards only a little below the national average for farm people.

Although corn is dominant in all parts of the Corn Belt the actual agricultural systems into which it is incorporated vary from area to area. Most of these systems also try to spread out the use of labour throughout the year since nearly all the farms are operated by individual farm families without extra farm hands. Feed crops of corn with oats and forages are the basis of the systems along with the livestock, principally beef and hogs, which are fattened on these crops.³ Wheat and oats are also grown for sale. The Corn Belt is, therefore, not only the leading corn producing area in the United States but also

1. Bogue and Beale op. cit. p. 142.

2. The variety of rental practices and land prices in the Mid-West are considered in: Hurlbert, V.L., Farm Rental Practices and Problems in the Mid-West. Iowa State College Research Bulletin 416, Ames, 1954 and North Central Land Tenure Committee, Farm Land Prices and the Midwest. Michigan State College Agric. Experiment Station Bulletin 349, East Lansing, 1948 p.34.

3. Haystead, L. and Fite, G.C., The Agricultural Regions of the United States. University of Oklahoma Press, Norman, 1955, p.148.

produces two-thirds of the nation's hogs and a quarter of the cattle.

Feed production is most heavily concentrated in the prairie sections of central Iowa (the southern part of E.S. 86) and east-central Illinois (E.S. 63). Here the complimentary hog and beef fattening programmes are not well developed and many farms simply produce feed crops for sale. Under the Type of Farming regionalization shown in Fig. 1., these are the two Cash Corn, Oats and Soybean areas. This type of farming makes good use of the prairie soils where mechanization can be well developed. Cash crop farming also favours share crop payments to landlords, some of whom do not live in the district or are banks and insurance companies.¹ Tenancy rates are high in these areas as a result of high land values and speculation at the time when the land was first taken up for settlement. Legumes, hay and pasture are little seen as animals play a small part in most farm programmes and the level soils suffer little from erosion or loss of fertility.

A more balanced programme of corn growing with cattle and hog raising is found on most farms on the loess soils which border the Mississippi and Missouri Rivers where more land has a degree of slope. Practices to curb soil erosion under grain crops are put into use and more land is kept under grass. Hogs are the most favoured converters of corn into meat but ground-fed beef cattle are also prominent. These

1. Sub-Committee on Economics of Cropping Systems, Economics of Cropping Systems in the Corn Belt. College of Agriculture Experiment Station Bulletin 429, Lincoln (Nebraska), 1955, p. 33.

areas principally occur in the Mississippi borderlands of eastern Iowa and west-central Illinois (E.S. 70) and the western Iowa and eastern Nebraska strip along the Missouri River (E.S. 85). These areas are shown on Fig. 1. as cattle and hog feeding areas.

A third type of farm programme is most common in the Eastern Corn Belt. Here soft winter wheat is grown along with corn while hog raising is an important part of the rural economies. Farms of this type are common in central Indiana and Ohio (E.S. 47 and 51) where units are of smaller average size due to historical reasons and the presence of part-time farmers who gain some income from industrial work in nearby urban areas. The once wooded soils are lighter and better drained than the prairie soils further west and are well suited to wheat. Corn, however, is still the dominant crop and forms the basis of the hog raising.

General farming, where other varied farm activities become common, gains in importance in the Wabash Valley of southern Indiana and southern Illinois so that this area is in some ways transitional to the general hill farming areas which lie south of the Corn Belt in Kentucky and Tennessee. Other subregions which form the southern, northern and western edges of the Corn Belt are less dependent on corn and some of the farms take on characteristics associated with the agricultural enterprises of the peripheral parts of the Mid-West. On the southern edges of the Corn Belt more of the land is sloping as little of the

area was affected by the recent glacial advances. Proportionately more land is kept under pasture since soils are shallower and more liable to erode and grazing tends to replace fattening. This type of farming is common in southern Iowa and the Missouri Grand Prairie and stretches into west-central Illinois. This area is represented by Economic Sub-region 71 in Fig. 2 and the Livestock and Pasture area in Fig. 1. In the Kansas-Missouri border area (E.S. 84) of the southern Corn Belt corn is combined with hay, wheat and livestock enterprises. This economy develops on largely non-glaciated land with the aim of maintaining a fairly intensive cropping programme without impairing soil fertility. The dairy produce can find a local market in the Kansas City metropolitan area.

Along the northern edge of the Corn Belt the soils are less productive than in the central prairies and the dominance of corn is rivalled by the growing of forage crops, like oats, where corn is less likely to mature in the shorter growing season. With more land in slope less is cultivated at any one time so that the pasture and forage crops favour farm programmes with a dairy interest rather than beef and hog fattening. This is especially so in north-eastern Iowa, north-western Illinois and south-western Wisconsin in Economic Subregion 69. This emphasis on dairying increases northwards and around the Chicago area. Similarly, northern Indiana and Ohio and southern Michigan (E.S. 48) have farms

predominantly of this type.

In the Western Corn Belt the corn and livestock programmes grade into the wheat growing and range livestock enterprises of the drier Great Plains. The drier pastures and lower corn yields per acre also reduce interest in hog raising so that in most years farmers sell off much of their feed crops rather than run the risk of overstocking in a dry year. This area is represented by Economic Subregions 92 and 93 in Fig. 2 and the Livestock and Cash Grain regions in Fig. 1. Economic Subregion 87, in the northwestern part of the Corn Belt, exhibits marginality in that dairying, wheat growing and general farming all feature with corn growing in an area where corn has only recently become important as hybrid forms have allowed the crop to penetrate into more northerly areas.

This agricultural development in the Corn Belt has gone on in an area where the increase in manufacturing enterprises and urban growth have been marked in recent years.¹ In 1960 the total population of the region was 17.2 millions (17,169,930) of which only 42.1 per cent (7,226,133) were classed as rural (Table II). Only 38.7 per cent of these were counted as members of the farm population. The total rural population

1. For a comprehensive study of the demography of the Corn Belt up to the situation at the time of the 1950 census see, Thompson, I.B., The Demography of the Corn Belt of the North American Middle West. Unpublished Ph.D. Thesis, University of Durham 1961. Also "The Genesis of the Population Structure of the Corn Belt". Tijdschrift voor Econ. en Soc. Geografie 54 (1963), pp. 106 - 110.

rose between 1950 and 1960 as a result of the increase in the rural non-farm population which compensated for a decline in the number of farm persons.

The 10 million urban persons lived in 21 standard metropolitan areas, each containing at least 50,000 persons, over 100 cities of more than 10,000 inhabitants and an even greater number of smaller towns of at least 2,500 persons each. The urban population made up a greater part of the total population in the eastern and central Corn Belt than in the west with the exception of E.S.85 which included Kansas City. These well scattered urban places have manufacturing or processing enterprises so that the whole Corn Belt economy is a mixture of agriculture and industry with many of these towns also acting as marketing centres for the farming population. Many of the industries in the larger cities now also serve national and international markets. Forming another "stratum" in this pattern of an even scattering of farm persons with many peaks of urban agglomerations, are the many thousands of small rural service centres which are dotted across the agricultural landscape at a few mile - intervals from each other. From a census viewpoint these have less than 2,500 inhabitants each, and are therefore classed as rural although almost entirely composed of non-farmers. Their inhabitants comprise much of the rural non-farm population. These centres largely function by meeting the more immediate needs of the surrounding farm population which is dispersed across the surrounding land.

With this basic information in mind each of the Economic Subregions can be described in so far as their physical, agricultural, economic and cultural features have a bearing upon the rural settlement in each area. It is convenient to divide the Corn Belt into eastern, central and western parts. Relevant data on each subregion are presented in Tables III, IV, V and VI.¹

The Eastern Corn Belt

The Eastern Corn Belt is composed of the three Economic Subregions 47, 48 and 51 which cover the western part of Ohio and most of Indiana apart from its south-eastern and north-western corners. A few counties in Kentucky bordering the Ohio River, some south-eastern Illinois counties along the Wabash River and a few counties in southern Michigan are also included. The area concerned is shown in Fig. 3.

All of the Eastern Corn Belt was glaciated at some time in the Pleistocene but the southern parts were not covered by the Wisconsin age advance. The physiography is varied but the main feature is an undulating till plain at 500 to 1500 feet above sea level which is composed

1. Data calculated from the 1954 Census of Agriculture and taken from Bogue and Beale was used to compile these tables. Comparable data from the 1959 Census was not published and the 1964 Census was not available by early 1965.

of glacial materials which completely bury the pre-existing topography of central Indiana and Ohio. In northern Indiana, northern Ohio and southern Michigan lines of terminal and recessional moraines, spillways and old lake beds are a common feature in E.S. 48. Further south in E.S. 47 the drift is older and less broken by moraines so that drainage lines have been able to re-establish themselves. Here, unlike the area to the north where the ridge and swale topography has influenced the siting of settlement to some degree, the flatter topography has exercised little influence on the settlement pattern which is dominated by the means by which the land was disposed to farm settlers. Further south again the topography becomes more hilly at the furthest reach of the glacial advances although the unglaciated and more rugged hill lands of southern Indiana and southern Ohio lie beyond the southern borders of the Corn Belt. The lower Wabash valley (E.S.51) forms a southern extension of the corn, hog and wheat economy on the flat broad floor of the flood plain, but on the poorer hill lands to either side land use and the settlement pattern are more typical of the general farming areas of southern Indiana and southern Illinois.

The Eastern Corn Belt is also marked by a diverse history of settlement. It was the first part of the region to be occupied by the northward movement of pioneers from Kentucky and by migrants moving west across the Appalachians and especially from Pennsylvania. The southern parts of the Eastern Corn Belt were settled in the early 1800's several

TABLE III The Eastern Corn Belt: Selected Agricultural
Data, 1954.

	Economic Subregions		
	47	48	51
Number of farms	89,086	95,609	38,225
Average Size of farms (acres)	129	126	135
% land area in farms (1)	90.3	90.4	81.9
% farmland in crops (1)	76.3	75.7	73.0
% cash grain farms	33.5	41.6	41.7
% livestock farms (except dairy and poultry)	39.4	19.1	29.4
Average level of living index	178	170	149
Average value of land and buildings per acre (dollars)	263	211	133
% tenant farmers	29.1	23.2	19.3
% part-time farmers (2)	29.8	30.9	31.6
% high-income commercial farmers (3)	29.7	23.0	16.7

1. 1950 data.

2. Commercial farmers who worked 100 days or more off the farm in the previous year.

3. Economic Class I or II farms.

Source for Tables III - VI: Bogue and Beale op. cit. p. 134 and U.S. Department of Commerce, 1954 Census of Agriculture, Vol. I. various tables.

decades before its northern parts. The Ohio River formed a migrant route from Pittsburgh to the south-west and the early settlers occupied the valleys of southern Ohio and southern Indiana where rivers drained into the Ohio. Most of the pioneers reached these sites by moving from the Ohio River into these tributaries on rafts although overland travel later became more important. Riverside sites provided water supply, game and some protection from the Indians as well as potential mill sites and land suitable for subsistence farming. As the choice valley lands were filled up some settlers went into the southern hills but the settlement of these is outside the scope of this study.¹

The central and northern parts of both Ohio and Indiana and the southern counties of Michigan were not settled until after 1830. Indian control of these areas was only relinquished in the immediately previous years and even then marshes and lakes in parts hindered settlement. The low porterages between the south flowing rivers and streams flowing into the Great Lakes had aided the exploration of these areas but their actual settlement was not fully underway until the Erie Canal was opened. This allowed migrants to come in by a direct route from the east. By 1840 all Ohio had been freed from Indian control and only the northern western part of Indiana was still held. Settlers spread across the area

1. The writer has considered certain aspects of the settlement of parts of these hill lands south of the Corn Belt in Rural Housing and Settlement in Southern Indiana with Reference to Selected Townships. Unpublished M.A. thesis, Indiana University, 1961.

rapidly but several of the ill-drained northern areas were not settled until the second half of the century, when artificial drainage schemes were completed.

The Eastern Corn Belt, both in its physical and settlement characteristics divides into three parts. A northern part has a landscape made up of moraines and low-lying, often swampy areas, many of them being settled at a late date. In the centre the topography is more rolling and the soils well drained. This area was largely settled by mid-century with the northward movement of persons from southern Indiana and Ohio as well as by new migrants from the east. The hill and vale lands of the southern parts of Indiana and Ohio were settled earlier than other parts of the Eastern Corn Belt. The overall density of rural settlement was higher than to the north and this contrast remains in spite of the poorer farming conditions in the south. The lower productivity, the importance of crops other than corn and the tendency for land to revert to non-farm uses in the Wabash Valley section of the Eastern Corn Belt make that area less typical of much of the Corn Belt.

Subdivisions of the Eastern Corn Belt

Economic Subregion 48, the most northerly of the three subregions of the Eastern Corn Belt stretches across northern Ohio, northern Indiana and southern Michigan. It is physiographically a mixture of swamp lands and morainal sand ridges. These have had a marked influence upon the layout of rural settlement by tending to align roads and farmsteads.

along the drier ridges. Also the farming systems are locally varied because of the soil variety found under these conditions. Corn, oats and hay are the usual crop combination but special crops are grown and dairy cattle are also kept on some farms. The presence of large urban populations nearby encourage farming diversifications.

The part of the subregion in Ohio (Ohio S.E.A.1) is composed of an area largely drained by the Maumee River and which was once covered by the Black Swamp. Settlement did not occur until the 1880's when artificial drainage was implemented long after surrounding areas had been taken up. The district remains predominantly rural today and lacks large towns. The drained muck soils in the depressions are mainly used for special crops like sugar beet with cash grains and soy. On the ridges which run across the area and represent the old beach lines of Lake Erie, more land is sloping and kept in pasture or hay to supply milk to the urban markets of Cleveland and Toledo.¹

The sand ridges are carried across the state border into Indiana (Indiana S.E.A. 3) and Michigan (Michigan S.E.A. 9a and 9b), but in both cases they cover a proportionately larger area and so reduce the amount of lower land between. Several parts of the intervening lower land are

1. Further details of this and other State Economic Areas are obtainable in Bogue and Beale, op. cit., p. 480ff. The S.E.A. numbers used in the following account are those devised in 1950. Some were re-numbered for the 1960 Census.

still dotted with lakes as a result of the glacial interruption of drainage. The greater amount of ridge land and the increased relief of the ridges has tended to favour livestock and pasture enterprises rather than cash crops since farm operations must be planned to keep soil in place on the sloping land. Average farm size is low. It was only 126 acres in the whole subregion in 1954 and a few acres less in the areas under consideration. This is partly because of the growth of part-time and residential farms in the vicinity of urban places like Kalamazoo.¹

Forming an area comparable to the Maumee-Black Swamp part of Ohio is the Kankakee-Tippecanoe area of northern Indiana (Indiana S.E.A.2a). This land was also settled late after artificial drainage of the muck soils.² Farms are rather larger as a result, averaging 147 acres. Specialist farming, including poultry and truck enterprises, rivals livestock and dairying with the Chicago metropolitan area only 25 miles away. Part of the reason for the larger average farm size is also to be found in the prairie area in the west which is the only extensive prairie in Indiana.³ Cash grain farms predominate in this part. Although average

1. Hill, E.B. and Mawby, R.G., Types of Farming in Michigan. Michigan State College Agric. Experiment Station Bulletin 206, East Lansing, 1954 p. 31.

2. Perkins, W.L., "The Significance of Drain Tile in Indiana". Economic Geography, 7(1931), pp. 380 - 389.

3. Robertson, L., Hicks, J.W., Young, E.C., Types of Farming in Indiana. Purdue University Agric. Experiment Station Bulletin 628, Lafayette, 1955, p.22.

farm size in the whole subregion is small compared with much of the Corn Belt, farm levels of living are up to the Corn Belt average. These two factors, which together considerably influence the high density of farm settlement and the good quality of farmhouses and farmsteads, are in large part the result of the presence of local urban populations peripheral to the subregion, and Kalamazoo and Fort Wayne which lie within the subregion. The proximity of Chicago, Detroit and Toledo enhance the value of farmland, direct farm enterprises towards meeting some of their requirements especially in general farming and, at the same time, introduce a large number of part-time farmers and smallholders who gain part of their income in urban employment. The presence of these urban-industrial employment opportunities also gives the full-time farmer and members of his family a chance to engage in ~~nonfarm~~ work.

Economic Subregion 47 lies to the south and covers south-western Ohio and central Indiana. It includes lands in the middle sections of the southward-draining rivers so that the rather greater dissection of the glacial tills has produced a rolling landscape without major drainage problems, although the soils are slightly leached and podzolic and not the most fertile in the Corn Belt. Some areas like the Tipton Till Plain (Indiana S.E.A.4 and 5) are less dissected and the general characteristics of farm enterprises and the rural landscape are indistinguishable from areas to the north in E.S. 48. Other areas are more dissected and the soils are more leached as well as the drift being thinner. Winter wheat,

hay and hogs are the basis of most farming programmes so that many farms are classed as livestock enterprises but rotations and pasture are employed to counteract the tendency for soils on the slopes to wash. Corn is, however, more important than in E.S. 48 and dairying less important. The same type of farming is found in the Scioto and Miami valley areas of Ohio (Ohio S.E.A. 3) two of the earliest settled parts of the Corn Belt. Farm size increases westwards in the rolling lands of the Wabash River Valley (Indiana S.E.A. 2b) where more land must be kept under grass. The average farm size for the whole subregion was 129 acres in 1954 but it was 156 acres in S.E.A. 2b. Rural settlement is dense in most parts of the subregion with the small average farm size and also considerable numbers of **nonfarm** persons living outside of the subregion's towns. Topography is too gentle to exercise much influence on the siting of farms and roads so that the pattern is close to the regularity imposed by the rectangular system of survey and land disposal. The urban centres include the state capitals of both Indiana and Ohio and, in the latter case, Columbus is joined to the manufacturing centres of Dayton and Hamilton. About a fifth of the farms are classed as non-commercial as a result of much nonfarm employment for farmers which also helps to account for the small average farm size. Farms are highly mechanized, however, and farm incomes are high.

A tier of counties along the southern edge of the subregion lie at the limit of the Wisconsin glacial cover. In this area more hilly

topography is found and the farming is more transitional to the general hill farming conditions of southern Indiana and Ohio. This increasing relief affects the pattern of farm settlement as the road layout breaks away from the survey lines in order to find easier gradients along the ridges. Farm buildings are sited on the level ridge or valley lands. More land is under woodland or pasture.

Economic Subregion 51 is very different to the two other subregions in the Eastern Corn Belt. Its farming characteristics make it transitional to general farming areas outside of the Corn Belt and its settlement and housing characteristics are comparable to other southern fringes of the region. The subregion is centred on the flat lands of the Wabash Valley (Indiana S.E.A.6 and Illinois S.E.A.9) but the hill lands to either side are also included, as well as the valley and hill lands in the area of Kentucky at the confluence of the Wabash with the Ohio River (Kentucky S.E.A.2).

Corn, wheat and soy are predominant in the programmes of farms on the valley floor and along the White and Green Rivers which are tributary to the Ohio and Wabash. These farms are generally prosperous but most counties include areas of sand and gravel ridges and hill borders with planosols where farming conditions are distinctly poorer.¹ No system of farm

1. Cross A.J., and Wills, J.E., Organization and Operation of Farms in the Claypan Area of Southern Illinois with Special Reference to Wayne County. University of Illinois Agric. Experiment Station Bulletin 579, Urbana, 1954. This report gives an indication of farming conditions in a similar planosol area.

specialization has developed in these areas and their effect is to lower the overall level of farm living in the whole subregion. Nearly twice as much land is out of farm use in this subregion compared with others in the Eastern Corn Belt. The Kentucky area is the poorest of the three with a high proportion of negro farmers.

The subregion is also lacking in urban centres or other nonfarm employment opportunities, with the exception of Evansville and Terre Haute both of which experience heavy unemployment. Urban areas have suffered population losses in recent decades at the same time as rural population has decreased. Part of the causes of these declines has been the changes in the coal mining industry of the region which has been mechanizing and contracting in size. Much land has been lost to strip-mining. Many farmers who found part-time work in the coal industry lost their extra source of income and have been thrown back on to farming or have left the district altogether. Other types of industry have been slow to develop and further farm enlargement and some farm abandonment can be expected as this area increases its farm mechanization. Farmland values and farm incomes are lower than in the rest of the Eastern Corn Belt.

The Central Corn Belt

The Central Corn Belt lies astride the Mississippi Valley and includes the major portion of the Corn Belt stretching from the Indiana-Illinois border to the western part of Iowa. On the south it includes northern and central Missouri and reaches into south-western Minnesota in the north. It includes the six Economic Subregions of 63,70,86,69,71 and 84. In subregions 71 and 84 in Missouri and eastern Kansas and E.S. 69 along the northern edge of the central Corn Belt, corn is less dominant in the farming enterprises and other characteristics, associated with areas peripheral to the Corn Belt, affect the farming types. The area of the Central Corn Belt and its northern and southern borders is shown in Fig. 4.

Most of the central and northern parts of this vast area is made up of prairie land of slightly rolling topography developed on a thick layer of glacial drift and associated materials which mask the pre-existing topography. These lands were mainly taken up by the middle of the last century after a delay because of the difficulties of ploughing the prairie sod, making farming pay and shipping in timber. The prairie edges were being settled in the 1830's and settlement spread into the inner prairies in the following years.

Conditions are well suited to cash grain farming on large, highly mechanized farms which are common in the Illinois and Iowa prairies

(E.S. 63 and 86 respectively). A more dissected area lies between these two prairies along the borders of the Mississippi River and its tributaries and here in E.S. 70, where more sloping land must be kept under pasture to protect it from erosion, livestock feature more prominently in the farm enterprises.

The two prairie areas can be considered first. Economic Subregion 63 covers the Grand Prairie of east-central Illinois which is one of the most prosperous farming areas in the Corn Belt. Much of the district is flat or gently rolling with a deep fertile prairie soil (brunizem) cover with patches of less fertile podzolic soils. In spite of misuses of these lands by the early farmers, little soil erosion or exhaustion resulted. Corn and small grains are raised over the whole area and are mainly sold off the farms. 86 per cent of the farmland was being cropped in 1954 and two-thirds of the farms were classed as cash grain enterprises (Table IV). The growth of this cash grain economy is well suited to the soils and the topography which allow the extensive use of machinery. The economy also reflects the relatively late settlement of the poorer drained prairies when land speculation and the high cost of land improvements caused many farmers to find themselves tenants rather than owners. Cash grain farming is amenable to tenant operation since it allows share cropping and frees the tenant from a heavy outlay on stock and their buildings. About half of the farms are tenant-operated but there appear to be no obvious differences between tenant and owner-

TABLE IV The Central Corn Belt: Selected Agricultural
Data, 1954.

	Economic Subregions		
	63	70	86
Number of farms	51,936	69,450	59,586
Average size of farms (acres)	197	174	188
% land area in farms (1)	91.6	93.7	96.8
% farmland in crops (1)	86.0	73.5	85.1
% cash grain farms	70.9	22.2	38.6
% livestock farms (except dairy and poultry)	16.9	65.1	40.7
Average level of living index	187	190	191
Average value of land and buildings per acre (dollars)	336	228	238
% tenant farmers	51.7	39.9	46.5
% part-time farmers (1)	13.9	12.5	7.5
% high-income commercial farmers (1)	48.6	39.6	41.4

(1) See Table III.

operated farms and farmsteads in the area.

In the northern part of the subregion (Illinois S.E.A. 5) the Kankakee Plain is largely made up of poorly drained fluvio-glacial and lacustrine materials while the Bloomington Ridged Plain is an area of broad morainic interfluves and ill-drained belts which have been artificially drained. Like the comparable Kankakee-Tippecanoe area in Indiana, this part of Illinois was settled later than surrounding parts. Since improvement were made, however, land values have risen continuously and kept tenancy rates high. Over half of the cropland is under corn in any one year.

The main part of the Grand Prairie lies to the south in Illinois S.E.A. 6a and 6b. These areas are bounded on the south by the Shelbyville Moraine which marks the southern extension of Wisconsin glaciation in Illinois and serves to divide the fertile level lands of central Illinois from the less fertile hill lands of southern Illinois. The western part of the prairie (Illinois S.E.A. 6a) was cut by tributaries of the Missouri River such as the Illinois and others which brought the first settlers into the central parts of the state. From here they could spread out into the less accessible eastern and northern parts.¹ In both of these areas of the Grand Prairie cash grain is also dominant but

1. Ross, R.C. and Case, H.C.M., Types of Farming in Illinois. University of Illinois Agric. Experiment Station Bulletin 601, Urbana, 1956, p.45.

erosion is more of a problem on the sloping land in the west where more pasture is found. Illinois S.E.A. 6b to the east is flatter and more of the land has been drained.¹ The southern counties in the two areas are more rolling as a result of the morainic deposits and are transitional to the more hilly counties in the southern parts of Illinois.

Land values in all these central Illinois counties are high along with high rates of tenancy. Farm incomes are sufficient not to require a supplementary off-farm income, although a proportion of farmers do find additional work in Peoria and Springfield and the many small towns which are regularly spaced out along the main highways and railways. Average farm size in the subregion was moderately large at 197 acres in 1954. With nearly all the land in farms and few physical obstacles to land use and settlement the pattern of farmsteads and roads is remarkably uniform under the influence of the method of rectangular land survey by which the land was divided up.

Economic Subregion 86 in northern Iowa and south-western Minnesota represents, at the western end of the Central Corn Belt, the area comparable to the Illinois Grand Prairie. This is the Iowa Prairie where a late sub-stage (Mankato) of the Wisconsin sheet spread south and laid out level tills on which have developed deep brunizem soils. This is also

1. A brief study of a small part of this area is Rose, J.K., "The Delavan Prairie; An Illinois Corn Belt Community". Journal of Geography, 32 (1933), pp. 1 - 13.

an intensive cash-grain farming area with highly mechanized farms of an average size of 188 acres, but livestock are more important than in the Illinois prairie because the climate is too severe to suit corn other than for its production for feed purposes. This was a last part of Iowa to receive settlers owing to its westerly position and the need to install artificial drainage in many areas.¹ The tributaries of the Mississippi in this area, principally the Des Moines in the south and the Minnesota in the north, have not fully re-established drainage over the whole subregion so that much swamp and pond drainage had to be undertaken between 1880 and 1915 before the settlement of the area could be completed. By this time the rail network was fully established as a further aid to the development of new areas of cultivation. Before drainage, settlements had been confined to valley sides and the higher and better drained knolls.

As in the corresponding part of Illinois, tenancy rates are high along with the high land values and intensive production of cash grains, but the subregion does not quite match the Illinois area in any of these respects. Even so, farm levels of living are among the highest in the Corn Belt. Livestock are more important in the northern part of the subregion where Minnesota S.E.A. 8 and the northern tier of

1. For a study of the probable extent of the wet prairie and its occupance with reference to Iowa see Hewes L., "The Northern Wet Prairie of the United States: Nature, Sources of Information, and Extent". Annals Assoc. Am. Geogs. 41 (1951), pp. 307 - 323.

counties in Iowa (Iowa S.E.A. 2a) are very similar with livestock providing over 50 per cent of the farm income.¹ This part of the subregion has remained very rural until the present with farms generally larger than in the southern part of the subregion and few urban centres. Settlement occurred late and largely with the influx of persons from central and northern Europe.²

The southern part of the Iowa Prairie (Iowa S.E.A. 2b) is less noted for its livestock than for its cash grains but altogether this subregion is agriculturally more diverse than the Illinois cash grain region in view of its greater cattle and hog interests. Off-farm employment opportunities are less than in Illinois with Des Moines being the only city of any size on the southern edge of the subregion. With these rural conditions and few rural nonfarm persons living in the open country, farm settlement patterns are very regular with only the occasional interruption of a slough or lake diverting a road line or displacing a farmstead location.

The area of west-central Illinois and eastern Iowa between the Illinois and Iowa prairies falls into Economic Subregion 70. This is one of the richest farming regions in the Corn Belt and, indeed, in the

1. These two areas make up the livestock-dominated type of farming area which the USDA map separates from a cash grain region covering the southern part of this subregion. See Figs. 1 and 2.

2. Jehlik, P.J. and Wakeley, R.E., Iowa Urban and Rural Migration. Iowa State College Agric. Experiment Station Research Bulletin 407, Ames, 1954, p. 78.

whole nation. These lands bordering the Mississippi River and its tributaries are gently rolling but become well dissected closer to the main lines of drainage. The upland prairie was divided up by wooded valleys. Much of the drift material is older than in the two major prairie areas to either side so that the soils on this material are more leached and need good management with crop rotations in order to maintain their fertility. The loess deposits in the area similarly need care to prevent their erosion. Under these conditions cash grain farming gives way to a balanced programme based upon the production of feed grains notably corn which takes up about 50 per cent of the cropland. These are fed to hogs and beef cattle although dairying is locally important.

This subregion was settled in the middle years of the last century before much of the Illinois prairie and any of the Iowa prairie were taken up. It was the first part of Iowa Territory to be opened up in the 1830's and most of it was filled within 30 years. Most of the early settlers were from further east in the Mid-West or from the Atlantic Seaboard, but Europeans formed a second wave which came later and took land being sold off by farmers and land speculators. The first settlers took the wooded, lighter podzolic soils in the valleys but they were soon expanding on to the prairies which were settled here sooner than the larger ones in Illinois. With these smaller prairies the sod was less tough for ploughing and the soils better drained. Timber was nearby and could be supplied from woodlots which farmers maintained in

the valleys.

The parts of the subregion in Iowa (Iowa S.E.A. 5 and 6) have a high percentage of land under cultivation with corn taking up about half of the cropland. But livestock is the main source of farm income and dairying becomes important closer to the rivers, where more land is sloping and under grass. It is closer also to urban markets like Davenport, Rock Island and Moline located along the Mississippi.

In the Illinois section of the subregion (Illinois S.E.A. 3) livestock forms the main income again and only 21 per cent of the farms were classed as cash grain enterprises.¹ Farm size in 1954 was slightly larger in this area being 187 acres on average, compared with 174 for the whole subregion. This is in part due to the presence of the Sangamon Prairie Plain where flatter conditions favour more cash grain farming. Some farmers in this district bring in western cattle to absorb their feed surpluses.

Tenancy rates are high in the subregion accounting for 40 per cent of the farms. Apart from good farm incomes, farm levels of living are boosted by the presence of several manufacturing towns on the Mississippi and further west in Iowa which provide some off-farm employment. The southern edge of the subregion becomes more dissected and grades into

1. Ross and Case, op. cit. p.42.

the hilly conditions typical of Economic Subregion 71. The rolling character of much of the topography, and the presence of river valleys, upsets the neat patterns of farm settlement seen in the Illinois and Iowa Prairies. Instead, roads have to take account of river crossings and gradients and irregular farm boundaries, but the density and scattering of the farmsteads is little affected by these factors.

Central Corn Belt Borders

Two subregions to the south and one to the north, which are transitional in agricultural and other characteristics to areas outside of the region, can be conveniently considered here as bordering parts of the Central Corn Belt. Economic Subregion 71, one of the largest subregions, appears transitional since corn is a less dominant crop in the typical farm programme and the proportion of land devoted to pasture is high. Only 59 per cent of the farmland was in crops in 1954 (Table V). Beef cattle also replace hogs as the main form of livestock, and fattening becomes less important than grazing further south. Farms are of moderate size but provide less income and are less mechanized than in subregions to the north.

TABLE V The Central Corn Belt Borders: Selected
Agricultural Data, 1954.

	Economic Subregions		
	71	84	69
Number of farms	100,233	36,150	84,684
Average size of farms (acres)	192	206	171
% land area in farms (1)	91.3	91.3	94.6
% farmland in crops (1)	59.0	54.7	72.1
% cash grain farms	22.4	22.0	18.2
% livestock farms (except dairy and poultry)	56.6	36.9	41.6
Average level of living index	160	149	185
Average value of land and buildings per acre (dollars)	106	72	171
% tenant farmers	23.2	19.7	36.3
% part-time farmers (1)	17.5	23.6	10.1
% high income commercial farmers (1)	15.7	9.7	30.9

(1) See Table III.

This subregion includes a part of west-central Illinois, northern Missouri and part of southern Iowa. The topography is more rolling than in the prairies to the north since it is developed on land which suffered earlier glaciation and later dissection. Most of the soils are silty loams some of which are leached and others are planosols with subsoil conditions which impede drainage. Land use is less intensive with lower crop yields per acre and more land is left under wood which, with prairie areas, formed the original vegetation. Some land which was early misused suffered erosion and was returned to non-crop uses.

In the part of the subregion in Illinois (Illinois S.E.A. 4), up to one half of the land in each county is under pasture at any one time and corn only occupies between 30 and 40 per cent of the cropland area. Dairying also becomes locally important around St. Louis but there are no other large centres in the subregion. Ottumwa, Hannibal and Quincy in no way rival the centres further north and east and provide little off-farm employment for members of farm families.

In Missouri the eastern Prairie and River Hills section (Missouri S.E.A. 2b) is an area of wooded valleys and interspersed prairie.¹ Timber was cleared in an early phase of settlement but much of this land has now gone down to pasture. A considerable area of bottomland exists

1. Collier, J.E., Agricultural Atlas of Missouri. University of Missouri Agric. Experiment Station Bulletin 645, Columbia, 1955. p. 16.

along the Mississippi and Missouri Rivers. Some is drained and given over to grain production but much remains unsuitable for cultivation especially between the Mississippi and Illinois Rivers. Early settlement generally avoided these poorly drained areas.

The topography becomes more rolling in central Missouri (Missouri S.E.A. 2a) where the soils are shallower and encourage their use for livestock pasture. Better soils for grains are, however, found in the western counties.¹ The two parts of the subregion in Iowa display much the same characteristics and provide a contrast to the cash grain areas which lie immediately to the north in E.S. 86. This part of Iowa was settled from Missouri in the 1830's and 1840's several decades before areas of prairie to the north, and the soils have suffered depletion as a result. In Iowa S.E.A. 3b the average values of farmland are only half of what they are in other parts of Iowa indicative of the lower returns it yields. There has been marked out-migration of farm persons as a result of farm mechanization and consolidation. Most of these persons have left the area entirely since there are few employment opportunities in the towns which have grown very slowly. Without this urban market, dairying has not developed in an area where the environmental conditions are well suited. Iowa S.E.A. 3a lies a little further north

1. Miller, M.F., Some Important Features of Missouri Agriculture. University of Missouri Agric. Experiment Station Bulletin 596, Columbia, 1955, p. 10.

than Iowa S.E.A.3b and has less dissected topography. More land is put under corn each year and conditions are more akin to the cash grain areas to the north with the result that farm levels of living are higher than elsewhere in the subregion.¹

The relief of the subregion increases southwards towards the Ozark uplands and the amount of wooded land also becomes greater with natural prairie openings forming only small enclaves. With average farm size running at 192 acres for the whole subregion, the density of farmsteads is fairly typical of the central parts of the Corn Belt but the diversity of the topography and the presence of woodland areas means that their scattering is less even and the road network far from regular.

Economic Subregion 84 lies astride the northern part of the Missouri-Kansas border and edges the Kansas wheat belt and the Ozark area to the south. Like E.S. 51 in the Eastern Corn Belt this subregion forms a second small, southern transitional area of relatively low farm incomes. Less intensive cropping, low land values, lower rates of tenancy and a slowness to develop farm mechanization are also characteristics which the subregion shares with the southern fringe of the Corn Belt.

Much of the subregion is composed of an undulating prairie dissected by tributaries of the Missouri River. The southern part was not

1. A brief description of one township in this area is by Renner, G.T., "A Geographical Survey of Iowa". Economic Geography, 10 (1934), pp. 297 - 301.

glaciated and here the topography is rough and soil erosion fairly widespread. Even in the north the glacial cover is thin. As a southern area it was settled at an early period. Pioneers entered the Missouri part of the region in the 1820's but the Kansas portion was not settled before the 1850's. The French traders had settled at points along the Missouri River at an even earlier date and examples of their influence are still to be seen. Most of the American settlers came from Missouri, Kentucky and other southern areas and included a proportion of negroes. Livestock are the main source of farm income with 45 per cent of the farmland in the subregion under pasture and corn only accounting for a third of the cropland area. Farms averaged 206 acres in 1954 being considerably larger on the Kansas side of the river (Kansas S.E.A. 7a) than on the Missouri side (Missouri S.E.A. 3) as a result of the later settlement to the west. Migration has occurred from the farms over the past 60 years and has removed many of the smaller, low income units but the subregion rivals the Wabash Valley (in the Eastern Corn Belt) as the area of the Corn Belt where farm levels of living are lowest. Few towns exist in the subregion to allow farmers to supplement their incomes or to absorb the surplus farm population.

Economic Subregion 69 forms an elongated northern border to the Central Corn Belt. It stretches roughly between Chicago and Minneapolis and includes counties in north-western Illinois, south-western Wisconsin, north-eastern Iowa and south-eastern Minnesota. Most of the land is

more rolling than in the subregion immediately to the south. This condition is the result in some instances of land escaping the effects of the Wisconsin cover as in the driftless area of Wisconsin and northwestern Illinois. In other areas the Wisconsin cover was only thin and had a less complete effect leaving a drift and loess-covered knoll topography. In the part of the subregion in Iowa (Iowa S.E.A. 4) much of the glacial drift is coarse so that the soils derived therefrom are as well kept under pasture as ploughed. Wooded belts are also common. In the Minnesota section of the subregion (Minnesota S.E.A. 7) several ill-drained areas are found. As a result of these limitations on land-use, the shorter growing season which prevents the proper maturing of corn, and the settlement of many West and Central Europeans, the agricultural systems on farms in the subregion are transitional between those of Corn Belt areas to the south and the dairying areas of Wisconsin and Minnesota to the north.¹ In fact the U.S. Department of Agriculture prefer to include a major part of the subregion in the dairying area in their 1950 regionalization of farming types. 16 per cent of the farm income of farmers in the subregion comes from dairying and this rises to 39 per cent in the Wisconsin part (Wisconsin S.E.A. 3). Nevertheless corn still takes up 40 per cent of all cropland which justifies the

1. Nelson, L., Ramsey, C.E. and Toews, J., A Century of Population Growth in Minnesota. University of Minnesota Agric. Experiment Station Bulletin 423, Minneapolis, 1954, p. 18.

inclusion of the area in the Corn Belt. The combination of pasture, corn and forage production also supports beef and hog production.

The eastern part of the subregion (Illinois S.E.A. 1) was settled in the 1830's with the aid of the node of settlement which had earlier developed around the mining area at Galena and which spread settlement into the rest of the driftless area.¹ Later settlers included Danish, Swiss and Scandinavians who came mainly in the 1860's once the railway had brought the southern parts of Wisconsin and Minnesota within easy reach.² These people brought their knowledge of dairy production with them although there was little attention to this type of farming until they were forced to give up wheat farming by the opening up of the Great Plains wheatlands.³ Rates of tenancy have never been very high since tenancy is incompatible with the large investments in stock. Farms tend to be smaller than in much of the Central Corn Belt (averaging 166 acres in 1950 and 171 in 1954), although they are well cared for and provide good incomes so that farm levels of living are high. These

1. Trewartha, G.T., "A Second Epoch of Destructive Occupance in the Driftless Hill Land, 1760 - 1852: Period of British, Spanish and Early American Control". Annals Assoc. Am. Geogs. 30 (1940), pp. 109 - 142.

2. Hagood, M.J., and Sharp, E.F., Rural Urban Migration in Wisconsin. University of Wisconsin Agric. Experiment Station Bulletin, 176, Madison, 1951, p. 10.

3. Durand, L., "Dairy Region of Southeastern Wisconsin and Northeastern Illinois". Economic Geography, 16 (1940), pp. 416 - 428.

incomes tend to be highest at the eastern end of the subregion closer to the main market for milk in the Chicago area and closer also to such towns as Rockford which can provide some off-farm employment. The presence of these urban markets and centres of employment undoubtedly help to account for the prosperity of this northern border in contrast to the southern Corn Belt fringe. Further from Chicago more of the milk is turned into cheeses and the cheese plant, often situated at a cross-road position, adds a further element to the rural settlement pattern. Since the topography is undulating to hilly in this subregion, the pattern of roads and farmsteads is less regular than on the flatter prairies further south. Roads seek to avoid ill-drained patches, and farmsteads, though still well separated from each other, tend to cluster between areas of woodland or cutover.

The Western Corn Belt

The Western Corn Belt consists of Economic Subregions 85, 87, 92, and 93. Here, insufficient rainfall in the growing season is a primary factor reducing corn yields. Other crops, like wheat and sorghum, become important and eventually replace corn beyond the limits of the western Corn Belt. In Minnesota, dairying and general farming increase in importance towards the northern edge of the Corn Belt. Since corn yields

vary greatly from year to year according to rainfall conditions, most farmers beyond the Missouri and on the western margins of the region tend to understock with cattle and hogs in order to avoid buying feed in times of shortage. Instead, they prefer to sell surplus grain to farms further east.

Topographically the Western Corn Belt includes the lands bordering the Missouri River and its main western tributaries, the Platte and Republican. Much of the region is flat or undulating prairie, although it becomes more dissected closer to the rivers. Loess covers extensive areas. Major features of the Western Corn Belt are shown in Fig. 5.

Settlement occurred at a late period in this subregion which was the last part of the Corn Belt to be occupied. Most of the migrants came when the railways reached across the Missouri River from Iowa, although some came across Iowa by wagon or stage and some settled in riverside areas after coming up the Missouri to Kansas City, Sioux City and beyond by boat. Most settlement in the region is therefore well under 100 years old and its pattern closely follows the section lines of the township and range survey which had been well tried and tested by this time. Most of the settlers were from more eastern parts of the Corn Belt with a proportion from central Europe. Although some parts were not entered until the 1880's, settlement was virtually complete by 1910.

TABLE VI The Western Corn Belt: Selected Agricultural
Date, 1954.

	Economic Subregions			
	85	87	92	93
Number of farms	124,697	31,571	43,978	37,269
Average size of farms (acres)	193	263	390	342
% land area in farms (1)	94.2	96.3	96.5	95.5
% farmland in crops (1)	76.4	79.6	59.1	64.5
% cash grain farms	26.3	42.4	24.4	56.0
% livestock farms (except dairy and poultry)	54.6	24.8	55.2	24.2
Average level of living index	179	166	168	172
Average value of land and buildings per acre (dollars)	173	97	72	88
% tenant farmers	39.4	31.4	36.5	38.0
% part-time farmers (1)	14.2	5.8	7.1	9.0
% high income commercial farmers (1)	28.4	20.7	19.3	21.0

1. See Table III.

Farms in the region have always been larger than in other parts of the Corn Belt in order to counteract the effects of lower yields under difficult climatic conditions. But farm out-migrations have been widespread since the period of settlement in the latter part of the last century, indicative of the fact that the units of settlement have not been large enough to allow farm families to support themselves at a reasonable standard. Farm mechanization has further aided continued farm consolidation to a point where average farm size in the two western subregions is now well over 300 acres. This means that the density of farmsteads is much lower than in subregions already considered and the road network becomes more open. The amount of land under crops at any one time is also lower.

Economic Subregion 85 is the most easterly of the four western subregions and as such it retains many of the characteristics of the Central Corn Belt. Farm size is only equal to the Corn Belt average. Livestock are the main enterprise on most farms to a much greater extent than in other western areas and cattle and hogs are brought in from western areas for feeding as in other parts of the Central Corn Belt. The subregion lies astride the middle Missouri Valley with its fringe of fertile soils derived from loess. These prairie brunizems are especially thick on the Iowa side, but they are easily eroded under crops so that a system of farming based on keeping a proportion of sloping

land under grass has developed. Even so, three-quarters of the farmland in the subregion is cropped.

In the Iowa part of the subregion (Iowa S.E.A. 1a and 1b), hog and cattle fattening is the dominant type of farming and several of the Missouri-side towns are noted for the stockyards where plains-reared cattle are transferred to fattening farms further east as well as to farms in the Iowa part of this subregion. In the northern of the two areas (Iowa S.E.A. 1a) conditions are ideal for the livestock and corn economy. This was a last part of the state to be settled being taken up in the 1870-1880 period. By this later settlement the area was able to avoid the development of many small and basically uneconomic farms as well as a proliferation of small service centres as occurred in more easterly parts of the Corn Belt. In recent decades there has been a loss of farm population as farms have grown larger and more mechanized, although they are not as large as those in that part of the subregion west of the Missouri River. There are few part-time farmers to reduce the average size of holding with few off-farm employment opportunities. The quality of the farming conditions, however, enable high farm levels of living and in 1954 this area had the highest levels of any State Economic Area in the Corn Belt.

In Iowa S.E.A. 1b to the south, the soils are generally lighter and more liable to loss of fertility. A similar livestock and grain economy is found but with these more moderate farming conditions, levels of

living are not quite so high as in Iowa S.E.A. 1a. Many farms in this area were foreclosed due to tax arrears in the Depression years and although this reduced overall farm density and allowed more farm consolidation, farm incomes did not fully recover for several years. Most of the settlement occurs on the prairies and avoids the wide Missouri flood plain where the river is still not fully controlled. This lowland does, however, provide alluvial soils supporting specialist crops like potatoes as well as feed corn. Much of the land in the flood plain is either owned or rented by farmers further from the river to increase their crop acreage. The loess bluffs at the edge of the plain are entirely under pasture.

Further south the Missouri River borders the north-western part of Missouri (Missouri S.E.A. 1) which is similar to the Iowa areas to the north. Loess prairie makes up the bulk of the area with a strip of alluvial lowlands in the valley of the river. Although this is the most prosperous part of Missouri, levels of farm income are lower here than in the Iowa part of the subregion.¹ This fall in farm levels of living southwards is partly caused by poorer soils and longer periods of land-use since this area was settled relatively early after 1837, but also because farm size on average is smaller in the south. This

1. McNamara, R.L., New, P and Pappenfort, D., Rural-Urban Population Change and Migration in Missouri, 1940 - 1950. University of Missouri Agric. Experiment Station Bulletin 620, Columbia, 1954, p.4.

itself is partly the influence of the Kansas City metropolitan area which has attracted small part-time farmers around it. The urban populations provide a market for dairy and other farm produce, but not to an extent sufficient to raise farming levels as high as those enjoyed further north.

A similar lowering in farm income and farm size is repeated southwards on the western side of the Missouri River. In the part of the subregion in South Dakota (South Dakota S.E.A. 4b) farm size averages 224 acres in spite of the presence of the Sioux Falls metropolitan area with its cluster of part-time farms. In Nebraska (Nebraska S.E.A. 6 and 7) the average farm size is 206 acres while in Kansas (Kansas S.E.A. 6), with a higher percentage of dairy farms, average farm size is 189 acres.

Economic Subregion 87, the most northerly in the Corn Belt is transitional in its farming characteristics since this area has not a tradition of corn growing and only became part of the larger Corn Belt when hybrid corn for livestock silage was able to penetrate into areas with a short growing season. The subregion includes part of southwestern Minnesota and eastern South Dakota and lies astride the Red River Valley. In this location farming types found in adjoining areas are also common including wheat farms to the west and general and dairy farms to the north.

Average farm size is larger than in areas immediately to the north, averaging 253 acres for the whole subregion (Table VI.) Rates of tenancy are also high. Farm size tends to be larger in the South Dakota area (South Dakota S.E.A. 4a) than in the Minnesota part (Minnesota S.E.A. 5) since yields per acre are reduced both by the short growing season and the dry conditions. Small grains like spring wheat are grown on most farms along with corn and forage crops to provide for cattle feeding. These forage crops are especially important since the cattle must be stall-fed for up to six months in each year. With larger farms the pattern of farmsteads is fairly open with some areas of poorly drained soils unused. A high percentage of land is under crops since pasture is not necessary as a soil erosion measure where the topography is level.

Economic Subregions 92 and 93 may be considered together since they represent the most westerly part of the Corn Belt where conditions for corn production become marginal due to a lack of moisture. At the same time the density of farm settlement falls off rapidly towards the sub-humid Great Plains. These harsher climatic conditions require larger farms in order to allow farm families to make a reasonable living. While average farm size is of the order of 250 acres in eastern Nebraska, in South Dakota at the edge of the Corn Belt it rises to over 700 acres, or less than one farm to the square mile. At the same time as the density of farms decreases, market and service centres become further apart, especially as the main cities for the area, like Sioux City and

and Sioux Falls, are situated along the Missouri River in E.S. 85.

The main phases of settlement followed the laying of railways in the 1870 - 80 period with farms first set up near the lines and then further from the routes as a road network was developed. Most areas were taken before the turn of the century with Central Europeans important among the newcomers.¹ The few remaining centres are essentially railway-side towns with the main highways now following similar routes.²

In subregion 92 covering the central and eastern parts of Nebraska and south-eastern South Dakota, two main areas can be recognized. In South Dakota the more westerly area (South Dakota S.E.A. 3a) has very large farms averaging 719 acres each in order to maintain farm incomes at a reasonable level and make machinery use profitable where crop yields are unreliable. A similar situation is seen to the south in central Nebraska where a double tier of counties forms Nebraska S.E.A. 3a along the Platte River. Although some land is irrigated the amount is insufficient to greatly reduce overall farm size which stood at 466 acres in 1954. With variable crop yields few stock are kept. In the two areas of the subregion to the east the slightly better rainfall conditions make farming slightly more secure so that smaller farms allow a similar level of living.

1. Johansen, J.P. Immigrant Settlements and Social Organization in South Dakota. South Dakota State College Agric. Experiment Station Bulletin 313, Brookings, 1937, p.11.

2. Chittick, D., Growth and Decline of South Dakota Trade Centers, 1901 - 1951, South Dakota State College Agric. Experiment Station Bulletin 448, Brookings, 1955, p.28.

The same transitions can be seen in Subregion 93 with farm density decreasing westwards as farm size increases, and farm incomes fairly uniform over the whole subregion. The Nebraska areas (Nebraska S.E.A. 4 and 5) are made up of loess covered prairie with chernozems commonly developed. Corn does not yield well and is partly replaced by cereals adapted to the drier conditions but the extra sub-surface moisture along the Platte and its tributaries helps to account for the extension of corn as an important crop as far as the Colorado border. Cattle rearing and winter wheat also become more important westwards in the tier of counties in northern Kansas (Kansas S.E.A. 4).¹ As most of the central part of Nebraska lies in grazing districts of the Sandhills it is excluded from the Corn Belt because of the importance there of pasture in the average farm economy. Some of these farms also corn-feed cattle so that the change from the Corn Belt to the cattle ranching areas is not everywhere obvious.

In summary, this chapter has attempted to provide a descriptive outline of the physical and economic features of the Corn Belt and its subregions, with particular reference to the agriculture and the rural

1. Hoover, L.M., Kansas Agriculture after 100 years. Kansas State College of Agriculture Bulletin 392, Manhattan 1957, p. 18.

settlement which is, in large part, dependent on it. It is clear that the variety in these features is reflected, to some extent, by variations in the type, density and form of rural settlement. The next two chapters present an historical account of the development of the settlement in the region in order to strengthen the basis on which the characteristics of the present-day settlement can be assessed.

CHAPTER II. THE BASIS OF THE LAND DIVISION AND LANDHOLDING SYSTEMS.

Different methods of settlement have done much to create regional variations in the rural cultural landscape of the United States so that it is here necessary to consider the policy which guided the disposal of the lands for settlement in the Corn Belt. At the base of this policy was the idea of the freehold ownership of easily defined parcels of land. This in itself provided a contrast with the land-holding system adopted in other parts of the United States. Some eastern seaboard land had been granted to individuals in an almost feudal manner while other land had been conveyed to trading companies. In the southern colonies, the individual buying and colonizing of choice new land helped to create there a haphazard arrangement of holdings and dispersed settlement; in contrast, there were the compact New England village settlements based upon the granting of township land to the whole community.¹

The freehold ownership of land had tended to replace other systems of land-holding by the time the frontier of settlement had reached over the Alleghenies.² But not until settlement reached into the area northwest of the Ohio River, including what is now the Corn Belt, was the

1. For details of these regional variations see Trewartha, G.T., "Types of Rural Settlement in Colonial America". Geog. Rev., 36 (1946), pp. 568 - 596.

2. Johnson, V.W., and Barlowe, R., Land Problems and Policies. McGraw-Hill, New York, 1954. This source has details on types of land-holding found in the United States.

disposal of the land in neat blocks allied with freehold ownership. This system of land division has tended to lead to a pattern of rural settlement over large areas characterized by family-operated farms of a fairly uniform size and laid out on the land in the form of neat blocks. Each farmstead is located within its own piece of farmland thus creating a dispersed pattern of farm settlement. Farm villages are almost non-existent and the only nucleated settlements are urban places and smaller centres inhabited by nonfarm persons servicing the local farm population. The large land estate, either worked as one unit or divided into several tenanted farms, is uncommon and a farm-labouring class, which does not own or manage land, is almost entirely absent. In parts of the Corn Belt where farming is prosperous enough to allow both an owner and a tenant to get a living off the one piece of land, as many as a half of the farms are tenant-operated but overall the types of farms, farmsteads and farmhouses are very similar over large areas along with the regular, almost monotonous pattern of farm settlement distribution.¹

The Southern Influence

The system of land division used in the area north-west of the Ohio River was specifically created by the Federal Government for the task

1. Throughout this study a farm refers to a tract of land under one management; a farmstead is the enclosure on the farm containing the farm buildings and the farmhouse of the operator.

of land disposal and settlement, but some of the features of settlement were brought in from other areas, the experiences of settling other areas to the east and notably the south.¹ Both Kentucky and Tennessee, south of the Ohio River, had been settled before the north-western lands and, as many of the earliest pioneers in the Old North-west were from south of the Ohio River, one would expect their influence to be felt. Southern Indiana, which was first settled by white Americans at the turn of the 18th Century, did develop a few plantations, some slave-holding and other features of a southern-style rural economy, but these did not long survive and similar developments are not reported for other parts of the Old North-west which were settled only a little later by persons of southern origin.

More lasting a feature of southern settlement and, in particular, Kentuckian settlement, which was carried north of the Ohio River was the custom whereby each pioneer farmer cleared his land and set up his farm in isolation from his neighbours giving dispersed settlement. This type of farm settlement really became universal throughout the Old North-west as a result of the indirect encouragement given to it by the Federal policy for the disposal of land, but dispersal was also common south of the Ohio River and in the parts of the Old North-west which

1. In an historical context the lands north-west of the Ohio River are often referred to as the Old North-west which includes a larger area than the present Corn Belt. This term is used in preference to Mid-West in this and the next chapter.

were settled by southerners outside of the jurisdiction of the Federal authority.

The southern influence was also felt in the settlement of the Old North-west in the manner in which roads and farm boundaries in southern Indiana and southern Ohio were laid out irregularly and largely with indifference to the ~~rectangular~~ grid of survey lines which were set up by the Federal surveyors to control the form of settlement. The hilly nature of much of the land in these areas, and the variable quality of ridge and valley soils, must partly account for the irregularity of the settlement patterns, but they also owe something to the character of the southern pioneer who preferred to choose his piece of land freely without the restrictions of existing survey lines to control the positions of his farm boundaries.¹ One northerner who traded among the early southern settlers around Connersville, Indiana, complained that these pioneers built "small log cabins with the door the back side of the house, the house the back side of the fields, and the fields frequently in the back side of their farms."²

1. How far the haphazard layout of the farms was the influence of the environmental conditions, as Turner would argue, and how far it was the part of the cultural inheritance of the southern settlers is difficult to judge without more documentary evidence. Most early farm settlers in the Old North-west had to comply to some extent with the Federal policy over land claims so that their farms were more regular in shape than in the southern and middle Atlantic states. These aspects of the Turner thesis can be found in: Turner, F.T., The Frontier in American History Holt, New York, 1947. The cultural effect in the Mid-West is considered in Murray, J., The Heritage of the Middle West. Norman, 1958 p.22.

2. Letter quoted in Power, R.L. Planting Corn Belt Culture, Indiana Historical Society, Indianapolis, 1953. p. 102.

The southern influence upon the settlement of the lands north of the Ohio River was not, however, as strong and long-lasting as one might have expected. It certainly helped to mould the pattern of rural settlement in those areas immediately north of the Ohio River where settlement occurred at an early date and came from the south. But as settlement moved on the southern influence waned. At least two factors can account for this. Firstly, the southern settler did not remain in the majority as the frontier of settlement in the Old North-west was pushed further north and west. He was largely replaced by the easterner and New Englander and later by European immigrants. Kentucky, as a possession of Virginia, had been settled entirely by southerners; in the early settlement of the southern parts of Ohio and Indiana, southerners still dominated but they were joined by settlers from Pennsylvania, New Jersey and other eastern states and these brought with them different ideas on pioneering; then in the central and northern parts of Ohio, Indiana and much of Illinois, the southern element was entirely swamped by easterners or Yankees. This Yankee domination was maintained as settlement spread further west across the Corn Belt.

A second reason why the southern influence waned rapidly in the settlement of the Old North-west was that these lands were, in the main, ceded by various claimant states to the Federal Government before settlement occurred. It rigidly imposed its own system of land division before settlers were allowed in whereas in the case of Kentucky, which

was settled as an extension of Virginia, the choice of settlers and the relatively undisciplined methods of settlement were controlled by Virginia and were therefore essentially southern in character.

The Federal Control

The cession of state claims upon land in the Old North-west to the Federal Government occurred at the end of the Revolutionary War. Three states, Massachusetts, Connecticut and Virginia claimed parts of the area.¹ Virginia claimed much the largest area in view of her land interests south of the Ohio River which she felt needed a buffer protection. Virginia opened her lands in Kentucky for settlement in 1779, but she withheld settlement from her claims in the Old North-west in view of protests from other eastern states who could not similarly provide land for their landless nor meet their war debts from the sale of such land.²

These protests led to the cession of most of these state claims in the Old North-west to the Federal Government between 1784 and 1786 with

1. Massachusetts claimed a strip across what is now Michigan, Connecticut claimed a parallel and adjoining strip to the south as far south as 41° N. covering the northern part of the present state of Ohio; Virginia claimed large areas south of this. Details of these claims can be found in Pattison, W.D. Beginnings of the American Rectangular Land Survey System, 1784 - 1800. University of Chicago, Chicago, 1957, p.5. The primary source for details of state claims and the development of Federal control on north-western lands is Library of Congress, The Journals of the Continental Congress 1774 - 1789. (34 volumes), Government Printing Office, Washington, published variously between 1910 and 1937.

2. Clarke, T.D., Frontier America, the Story of the Westward Movement. Scribner's, New York, 1959, p. 142.

some exceptions. Not only had Virginia retained Kentucky, which became a state in 1792, but she also retained three areas in the Old North-west. These were the old French settlements along the Mississippi River and its tributaries in the Illinois country; a further 150,000 acres on the north bank of the Ohio River opposite Louisville and outside of the Corn Belt which were granted as military bounty lands to George Rogers Clark's men for their war services; and, thirdly, Virginia retained control of an area between the Scioto and Little Miami Rivers in southern Ohio to settle Virginia militia once the Kentucky lands were full.¹ This became the Virginia Military Reserve.. . .

Massachusetts ceded all her claim, but Connecticut retained 3.8 million acres in an area bordering Lake Erie and stretching 120 miles west of the Pennsylvania state border. This became the Western Reserve for Connecticut settlers and part of it borders the north-eastern corner of the Corn Belt. New Englanders settled the eastern part from 1796, at the same time as settlers from the south were making the first clearings on the northern side of the Ohio River in southern Ohio and Indiana. Political control of the Western Reserve later passed to the Federal Government but Connecticut retained her rights of settlement and the

1. The French settlements were Kaskaskia, Prairie du Rochier, St. Phillipe, Cahokia and Vincennes. Details of the Virginian holdings are to be found in Pattison, op. cit, p. 10.

population remained predominantly New Englander in origin.¹ A Federal policy of land division and disposal did not operate in these areas where state control was retained and, as will be seen later, the influence of this on settlement patterns can be seen right up to the present. Even in the large areas which came under Federal control a single system for the parcelling and settlement of the land was not at first imposed, so that in these areas, notably Ohio, the overall form of settlement is far less uniform than in areas settled later further west, by which time the system of disposal had become more stable. Ohio, as part of the Old North-west, was also subject to political influence by Pennsylvania which tried to control the type of administration and settlement in border areas.² Also, some Federal land in Ohio was soon granted to land companies who were left to parcel it out largely in their own way.

The Federal policy for the division and disposal of its vast holdings in the Old North-west, the so-called public domain, had to be shaped with four main points in mind. These were the rights and claims of the Indians who were still in the area at the end of the 18th Century; the most suitable method of land survey for these vast areas; the means of

1. Garland, J.H., "The Western Reserve of Connecticut . Geography of a Political Relic." Economic Geography, 19 (1943), pp. 301 - 319.

2. Clarke, op. cit. p. 180. One reason for the desire of Connecticut to retain her rights in the Western Reserve was a fear that Pennsylvanians would swamp her settlements there.

disposal of the land for settlement; and the policy for the creation of new states as settlement filled the area. The latter point needs only brief treatment as it little affects the development of rural settlement.

The Indian Question

Before the North-western lands could be opened up for settlement, the Indian population had either to be contained or removed. The latter course was generally adopted. By the Treaty of Paris (1783), Britain had ceded to the Americans all rights in the area west to the Mississippi River.¹ The strong Indian tribes which lived and hunted in the area had made no such cession to the American Government. As far as they were concerned the Treaty of Fort Stanwix (1768), which had recognized Indian control of land north-west of the Ohio River, still stood after 1783. But eastern pressure upon the Federal Government grew to get the Indians removed from at least part of this area so that it could be opened up for settlement. A Congressional Report in 1783 had suggested that the boundary between the Indian claims and white settlement should be moved from the Ohio River west to lie along a line following the Great Miami and Maumee Rivers to Lake Erie so giving the Federal Government control of an area which approximates to the state of Ohio.² This line was

1. Clarke, op. cit. p. 133.

2. Journals of the Continental Congress. op. cit. Vol. 25 (1783) p. 686.

accepted by some tribes at the Treaty of Fort McIntosh (1785) but no general agreement with the Indian confederacy was obtained until ten years later. This failure to obtain control of the area did not entirely halt white settlement beyond the Ohio River but it did mean that the early settlers on the north bank of the Ohio and its tributaries were open to menace from Indians, the more so because many of these settlers were squatting illegally on land ahead of where Federal control provided some protection.¹

A general cession line to which all tribes concurred was reached in 1795 at the Treaty of Greenville. This extended Federal control as far as the Cuyahoga River on the north and the Whitewater on the south and removed the Indians from the area of the present state of Ohio with the exception of the Black Swamp (See Fig. 3). This north-western corner was not to attract white settlement for many more years. Two tracts of land in southern Indiana were also acquired under the treaty.

There was nothing final about this treaty or any of the others which followed between the Federal Government and the Indians. The continued westward movement of pioneers and speculators, in search of

1. Fort Hamar and other defensive points on the north bank of the Ohio River were built by the Federal authorities in order to protect white traffic on the river but they also served to try to prevent the movement of squatters on to lands not yet under Federal control.

choice pieces of land, meant that they often went ahead of the partially settled Federal-controlled areas into Indian-held territory. Each time Indian tribes had eventually to concede more land. After 1800, treaties followed at such a pace that the Indians did not fully comprehend what was happening. They were to be pushed back into the semi-arid areas before the pressure upon them was eased.

The order of treaty-making in the eastern parts of the Old Northwest meant that southern areas were released from Indian control before northern areas. In both Indiana and Illinois, settlement was well advanced in their southern parts before the northern prairie areas were freed for settlement. Undoubtedly the white pressure for land in the south was greater and so led to these earlier cessions. As can be seen in Fig. 6, in 1803 southern Illinois was taken from the Kaskaskias; in 1804 a tract of land from Louisville to the mouth of the Wabash in southern Indiana was acquired from the Delaware and Piankashaws and in the same year a vast stretch of land including part of the present state of Missouri was taken from the Osage, Sac and Fox tribes. The Treaty of Grouseland (1805) obtained for the Federal Government an area between the Ohio border and Louisville and lands west of the Wabash River were acquired in the same year.¹

1. Full details of these and other cessions can be found in Buley, R.C., The Old Northwest, Pioneer Period, 1815 - 1840 Vol. 1. Indiana University Press, Bloomington, 1951, p. 111.

In contrast much of the northern lands in the present states of Indiana and Illinois, and even part of Ohio to the north of this great southern tongue, was not acquired until the second decade of the 19th Century and after the 1812 War. These were mainly prairie areas and not attractive to settlers at this time so that the two factors acted together to keep settlement to the south. After 1812 the speed of the Indian retreat was hastened and land acquisitions in the present central and western Corn Belt occurred on a broad front so that the advance of settlement in those areas was no longer constrained by Indian resistance.

Methods of Land Survey

Once land had been freed from Indian control, a policy of land survey prior to division for settlement was adopted for the Federal lands. This decision to survey the land prior to its disposal to private individuals was a new departure for the treatment of western lands. In other western areas, like Kentucky, settled under the authority of individual states, a system of land selection without the clear establishment of property boundaries had evolved. Metes and bounds, for the marking of property lines, had led to endless litigations and created a crazy-quilt pattern of farm units with the poorer land often remaining unsold while the ownership of the better parcels was at the same time in dispute. These problems were not all the result of a lack of foresight

on the part of the state legislators since the Federal constitution did not allow individual states to enact adequate land laws.¹

A rectangular form of survey strongly commended itself to the Federal Government for their lands. A regular grid of survey lines within which land parcels could be easily defined would create the rigidity required for the orderly settlement of large areas. This orderliness

1. Kentucky, the last western area to be settled under state control before the settlement of the Old North-west began, provides examples of the problems created by the disposal of land without adequate laws to control the process. These are discussed in Barnhart, J.D., Valley of Democracy. Indiana University Press, Bloomington, 1953. Virginia opened up her Kentucky lands for settlement in 1779 and squatters, military bounty holders, and land companies were all allowed to stake claims. There was no land survey prior to disposal and property boundaries were defined by a system of metes and bounds. Each claimant was allowed 400 acres which was considered the maximum area that one person could cultivate but each could register an option on a further 1000 acres for more speculative purposes (Clarke, op. cit. p.137). There was no control to prevent one person entering a claim for more land under the name of another and holdings of as much as 200,000 acres were built up in a few cases (Barnhart, op. cit. p.68). The supply of land soon ran out for which reason Virginia was anxious to retain some of her claims north-west of the Ohio River. Settlement in these Virginian lands got under way in 1790 and Virginians and persons from Kentucky who had failed to gain land there made up the bulk of the settlers in these areas. Others moved north and squatted on Federal land. In this way a misguided land policy in Kentucky speeded settlement in the North-west and pointed out to the Federal legislators some of the pitfalls of the indiscriminate opening of new land to all-comers. The main lesson learned was that the Federal land must be surveyed first so that settlement could occur compactly and without dispute.

had been lacking in the settlement of Kentucky.¹ Such a system of prior survey was also possible since the lands to be surveyed were virtually empty of white settlers so that survey lines would not have to be adjusted to existing property boundaries. The system would also allow the surveyors to move across country fairly rapidly although the forested nature of much of the land in the eastern part would have slowed down any form of surveying.

Main township lines running east-west and range lines running north-south could be oriented to the main compass points and parallel line sub-divisions between these township and range lines would create the standard size freehold land units for disposal to individual settlers.² The rudiments of the survey are laid out in Fig. 7. The

1. Thomas Jefferson was largely instrumental in creating the new Federal land system. He had been Governor of Virginia (1779 - 1781) at a time when the settlement of Kentucky was creating land problems and he later greatly influenced Federal land policy.

2. Although the rectilinear survey system was basically simple and suited the conditions and survey techniques of the time, difficulties did arise. At first all range lines were run on true meridians but this made it impossible to create truly square townships between the intersecting range and township lines. The northern side of each township would be 40 feet shorter than the southern side in each 6 mile length. This error was accommodated for in the north-western section of each township. Nor could the township lines be continued over very great distances without errors arising. The pattern of townships in each state was therefore isolated from that of its neighbour along 'shatter zones' which were also created within states where new base lines were set up. These and other surveying problems are discussed in Pattison, op. cit. p.55.

system also had benefits for the settler. There could be little possibility of dispute over the position of property boundaries and as settlers would have square or rectangular blocks of land, each could easily satisfy himself that he had received the area for which he had paid.

Disposal of Land for Settlement

Since survey came before disposal the basic pattern of land units was pre-determined by the surveyors' lines but, even so, the system still allowed for some licence notably in the size of land parcels which were to be offered and the method of sale. These points were laid down and modified in successive land acts.

The policy of prior survey and the means of land disposal have some antecedents in parts of the United States which had already been settled. A rectangular system of land division had certainly been applied in New England and it may have had origins outside of the United States.¹ Ford points out that the survey of land prior to its disposal was also carried out in New England where new grants of land were generally made

1. A point of view put by Ford, A.C., Colonial Precedents of our National Land System. Bulletin 352, University of Wisconsin, Madison, 1910. See also Haller, W., The Puritan Frontier, Town Planting in New England Colonial Development, 1630 - 1660. Columbia University Press, New York, 1951.

to expanding townships after survey had taken place. This ensured that settlement went on in an orderly manner, all land was taken up without regard to its quality, and litigation over boundaries was uncommon. Such a system might be said to suit the compact settlement conditions of New England where new areas could be better taken in by communities rather than individuals working in relative isolation.

Even so, the means of land disposal within this framework of prior survey, which was first proposed for the Old North-west, was no simple copy of New England ideas. Indeed, Pattison regards it more as a copy of the southern method of land disposal with certain controls applied.¹ But these proposals were later so modified that New England ideas replaced the Southern. As Pattison points out, the draft plan of 1784 coupled the orderly distribution of land by means of prior survey with very low sale prices.² This would encourage the poor and landless in the south and east to come west to set up their own small farms, as had already happened to some extent south of the Ohio River. There seems to have been little intention to encourage group migrations and settlements in the west as had been customary in New England. The draft also

1. Pattison, op. cit. p. 39. This writer quotes an earlier view which is in disagreement here. See Treat, P. "Origin of the National Land System under the Confederation". American Historical Association Annual Report, 1905, 1 (1906) pp. 231 - 239.

2. Pattison, op. cit., p. 43. The 1784 plan is laid out in the Journals of the Continental Congress, op. cit., Vol. 26(1784), pp. 324 - 330.

proposed that settlers could go ahead of the surveyors to select better land so long as their lots could be identified by the surveyors and the boundaries fitted in with the survey lines. This was also a southern idea which saw the land was basic to the settler's livelihood so that he should be allowed to choose the best land available. Jefferson, who was backing this draft plan, was also planning to make provision for the early survey and sale of land which was most in demand in a form of scatter survey. Coupled with this controlled southern approach, he planned to sell land at the low price of one-third of a dollar per acre so that even southerners would not object to buying some poor land along with the good in order to achieve an orderly disposal of regular-shaped blocks.¹

The Ordinance of 1785, which governed the first sales of land in the Old North-west, omitted most of the southern ideas in the draft plan and replaced them by points with more of a New England origin. The six-mile

1. Other elements in the draft suggest a southern origin. It was expected that the regular blocks would be broken up into irregular units but this would not matter so long as the primary disposal had been orderly. It was proposed to allow claims by warrant as was common in the south. Lastly the Township was only to be an areal unit and not an administrative unit as in New England. Other points in the draft plan of Jefferson's committee were neither northern nor southern in origin. A whole set of decimal land measurements including 100 square mile townships and a new 'geographical' mile with a one square mile section containing 1000 reformed acres were envisaged by Jefferson. None of these ideas was incorporated in the first land act for the north-western lands.

square township, made up of 36 one mile-square sections, was a copy of the New England unit and became the basic land area for the Old Northwest. By the 1785 Ordinance the land was to be surveyed into townships before land could be sold and one township had to be sold before another was offered for sale.¹ In trying to compact settlement there was no room for the more liberal ideas for prior selection laid out in Jefferson's draft. The price of land was fixed at one dollar per acre and sales were to be by auction. Under this act warrants were not accepted in place of cash.² Other New England points brought in by the Ordinance included the reservation of four sections in each township for future disposal and two others which were set aside to provide funds for religious and educational purposes in the townships.³ Alternate townships were to be sold whole and the only people likely to be attracted to 23,040 acre blocks would be New England settler communities. There would be few southern persons of sufficient wealth who would pay a dollar an acre for a mixture of good and bad land. The other townships were

1. The terms of the 1785 Ordinance are laid out in the Journals of the Continental Congress, op. cit. Vol. 28 (1785), pp. 375 - 381.

2. Johnson, and Barlowe, op. cit. p. 45.

3. The 1796 Act dropped the section for the support of religious institutions, Pattison, op. cit. p. 96.

to be offered for sale in sections of 640 acres each, but 640 dollars was more than most pioneers could afford so that the majority squatted illegally ahead of the areas where surveying and sales were taking place.¹

Later acts replaced several of these points by others, some of which had already been dropped from the 1784 draft. The process of squatting on a choice piece of land ahead of the official frontier of settlement became so common that it had eventually to be accepted as a legal method of settlement so recognizing the right of prior selection of land. By pre-emption the squatter was later allowed to purchase the piece of land he had settled and improved without interference from others who might bid for the land and take it from him or at least cause the price to be raised.

This was only one way in which the 1785 act was relaxed. In later acts warrants were accepted in place of cash; settlement was allowed to go on over a broad front unrestricted by pockets of land which did not for some reason attract buyers. Such land was offered at a reducing price according to the length of time it had been on the market.² The minimum size of lot was also reduced in order to encourage the settlement of the pioneer of more moderate means, for the sales of large land blocks,

1. Clarke sees this as a concession to the northern settler of moderate means, Clarke, op. cit. p. 147.

2. Johnson and Barlowe, op. cit. p. 87.

allowed for under the 1785 Ordinance, never attracted many New England groups of settlers. Those lands only fell into speculative hands which divided and sold the land in smaller, higher-priced pieces.

The Creation of New States

From the point of view of the rural settlement of the Old Northwest the Federal policy on the creation of new states is of less importance, but their means of creation and the order in which they were created do illustrate certain factors which have a bearing upon settlement history. In particular, the presence of wide stretches of prairie land led to the belief that the overall density of population would be lower than in the wooded east. At this time many of the prairies were seen as damp morasses with little potential for the support of settlement. Larger states containing a mixture of land qualities and a thin spread of population would therefore have to be created.

60,000 free adults was accepted as the figure for an area to gain statehood. State-making proceeded from the east to the west as the frontier of settlement moved across the North-west but the outline of the states does not reflect the fact that the southern areas were settled before the northern because the state-makers tried to include different types of land in each state. Both Indiana and Illinois include hilly, wooded land in the south, mostly settled early, and more open till-plain and prairie in the north-where settlement tended to lag. State lines

were largely drawn along meridians and parallels, in the same geometrical fashion applied to the land survey, since few natural frontiers existed on which to draw state boundaries. Where they did exist they were often made use of, and both the Ohio and Mississippi Rivers form parts of the boundaries of seven states while the Missouri partly bounds six states in the Mid-West. All three rivers acted as frontiers as settlement moved westwards and separate economies tended to develop on each bank. Smaller rivers did not act as barriers in the same way but were the nuclei of local economies, so that state boundaries avoided these.

The organized areas went through a Territorial stage before their most populous parts were separated off as a state. Thus, Ohio was created as a state in 1803 out of the eastern, most populated part of Ohio Territory. Indiana and Illinois Territories were then created and then Missouri Territory when Indiana and Illinois received statehood.

Although the shape of states was little affected by the way in which the frontier of settlement progressed, the dates of state admittance partly reflect the progress of settlement. Ohio was sufficiently settled in its southern and central parts to be granted statehood in 1803 by which time settlement in southern Indiana was well advanced, but the slowness with which northern Indiana was freed for settlement and proved attractive to settlers meant that she was not admitted to statehood until 1816. This was only two years before Illinois became a state with

its much larger areas of forbidding prairie. Further west again, Missouri, largely settled from the south, became a state in 1821 long before the Iowan prairie lands immediately to the north boasted a sufficiently large population.¹

Summary

Three points are worth restating. Firstly, it is clear that the settlement of the Old North-west went on under a system of Federal supervision which both tended to scatter the farmers on to their pieces of land and to shape their blocks of land in keeping with a compact, geometrical system of land survey and division. The relative importance of the southern and New England influence upon this simple system is still open to question but it is clear that many of its features were innovations. This will become clear in the next chapter where the implementation of successive land acts is considered.

Secondly, smaller parts of the area were not always subjected to

1. Iowa obtained statehood in 1846 but her entry was delayed by political considerations concerned with the balance between northern and southern states. Even so she had not reached a population sufficient for statehood before 1840. Details of state-making can be found in Bureau of the Census, United States Summary-Number of Inhabitants, Final Report, PC(1)IA, 1960. Washington, 1961, and no author. "State-Origins and Boundaries", Geographical News Notes, 4 (1961), No. 1. Nystrom, Chicago, 1961.

this geometrical survey process. These were the districts which remained in state control or under the control of land companies. These areas of settlement were confined to the south-east from which survey and settlement later spread out into more distant prairie lands.

Another feature which tends to mark off the early settled southern and eastern edges of the Corn Belt from the later settled north and west was the short-lived impact of southern persons. These made up a large proportion of pioneers until swamped by easterners and European migrants. The distinctiveness of the settlement features of these early-settled areas will be returned to in later parts of this thesis.

CHAPTER III. THE PROGRESS AND CONSOLIDATION OF INITIAL SETTLEMENT

Part I. The Eastern Corn Belt, 1785 - 1820.

The original settlement of that portion of the Old North-west which forms the Corn Belt must be seen as part of a larger and continuous process of settlement. This frontier of settlement moved across the Appalachians and the wooded, eastern North-west (the Eastern Corn Belt of the present time) and into the prairies of the central and western Corn Belt before reaching the Great Plains in the latter part of the 19th Century.

This settlement process went on under a system of controls and influences outlined in the last chapter. It also occurred rapidly over wide and fairly homogeneous areas. Nevertheless, variations in the processes of farm settlement did happen as a result not only of the changes in Federal and other controls but also in the techniques of pioneering, farming and transportation, all of which were changing rapidly at this time.

The purpose of this chapter is to trace out the progress of settlement across the Corn Belt in relation especially to those changing influences. The first part of the chapter concentrates on the farm settlement of the wooded, eastern part of the Corn Belt; the second section will consider the development of settlement in the central and

western areas which took place largely after 1820 at the time when settlement was being consolidated in the earlier settled areas.

Frontier and Post-Frontier Settlement

As part of a moving band of settlement, the original taking up of land in the Corn Belt had two major characteristics. Firstly, there was the nature of settlement in the frontier zone itself where conditions were primitive. Secondly, there was the post-frontier area over which the frontier had passed some years before. The harsh conditions of settlement in the frontier zone required the pioneers to step back from more sophisticated ways of life, found further east and south, into a more primitive cultural environment where the agricultural economy needed to be of a self-sufficient type. The settlement and communications were incipient and most refinements of life were lacking. In the post-frontier area life had lost some of this rawness. More settlement, the development of a trade-oriented agricultural economy and better communications brought the conditions of the society closer to those found in longer settled, eastern and southern areas. Numerous variations of the frontier and post-frontier conditions of settlement could have been found at any one time as a result of several factors. These factors included the nature of the land laws, the physical environment of the settlement, the origins of the settlers and the general state of technical progress at the time of settlement.

The more advanced post-frontier condition of settlement in time everywhere replaced the frontier of more primitive conditions so that the frontier area can be thought of as a mobile and temporary zone of settlement. But, in spite of being physically ephemeral, its effects upon later settlement have been longer lasting. These effects are exemplified by the attractions of cheap land, relative isolation and the rapid introductions of ways of life and techniques which encouraged people to move west up to, or near to, the frontier.

One of the main attractions of the frontier zone to the pioneer was cheap land. Federal land could be had for the minimum price of one or two dollars per acre. Many even went onto land ahead of the Federal surveyors and squatted without any payment. Most of them felt fairly free of molestation until more settlers caught up with them, whereupon some would move on again, especially if they could sell their holdings at a profit. The pioneer would, at most, only be paying about one-tenth the price that poorer land cost in the east and the price of the land rose rapidly as the frontier zone became more densely settled. This steep gradient in land prices across the frontier into the post-frontier area forced many, unwillingly, to go further west than they really intended in order to get land at the price they could afford. The search for cheap land attracted not only the landless westwards but farmers who had already established themselves in more easterly areas. The main sources of migrants into the prairie states in the last century

were the states immediately adjoining them to the east rather than the migrants from the industrial east or from Europe.

The sparseness of settlement at the frontier also proved attractive to many pioneers, although once established most did not pack up as the area became more densely settled unless they could not, or would not, pay for the land they had squatted on.¹ Most welcomed denser settlement which generally meant rising land values and the development of better communications. The frontiersman became less a hunter, trapper and cattle grazer growing his own family needs and became more a crop producer benefitting from new lines of communication with eastern markets. The establishment of these market links and the transformation of the woodland clearings into farms often took several years as the frontier society became less exploitive and developed instead into an improving post-frontier society. Although most welcomed the advantages of denser settlement, as intervening land was taken up, the idea of dispersed

1. The early pioneers on the Ohio lands were far less settled than those who later took land in the north and further west. Michaux states at one point, "more than half of those who inhabit the borders of the Ohio are a kind of men who cannot settle upon the soil that they have cleared, and who under the pretence of finding better land, a more wholesome country, a greater abundance of game, push forward, incline perpetually towards the most distant points of the American population." Michaux, Travels to the West of the Allegheny Mountains, in Thwaites, R.G., Early Western Travels. Clark, Cleveland, 1906, Vol. 3 pp. 192 - 193. Thwaites's 32 volume compilation of western travellers is a major source of contemporary material on the settlement of the Corn Belt.

settlement, rather than village farm communities, was retained.

The frontier encouraged the use of new ideas and techniques which then took hold in the society which developed therefrom. On the economic side, corn was early the main crop as it could be planted between the tree stumps and never failed to yield a crop. Wheat only came in later. On the sociological side, an acceptance up to the present day of the mobility of families and individuals is matched by a lack of social stratification among the rural people in the Corn Belt. Both aspects would seem to owe much to the pioneer tradition.¹

The frontier zone also left more direct imprints on the landscape of the post-frontier area. The Indian and buffalo trails, which had been followed by the trader and trapper, often influenced the direction of pioneer movements and became in turn the roads and turnpikes.² Log cabins and other evidences of a more primitive economy in the recent past are not uncommon. Rivers and creeks formed the main arteries of

1. Many contemporary travellers described the "levelling of society" in the frontier area while later writers on the Mid-west have tried to analyse such characteristics in terms of pioneer and other influences. Noteworthy among the former is Lindly, H., Indiana as Seen by Early Travellers. Indiana Historical Commission, Indianapolis, 1916. Among the latter group are the works of Turner, F.J., especially The Significance of Sections in American History, Holt, New York, 1932, and also "The Colonization of the West, 1820 - 30". Am. Hist. Rev., 11 (1906), pp. 306 - 321. A useful study of the development of the Turner ideas on the evolution of society from its frontier to its later forms is by Anderson, S. Westward is the Course of Empires. Oslo University Press, Oslo, 1956.

2. See, for example, Meyer, A.H. "Circulation and Settlement Patterns of the Calumet Region of Northwest Indiana and Northeast Illinois: The Second Stage of Occupance - Pioneer Settlement and Subsistence Economy, 1830 - 1850". Annals Assoc. Am. Geogs., 46 (1956), pp. 312 - 356.

communication in the frontier zone and almost moribund market centres, set up in the last century, can still be found along them.

The progress of the settlement frontier and its post-frontier society was relatively slow across the eastern and wooded Corn Belt (See Fig. 8). In the 35 years between the first land Act for the Old North-west and 1820, when the frontier was approaching the larger prairies of Indiana and Illinois, settlement had only really consolidated itself in Ohio. Much of this post-frontier consolidation occurred when the canal and the road were the main forms of communication whereas, later, when prairie settlement was being consolidated, the railway dominated. With its help the frontier of settlement moved much faster than it had in the east. Indeed, prairie pioneer settlement often only succeeded if transport was available to bring in adequate implements for farming right to the frontier, so that a market-oriented economy could develop immediately in the newly settled areas.

Early settlement in the Eastern Corn Belt

The 1785 Ordinance, the first land act for the Federal lands in the Old North-west, was first applied in the Seven Ranges close to

Pittsburgh and just east of the present Corn Belt.¹ The progress of the survey and the sale of land in this area went very slowly and proved disappointing to a Congress which hoped to raise cash hurriedly by the sale of land here and to the west in order to cover war debts.²

Several factors help to account for this apparent lack of demand and are indicative of changes in later land acts. Half of the townships were to be disposed of whole, the others divided into sections, Few individuals were interested in this size of holding (640 acres minimum) at one dollar per acre and few groups of settlers came forward. As the sales were only held at Philadelphia, this reduced the possible number of customers. A credit system which still required the remaining two-thirds of the payment to be made within three months of the purchase would have

1. Buley, op. cit. p. 95. The Seven Ranges are not perhaps, the best place to examine the effects of the survey upon the pattern of rural settlement apart from the fact that the area lies outside of the Corn Belt. The hilly nature of the area means that most roads and fence lines do not follow the survey lines laid down. Also the running of section lines at one-mile intervals was not provided for until the 1796 Act so that the geometrical layout of the landscape in the Seven Ranges would not have been so perfect even if hilly topography had not hindered its development. Section line positions on the range and township lines were marked in order to allow the land to be so divided up, but these lines were not actually run.

2. Clarke, op. cit. p. 148. Because of the hilly, wooded nature of the area and some Indian hostility which faced the first survey parties, the whole area of about 2,500 square miles took 4 years to survey. Further, when the first sales were held in 1787 for land in the four eastern ranges less than 15 per cent of it was sold.

been little help to most prospective purchasers.¹ As a result most of the 73,000 acres sold in 1787 went to speculators, the riverside land with its greater accessibility attracting most of the buyers.

This lack of demand for western land was more apparent than real. Travel accounts of the time tell of the considerable movement of pioneers going west. Most often they were going to land ahead of where the Federal surveyor and auctioneer were at work.² There they could take land, albeit illegally, in pieces of quality and size to suit them.

The direction of these pioneer movements was mainly controlled by the available means of getting to the frontier on the north side of the Ohio River. The Ohio River itself was the main artery of western migrations at this time as it provided over one thousand miles of uninterrupted navigation for small craft. Migrants from the east reached the Ohio river system, then drifted down-river to Cincinnati where most pioneers left the valley before it turned south-westwards and away from the areas available for settlement.³ Others crossed the Ohio from

1. Johnson and Barlowe, op. cit., p.45.

2. In the mid - 1780's about 1500 squatter families were evicted from the Miami and Scioto valley lands of Ohio by Federal troops (Barnhart, op. cit. p. 130).

3. Switzer, J.E., "Some Observations Concerning the Historical Geography of Indiana". Proceedings of the Indiana Academy of Science, 51 (1941) pp. 207 - 214. See also Fig. 3.

Kentucky in the same area. Virginian settlers made especially for the Virginia Military District in Ohio, Clark's Grant in Indiana and the old French fur trading settlements at Vincennes and its vicinity. The trail which linked these areas of Virginian settlement also, in time, became settled along its length and helped to spread settlement across southern Indiana inland from the Ohio banks. About 150 Virginian families had settled around Vincennes and had obtained grants of land of about 400 acres each before 1791.¹ As further families arrived after that year they were able to receive Federal land so building up an early nucleus of white settlement far west of that in eastern Ohio (see Fig. 8).

Other overland routes brought settlers into areas between the Seven Ranges and north of the Ohio River either as squatters or proper settlers after the land was released for legal settlement. Federal money had been made available in 1796 to build Zane's Trace westwards across Ohio to provide a shorter route to the lands of Ohio than was provided by the Wilderness Road through Kentucky.² Settlement spread out from this route and towns were set up where the road crossed the Ohio tributaries. At these points migrants on the road could leave it and follow the tributaries upstream to find suitable land. By 1812

1. Barnhart, op. cit. p. 163.

2. Clarke, op. cit., p. 340.

Zane's Trace had reached Cincinnati from where other trails had been opened to Fort Wayne, Sandusky, Columbus and west into southern Indiana and Illinois.

The Genesee Road north of the Seven Ranges served to bring New England settlers into the Western Reserve. In the first decade of the 19th Century this route was extended westward and had reached the Black Swamp in north-west Ohio by 1812. The settlement and improvement of the swamp, its borders and the lands beyond, was to be delayed until the opening of the Erie Canal made a more convenient routeway to these northern areas.

By the movement of squatters onto western lands not yet released by the Federal authorities and by the early settlement of the Virginian and other state lands in the Old North-West, several nodes of settlement had been built up before the end of the 18th Century. At this time Federal land sales to private individuals were largely limited to the Seven Ranges, and an area immediately to the west.

One result of the slow rate of survey and sale of Federal land in this area was that the Government offered land to companies at a

one-third discount for all transactions in excess of a million acres.¹ In 1787 the Ohio Company of Associates under Colonel Symmes was granted $1\frac{1}{2}$ million acres of land west of the Seven Ranges.² Settlement by New Englanders was begun and centred upon Marietta. A sister company, the Scioto Company, took 5 million acres between the Seven Ranges, the Ohio River and the Scioto River. A group of French immigrant settlers was attracted to this grant but the company failed before the settlement got established and they were moved to the Ohio Company lands. By 1793 about 430 persons had been settled on that grant.³ Symmes took another grant of one million acres between the Great and Little Miami Rivers. This was known as the Miami Purchase. Settlers from Pennsylvania and Kentucky were attracted here. The locations of these company grants are given in Fig. 9.

Proving reasonably successful both as a means of business and of spreading settlement on Federal land beyond the confines of the Seven Ranges, Congress received other requests for land grants all of which were

1. The use of land companies to encourage settlement in the interior was not new. During the period of Anglo-French rivalry in the mid-18th Century increasing competition for the trade and friendship of the Indians pushed British interests further west. One means of furthering these interests was the land company. The rivalry led to war which removed the French forts but the fur-trading settlements remained and later were taken by Virginia. Osgood, H.L., The American Colonies in the Eighteenth Century. Columbia University Press, New York, 1924. pp. 280 - 285.

2. Pattison, op. cit. p. 170.

3. Barnhart, op. cit. p. 139.

rejected. Settlement by individuals speeded up in the 1790's and congressional interest in land companies waned. Further, most land company promoters were too demanding. Some wanted free land. Others wanted only land fronting onto the Ohio River or its major tributaries but Congress had agreed that no grant should have a river frontage of more than one-third of the depth of the grant.¹

As Ohio was the scene of most of these company and state land grant developments, as well as the area where the Federal survey parties first began work, a greater variety of geometrical and non-geometrical survey and property lines were laid out and have left an imprint on the landscape. In the western states in contrast, the survey was entirely under the control of the Federal authorities and was carried more methodically and accurately across much larger stretches of country. No land passed into the hands of individuals or other bodies until the survey had been carried out. But in Ohio ten districts were surveyed separately and five of these were surveyed by non-Federal authorities. These areas are shown in Fig. 9. The boundaries of the major survey areas have been superimposed upon a map showing all the minor civil divisions in the state. Of the non-Federal areas, the Ohio Company

1. Havighurst, W. Wilderness for Sale. Hastings House, New York, 1956. p. 96. Synmes' Miami Grant, for example, only had a twenty mile river frontage.

lands were surveyed into townships and sections from the company's own base-line but many of the early settlers staked out their farmlands indiscriminately. The civil administrative boundaries show a similar lack of regularity since they largely follow property lines. Only the southern part of the Miami Purchase was surveyed by Symmes, the work being continued northwards by the Federal surveyors who were employed by him. Again, land divisions within the sections were indiscriminate. In the Virginia Military Reserve to the north of the Ohio Company lands, townships of only 5 miles square were set up, each of which was to be quartered and re-quartered into 1,000 acre units. Much the same happened in the Western Reserve. There was no prior survey in the Virginia Military District where a haphazard settlement and administrative pattern resulted.¹ Settlement patterns across the state also vary with the administrative boundaries from the geometrical in the Western Reserve, to the semi-geometrical in the company grants and the crazy-quilt pattern of the Military District.

Settlement After the 1796 and 1800 Acts

The acquisition of new areas of land from the Indians by the Treaty of Greenville, some of which was surveyed and ready for disposal in 1798; the disappointment with the sales of land in the Seven Ranges; and

1. Works Project Administration Writers' Project, The Ohio Guide, Oxford University Press, New York, 1940, p. 21.

the knowledge that many were squatting illegally ahead of the area under Federal control, were all factors which prompted the 1796 Land Act. This act attempted to deal with several matters. It authorized the survey of lands beyond the Seven Ranges. It attempted to thwart speculators who had taken much of the land in the Seven Ranges, by raising the price of land to two dollars per acre. This also doubled the Federal Government's income from this source. At the same time credit facilities were extended to one year in order to help the genuine land purchaser and settler. The minimum lot remained at 640 acres but tracts of 9 square miles (quarter townships) became available.¹ Fig. 10 shows diagrammatically the reduction in the size of lot available under the first ordinance, the 1796 and subsequent acts.

The 1796 Act was unsuccessful in most ways. Land sales did not appreciably increase. Many of these sales were to persons who purchased land without improving or using it but simply held on to it while its value appreciated. Squatting went on unabated. The credit facilities lost their point with the doubling of the minimum price of land since the settler was still required to find 640 dollars within 30 days of buying a section and another similar amount at the end of the year. Before 1796 only one such payment could have secured the same amount of land.

1. Clarke, op. cit. p. 197. Land offices for the sale of land were also opened closer to the areas of settlement.

A third land act, the Harrison Land Act, followed in 1800. The effects of this act upon land sales were far more striking largely because it went far to encourage the sale of Government land for the sake of settlement rather than as a means of raising revenue. The minimum price of land remained unchanged but the minimum sale units were reduced to half sections which were to be surveyed off in townships west of the Muskingham River.¹ Credit facilities were also greatly improved. Only one-twentieth of the purchase price was required at the time of sale, a quarter had to be paid in 40 days and the balance was to be paid over four years. A further year of grace was normally granted before the land was forfeited in the case of non-payment so that, in effect, a settler could obtain five years of secure settlement on 320 acres for an outlay of 160 dollars.² A further act in 1804 reduced the minimum lot size to 160 acres. Land sales were still held at auctions but more local land offices were opened close to the settlement areas and land which was unsold at the auctions could be purchased afterwards at the minimum price.³

Land sales and settlement rapidly gained momentum after 1800 with the incentive of these land acts and the much wider area open for sales.

1. Clarke, op. cit. p. 197.

2. Buley, op. cit. p. 103.

3. A further help to settlers was an 8 per cent discount to cash purchasers. Also, as these small parcels of land (160 acres) became available the surveyors marked off the quarter-section lines to form the farm boundaries and improved the rectangularity of settlement.

Between the July, 1800, sales and the end of 1801 some 400,000 acres were sold and almost as much in 1802. Sales annually remained at this level, or a little below, until the middle of the second decade of the century when they began to climb sharply to a peak in 1819. Table VII gives details of these sales.

In the early years most of these sales were of land in Ohio with some in southern Indiana, but the proportion in Indiana and Illinois increased in the second decade as Ohio became more densely settled and rising land prices there forced many pioneers to go further west to get Government land at lower prices (See Table VIII).¹ Another factor pushing the frontier on was the erosion and abandonment of some land after a few years of exhaustive cropping and the consequent need to uproot the settlers.

This rapid growth in land sales in the early years of the 19th Century both increased the density of settlement in eastern Ohio and moved the frontier zone on into southern Indiana and well into the

1. Cuming described the swarming humanity on roads in Pennsylvania and Ohio as the frontier rapidly moved west. Cuming, F., Sketches of a Tour to the Western Country, Year 1839., St. Louis, 1912, pp. 84 - 90. Others had described the activity in earlier years, for example, Hoffman, C.F., A Winter in the West., New York, 1835, pp. 42 - 48. But there was abundant land and little need to compete for the same piece. Faux tells of an Irish immigrant in Ohio who rode all night to claim a good piece of land expecting 20 competitors and finding none, in Thwaites, op. cit., Vol. 11, p. 184.

TABLE VII. Sales of Federal Land, 1800 - 1820.¹

<u>5 Year Period</u>	<u>Acres</u>
1800 - 1804 (inclusive)	1,293,334
1805 - 1809	1,715,645
1810 - 1814	1,820,768
1815 - 1819 ²	7,410,060

TABLE VIII Land Sales by States, 1800 - 1820.³

<u>State</u>	<u>Acres</u>
Ohio	8,848,152
Indiana	2,490,736
Illinois	1,593,247
Michigan	67,362

1. Adapted from Buley, op. cit., p. 137.

2. The figures for these years run from October, 1814 to September, 1819. Sales between October, 1819 and June, 1820 fell to 68,268 acres, only 3 per cent of the sales in the previous twelve months.

3. Buley, op. cit., p. 137. This table includes credit sales only which made up the greater majority of total sales.

south-eastern corner of the Corn Belt. Ohio was admitted to statehood in 1803 with most of its eastern, central and southern parts settled. The zone of settlement had also extended into the Whitewater valley in south-eastern Indiana where settlers from Kentucky and North Carolina were mixed. Over the next few years, as the eastern arm of settlement in Ohio met the southern branch advancing northwards from the banks of the Ohio River in southern Indiana, most of the valley lands in southern Indiana were taken up as far north as the Buffalo Trace leading to Vincennes. As can be seen in Fig. 8, this gave a zone of settlement up to 60 miles deep north of the Ohio River in southern Indiana. The lands closest to the Ohio River and along the valleys of its northern tributaries were the first to be settled and became more densely settled as the frontier moved on. The first counties to be organized in Indiana bordered the Ohio River and Indiana's first capital was set up at Corydon.¹

The early settlement of these southern hilly areas in Ohio and Illinois, as well as in Indiana, meant that they tended to develop a denser pattern of rural settlement than the flatter till plains to the

1. Corydon is in Harrison County which borders the Ohio River. Indianapolis (in the centre of Indiana) did not become state capital until 1821, three years after statehood. Even then only 47 of Indiana's 92 counties had been organized because three counties covered the whole of the vast northern and unsettled part of the state. The same northward movement of the capital occurred in both Ohio and Illinois as a result of the changing distribution of population with the advance of settlement. Committee on Southern Illinois, Southern Illinois. University of Illinois Press, Urbana, 1949, p. 10.

north which were taken up in the following years. Most of this southern settlement concentrated into the valley lands and as more settlers sought land they either moved further north or west into central Indiana and central Illinois. They also moved further from the river routeways or made clearings in the hill areas between the valleys.

The spread of settlement in the flatter parts of central Indiana and Illinois occurred mainly in the second and third decades of the century being a little later in Illinois. The settlers from the south were augmented increasingly by eastern and New England settlers especially after the Erie Canal was opened. Until then New England settlement appears to have been mainly confined to Ohio and the Western Reserve in particular, but the poor New England harvest in 1816 and the presence of the Black Swamp, which prevented settlement immediately west of the Reserve, in time led other New Englanders into central Ohio, Indiana and Illinois.

Altogether by 1820 an arc of settlement had reached across Ohio, central Indiana and south-central Illinois and Missouri with prongs running northwards up the Illinois and Missouri Rivers and with isolated pockets in the north around Detroit and the lead mining areas around Galena.¹ There were few large empty pockets of land behind

1. The mines had early attracted southerners as well as easterners. When mining declined Galena acted as a centre for agricultural settlement in south-western Wisconsin. Trewartha has made a study of the sequent occupance of the area including, Trewartha, G.T., "A Second Epoch of Destructive Occupance in the Driftless Hill Land, 1760 - 1832." Annals Assoc. Am. Geogs. 30, (1940), pp. 109 - 142.

this frontier except in parts of the hill and swamp lands and where speculators held land in an unimproved state while its value rose.¹

While the new states of Indiana and Illinois were growing rapidly in population, Ohio also was still taking in many settlers who filled in the unsettled gaps and created a post-frontier condition of settlement. The progress of this consolidation process is illustrated in Fig. 11. Ohio's population nearly doubled between 1810 and 1815 when it stood at 400,000, partly by an increase in rural settlement and partly because the first towns grew up. Communications connected her farms with eastern and southern markets. But at the same time Indiana's smaller frontier population grew more rapidly from 24,000 in 1810 to 64,000 in 1815.²

The year 1820 can be considered a convenient point to pause; not only because it had seen the establishment of consolidated post-frontier rural settlement in the eastern part of the Old North-west. It was

1. Speculators are known to have taken considerable sections of the land in Illinois between the Illinois and Mississippi Rivers largely by purchasing military warrants at low prices in the east and exchanging them for large blocks of land on the frontier. But, on a smaller scale, speculators held land in an unimproved state in many other areas. Dickens, on a journey to Columbus, Ohio, describes coming across "a waste of grass, trees and squalid huts purchased by an absentee owner so that no one else can claim it. Here it lies in the midst of cultivation and improvement like ground accursed". This was written as late as 1842, Dickens, C., American Notes. London, 1842. Republished, Premier Americana, Greenwich (Conn.) 1961, p. 221.

2. Buley, op. cit., p. 19. Indiana passed into the phase of less rapid growth once the frontier of settlement had moved on. In Ohio this phase ended in the 1820's but Indiana was still doubling its population each decade until 1840.

also the year of a new land act intended to solve some of the problems created by the previous acts which had finally encouraged rapid settlement in the area. By 1820 also the frontier of settlement was standing on the edge of some of the larger prairies in northern Indiana and Illinois. Over the next eighty years the prairies of the central and western Corn Belt were to be taken up in farms. The rural economies of both the wooded east and the prairie were to develop along lines which settled and used the land more intensively than was the case in the frontier zone.

Part II: Initial Settlement in the Central and Western Corn Belt and Settlement Consolidation, 1820 - 1900.

The 1820 Land Act was a major step in the Federal Government's change of attitude to the sale of its lands. The 1785 and 1796 Acts had done little to encourage rapid western settlement since the Federal lands were sold mainly to gather in revenue rather than to promote the settlement and development of that part of the country. The 1800 Act, and its 1804 successor, went far to helping the settler of more moderate means by offering credit facilities and smaller pieces of land.

The 1820 Act came at the end of a period of rapid land sales which suddenly collapsed in 1819, largely as a result of too much land being put on the market at one time both by Federal land offices and private individuals. As such the 1820 Act attempted to restore confidence and to get the momentum of new settlement moving again. The price of land was lowered and the minimum lot size was reduced even further to attract the settler of more restricted means (Fig. 10). The forward movement of the frontier recommenced in the early 1820's and was maintained across the Corn Belt for the next forty years by further acts aimed to encourage orderly freehold farm settlement. The process of encouraging such settlement culminated in the 1862 Homestead Act which gave land free to bona fide settlers. Even later land acts were designed to be more in the interests of conservation as settlement reached into semi-arid areas. But these attempts to shape the progress and pattern of settlement in the latter part of the 19th Century little concern the area of the Corn Belt, the form of whose settlement was largely fixed by then.

The 1820 Act made two major changes in land disposal in order to restore confidence after the 1819 fall in land sales. Firstly, the price of land was lowered from 2 dollars to $1\frac{1}{4}$ dollars per acre and the ~~minimum~~ size of lot was reduced to 160 acres and even 80 acres in some areas. This brought western farm ownership within the range of a greater number of people. A farm for 100 dollars was now possible and

the records of entries show that most settlers chose small lots. As a result land sales climbed in the years immediately following the act aided by the opening of the Erie Canal which especially brought in many eastern and New England migrants of moderate means. These now exceeded in numbers those coming into the Corn Belt by way of the Ohio River or from the south and the line of the Erie Canal route tended to direct these new settlers to the empty northern prairies of Ohio, Indiana and Illinois, and later, Iowa (Fig. 8).

Secondly, the Act attempted to eradicate problems of land reversion which had grown up in the land boom of previous years. The extended credit facilities of the 1800 Act had encouraged the settlement of land by those who could not afford to meet their final payments at the end of four years of settlement. As a result much of the land taken on credit facilities between 1800 and 1820 eventually reverted back to the Federal authorities. Others were only able to meet their payments by selling part of their holding in order to pay for the rest. Neither reversion, nor the flood of private land which came onto the market, was healthy for orderly settlement. At the same time as reducing the price and the amount of land that each future land transaction involved, the 1820 Act also restricted the credit facilities. The 80 acre holdings were only available for cash payment. Further, the outstanding debts on land bought at the old price were reduced to bring them in line with the prevailing prices and in this way minimized further

forfeitures. Even so they still about equalled the new sales between the years 1820 and 1825 after which they decreased rapidly.¹

With the opening up of the central and northern parts of Indiana and Illinois in the 1820's and some of the lands of Iowa Territory after 1830, major areas of prairie had to be faced for settlement for the first time. For a while the suspicion of prairie land, the lack of fuel, timber and water, and the problem of ploughing the sod slowed the broad forward movement of a solid front of settlement which had tended to be characteristic of eastern wooded areas. Instead the frontier became more hollow with tongues of settlement moving up the wooded valleys and along the edges of the larger prairies. At first the prairies were only used for the pasturing of animals belonging to farmers who had set up on the prairie edges or in the wooded valleys. The creation of true prairie farms and a pattern of settlement there required the development or utilization of new techniques of farming and a means of marketing the surplus crops which the system entailed. When this was achieved in the later 1830's the settlement spread rapidly in from the valleys and prairie edges to take up much of the available land in the next decades. Some damp prairies in Illinois and Iowa, however, were not drained and settled until the end of the century.

1. Buley, op. cit., p. 135. Buley has full details of the 1820 Act.

Most of the Indiana, Illinois and eastern Iowa prairies were taken up after 1840. Some of the small prairies in Ohio and Indiana were taken up before this date but none was occupied as early as the southern lands since these prairies in Indiana were only released from Indian control in 1818. Those of Illinois followed in 1819. The final remnants of some Indian tribes were not removed beyond the Mississippi until 1840 but after 1820 they no longer hindered the spread of white settlement.¹ In turn, the eastern part of Iowa Territory was taken for settlement and the Indians were shifted again. In the twenty years after 1820 about 75 million acres of land went to settlers so that by 1840 settlement had spread across nearly all of Indiana and Illinois and had crossed the Mississippi into Iowa. Meanwhile Michigan was being filled and south-western Wisconsin had become the most populous part of that state.² Further south the settlement of northern Missouri had been consolidated and settlers stood on the edge of Kansas Territory. The changing situation of the frontier of settlement is shown in Fig. 8.

Whereas Ohio and Indiana passed through a period when southern settlers outnumbered those from the east, until further eastern immigrants

1. Even so the frontier facing Iowa Territory was not safe in the 1830's since Indians who had been shifted across the Mississippi made occasional raids into Illinois. Clarke, op. cit., p. 470.

2. Smith, G.H., "The Populating of Wisconsin". Geog. Rev., 18 (1928), pp. 402 - 421.

righted the balance, Illinois, Michigan and states further west, except Missouri, were predominantly settled by New Englanders and other eastern persons without a southern influx. In 1837 two-thirds of Michigan's population had come from New England and New York and this proportion grew as the state attracted more settlers.¹ Table IX gives the number of persons of New York (eastern) and Virginia (southern) origin in four western states in 1850 as an indication of this trend.²

TABLE IX: Numbers of Persons of New York and Virginia Origin in 4 Western States, 1850.

	From New York	From Virginia
Ohio	83,780	85,975
Indiana	24,300	41,819
Illinois	67,180	24,756
Michigan	133,750	1,504

These eastern settlers were less and less pioneers in the same way as those who had made the first encroachments in the Old North-west. More of them came direct from well -settled eastern areas rather than from other isolated pioneer districts outside of the Corn Belt. Many had middle-class backgrounds and a certain amount of capital support which was often essential in the development of prairie farms. One major factor attracting them to the frontier was the decline in New England

1. W.P.A. Writers' Project, Michigan, A Guide to the Wolverine State. Oxford University Press, New York, 1941, p. 104.

2. Clakke, op. cit. p. 300.

where the farming systems were hit by the competition of cheap grains from the new western areas. Many New England and eastern farmers had to go west to survive.¹

The presence of these persons, rather than southerners, undoubtedly helped the prairie areas to develop their commercial farms rapidly so avoiding the frontier subsistence economies which characterized many southern settled areas for several years.

Settlement in the prairie areas went on rapidly once the problems of their development were mastered. Iowa provides a useful illustration of the speed of prairie settlement. Clarke has pointed out that white settlement had not been allowed beyond the Mississippi River before the 1830's although a few families had already crossed to search for minerals opposite the Galena mines. The pressure for land beyond the Mississippi led to the treaty with the Sac and Fox in 1832 for a 6 million acre, 50 mile wide strip along the eastern side of the present state of Iowa. Within three months of the opening of the area some 2,000 persons had settled, in spite of a law which prohibited such squatting before survey. 20,000 had, by 1836, staked claims to land even before the survey had begun.²

1. Billington, R.A., Westward Expansion. MacMillan, New York, 1960, p. 302. The eastern urban class contributed little to this westward movement to the land. See Goodrich, C. and Davidson, S., "The Wage Earner and the Westward Movement". Political Science Quarterly, 50 (1935), pp. 161 - 185, and 52 (1936), pp. 61 - 116.

2. Clarke, op. cit. p.593.

By 1838 the population in the strip had reached 23,200 so that a further $1\frac{1}{4}$ million acres of land was purchased from the Indians to relieve the pressure.¹ By 1846 the population had reached 116,454 and it grew by another 76,000 to 192,214 by 1850.² Between 1850 and 1860 482,000 entered the state most of them coming from Indiana, Illinois and Ohio where droughts and an increase in the density of farm settlement had caused some hardship.

By mid-century even the western prairies beyond the Missouri River, which had been referred to by explorers like Pike as desert land incapable of settlement, were being taken up in farms.³ But a change in the frontier economy occurred as settlement reached into these sub-humid areas. Whereas previously the cattle ranching economy, which often went ahead of frontier farm settlement, was eventually displaced by the expansion of cultivation, in these Western areas cultivated districts remained discontinuous. Nor has the density of settlement ever been as great as in eastern areas

1. Murray op. cit., p. 36.

2. Bureau of the Census, Census of Population, Vol. II, Characteristics of the Population, Part 15. 1950, Table I. 95 per cent of this 1850 population was classed as rural.

3. For details of the variable extent of the so-called American desert in contemporary literature, see Lewis, G.M., "Changing Emphases in the Description of the Natural Environment of the American Great Plains Area". Transactions and Papers of the Institute of British Geographers, 30 (1962), pp. 75 - 90. Coues, E., The Expeditions of Zebulon Montgomery Pike. II, Harper, New York, 1895, p. 525.

and in-and out-migrations at times of rainfall fluctuations have prevented it achieving as much economic stability. It is true that settlement in these far western parts of the Corn Belt, and beyond in the Great Plains, was aided by new land acts designed to encourage cultivation, irrigation and tree planting, but it is also clear from the movement of peoples out of the area in later years that these acts did not fully fulfil their purpose by adjusting the forms of settlement to the conditions that the settlers met.¹

Settlement Consolidation and the Role of Communications.

The frontier of settlement has tended to get undue attention from

1. It is not necessary to refer to these later land acts in detail since they were largely applied in areas beyond the Corn Belt. They included the 1862 Homestead Act which gave 160 acres of free land to genuine settlers and the Timber Culture Act, 1873, which gave 160 acres to any settler who would plant trees on 40 acres of the grant. This act was mainly intended to restore woodland losses in more eastern areas but the act provided a way for some western settlers to acquire an extra quarter section of land. The 1862 Homestead Act was applied in these sub-humid areas, but it had two marked faults there. A quarter-section of land per family was insufficient in these areas as can be seen by the losses of settlers which occurred in dry years. Hence settlers tried to create larger holdings by acquiring portions of adjoining land under different land acts. Secondly, the division of land into sections was unsuited to dry areas where each farmer needed to control a portion of a drainage basin. Powell recommended in his report that western pastoral farms should have their boundaries related to topographic features and it is probable that better land division in the western Corn Belt could have prevented the unstable settlement conditions which are still resulting in losses of farm persons as increasing farm size tries to achieve an economic balance for the profitable use of machinery. The Enlarged Homestead Act of 1911 allowed settlers to take up farms of 640 acres but this came too late for the western Corn Belt. References to these later acts can be found in Webb, W.P., The Great Plains. Grosset and Dunlap, New York, 1931, and Department of Agriculture, Land, the Yearbook of Agriculture, 1958 Washington, 1958. The Powell Report is Report on the Lands of the Arid Region of the United States. (1879), Reprinted and edited by Stegner, W., Belknap, Harvard University Press, Cambridge, 1962, p. 40.

the historians of the Mid-West when far more settlement was going on by a less spectacular process of infilling well behind the frontier zone. The resulting increase in the density of farm settlement and a growth of commercial farming allowed an infrastructure of communications and towns to be slowly created. The primary means of communications in the eastern Corn Belt in the early years of settlement had been the Ohio River and its tributaries and the trails adapted from the Indians which often ran from the rivers to inland areas.¹ Rafts and other small craft were used on the rivers and packhorses were most common on the land routes. Improved roads on which carts and wagons could be used came after about 1820. The National Road, built to aid western movement, only reached Wheeling on the Ohio in 1817. On the prairies the rivers were farther apart and less navigable so that lines of communications had to be created especially as the main rivers ran north to south and most of the settlers on the prairies were coming from the eastern seaboard and eastern parts of the Corn Belt.

One of the most important of these new lines of communication was the Erie Canal which, with the Great Lakes, made the lands of northern Ohio, Indiana and Illinois accessible to migrants from Pennsylvania and the east. Its opening was foreshadowed by the beginning of steamboat

1. For a study of these route developments see Brown, R.H., Historical Geography of the United States. Harcourt Brace, New York, 1948, pp. 255 - 269.

services on Lake Erie in 1818 which principally served to move migrants westwards. Indeed the first years of the canal's operation saw it acting as a migrant route rather than moving agricultural products to eastern markets. This only became its main role once settlement on the prairies had become firmly established.

The water route competed with a road running across northern Ohio. Although this route fed many migrants into northern Ohio, much of which was settled before the canal was opened, extensions of the road beyond the Western Reserve were hindered by the presence of the Black Swamp.¹ This virtually cut Detroit off from the east until the canal allowed the settlement of southern Michigan and northern Indiana to go ahead. The movement of farm produce out to eastern markets by way of the canal saw also the virtual cessation of agricultural exports down the Ohio and Mississippi Rivers to New Orleans. The early necessity of moving farm produce southwards had encouraged the conversion of much corn into pork and whisky. This was no longer essential with the Erie Canal. Grains as well as livestock were now taken east encouraging an increase in corn and animal production. Upstream movements on the Ohio were not possible until 1830, but by then the river had lost its trading initiative to those other routes.

The Erie Canal soon became an important link in a series of canals which spread across Ohio and parts of Indiana aiding both settlement and

1. The Black Swamp of north-western Ohio was a 1500 square mile area of ill-drained plain on the east side of the Maumee River (see Fig. 3).

the export of farm products. These canals were built to link Lake Erie and the Ohio River and to cross the settled lands and potential areas of settlement in Ohio. The Cuyahoga, Scioto, Miami and Maumee Rivers provided the main links in Ohio under an 1825 State Improvement Plan.

Indiana's canal system was far less extensive since much of it was abandoned in the economic depression at the end of the 1830's. A water link between Lake Erie and the Ohio was constructed through Indiana by way of the Maumee and Wabash Rivers but the project came only shortly before the advent of railways in the state and was not a financial success.¹ The disposal of land along the line of the canal in order to help pay for it did, however, aid the settlement of central Indiana. As the canal building programme in Illinois came even later none of it was implemented before railways became the main means of transportation.

Feeding trade to these canals and creating a web of routes between them, were state and Federal roads and other tracks which had previously been Indian trails. The National Road reached Indianapolis where it is intersected with a north-south state road which joined the southern part of the state to the new capital. It also passed north to the newer areas of settlement. In Illinois the south was settled first using the rivers and the Indian trails. State roads were built north towards

1. Taylor, G.R., The Transportation Revolution, 1815 - 1860. Rinehart, New York, 1951, p. 46.

Chicago and to the new areas of settlement where rivers could not carry the traffic. Between these rivers, canals and major land routes, an infrastructure of minor roads was slowly created along the survey lines. The density of this infrastructure largely depended on the amount of settlement and number of county taxpayers who could support the cutting and maintaining of roads but, clearly, more roads tended to attract further settlers where land was still available. Areas which had other hindrances to settlement tended to be poorly served with roads until settlement brought a need for them.¹

Railway building came after the canal and primary road network of Ohio and Indiana had been laid out, but as the momentum of railway construction increased it brought lines right into the newly settled frontier areas. They replaced the canals and state roads as the primary means of aiding settlement and exporting the products of the new farming districts. Indeed, in the western parts of the Corn Belt the railways were built at the same time as frontier settlement was being laid out and so created the accessibility which had been provided by the rivers in the pioneer settlement of the eastern Corn Belt.

L. The Black Swamp of Ohio had little settlement and road development before 1860 compared with surrounding areas. See Kaatz., M.R., "The Black Swamp: A Study in Historical Geography". Annals Assoc. Am. Geogs., 45 (1955), pp. 1 - 35. The Kankakee Marsh was a similar empty area until the 1880's. See Meyer, A.H., "The Kankakee 'Marsh' of Northern Indiana and Illinois." Papers of Michigan Academy of Science, Arts and Letters, 21 (1935), pp. 366 - 395. More attractive areas, like the Upper Scioto Valley, found denser settlement was dependent upon road development. Buley, op. cit., p. 23.

The densest rail net was created in the states east of the Mississippi where at least some means of communication already existed. In Ohio and Indiana there were also the recently built canals and roads but in Illinois and further west there were fewer navigable rivers and Indian trails. The spur to rail building was largely trade competition between the eastern market centres eager for a share of the growing trade of the newly developed interior. The Erie Canal had given New York a favoured position for trade with the interior so that Philadelphia countered with a mixed rail and canal system to Pittsburgh which spread westwards from Pittsburgh after 1852.¹ Baltimore, which had taken an interest in western trade as the terminus of the National Road, re-developed her interest. Her rail link was later extended to Cincinnati in competition with other lines including one which reached the Ohio through Kentucky.² New York also joined in with a line to Lake Erie which had connections to Cincinnati and Chicago by 1860. Other smaller companies laid out linking lines so that by 1860 Ohio had a complete rail network.

The rail nets in Indiana and Illinois also grew rapidly and were almost complete by 1860. Each was an extension of the lines which crossed Ohio but in both cases the density of lines was less since far

1. Havighurst, W., op. cit., p. 124.

2. Clarke, op. cit., p. 356.

fewer market centres had been able to develop in either of the states.¹ The railroad companies could thus choose their routes and market centres tended to grow up along these whereas railways in Ohio had, in many cases, to serve pre-existing centres.

In spite of the relative completeness of these systems in Ohio, Indiana and Illinois, few railways had reached across the Mississippi River before 1860. Much of Iowa was settled overland by wagon or by settlers taking journeys up the Mississippi and Missouri Rivers. Regular steamboat services operated on these rivers to towns such as Kansas City and Omaha and further north on the Minnesota River.² In time the rail builders caught up and contributed to much of the filling-in process of settlement in these areas and many of the later settlers, including European immigrants, arrived in the west by rail. In the far western Corn Belt settlement was not attempted before railways had crossed the Missouri River and had reached right to the frontier.

Problems of Prairie Settlement

The open prairies of Illinois and further west were not at first attractive to settlers. These areas presented very real problems. Suspicion of prairie soils which did not grow trees was only of secondary

1. Both Indiana and Illinois lacked centres at this time from which rail nets could develop. Indianapolis was still small and Chicago only became a rail centre when railways spread beyond the Mississippi River.

2. River transport declined as military and state roads as well as railways radiated out from these centres. See Brown, op. cit. p. 332.

importance. One of the main problems seemed to be that the absence of timber made settlement prohibitively costly. Small eastern prairies in Ohio and Indiana had been settled soon after the surrounding woodland but, here, timber was never far away.¹ In western prairies timber, which was needed for housing, farm buildings, fencing and fuel, was often in short supply and the hauling of logs, where roads had not been developed, could be both hazardous and expensive.² Movement across the prairies was most difficult after the spring thaw and a general lack of rock outcrops meant that stone roads could not replace the plank roads which had been laid in Ohio and Indiana.

Upland damp prairies were avoided in most cases until the last two decades of the century when tile drainage techniques were introduced and drainage districts were organized.³ Prairie settlement also presented other problems which could only be overcome at some expense and most

1. Thus Stork County, Ohio, was a small prairie which was unfarmed till 1833, years after surrounding woodland had been cleared, but by the 1840's it was a leading wheat producer in the state. Bidwell, P.W. and Falconer, J.I., History of Agriculture in the Northern United States, 1620 - 1860. Peter Smith, New York, 1941, p. 267.

2. The desire to settle on the prairie edges close to the woodland has been demonstrated in a settlement study of Story County, Iowa. See Hewes, L., "Some Features of Early Woodland and Prairie Settlement in a Central Iowa County". Annals Assoc. Am. Geogs., 40 (1950), pp. 40 - 57.

3. The damp prairies were mainly in the Illinois Grand Prairie, north-central Iowa and the Red River Valley. Hewes has attempted to map them in Hewes, L., "The Northern Wet Prairie of the United States: Nature, Sources of Information and Extent". Annals Assoc. Am. Geogs., 41 (1951), pp. 307 - 323. Many upland prairie farms on drier land contained patches of damp land which were gradually eliminated.

often by settlers, like Scandinavians, with the necessary skills.¹ Deep wells were often essential. The prairie sod was thicker under western prairie soils than that encountered in the east. The wooden mould board plough and the cast iron tool, which were satisfactory in woodland soils and those of the small eastern prairies, were quite unsuited to the western areas. A steel plough which could turn the thick sod over and would self-scour in the sticky soils was first developed in 1837 but it was an expensive implement to buy and also to use since it required a team of oxen. The labour of sod ploughing may not have been as great as clearing the eastern woodland but as it involved more equipment it was necessarily more expensive. Figures of $1\frac{1}{2}$ - $2\frac{1}{2}$ dollars per acre were quoted commonly for ploughing under contract which meant that the preparation of the land could cost more than the land itself.² To this must be added the cost of getting timber from elsewhere so that the overall preparation of the land for farming might amount to three or four times the initial outlay for the property.³ Also to be added was the cost of basic implements for grain farming including a thresher and

1. Though some early settlers avoided the prairie through suspicion of the quality of their soils, many recognised their potential as well as their difficulties. Bradbury, for example, saw that the Indiana and Ohio prairies were good for stock and did not need to be cleared. He went so far as to say that "had this portion of the country been placed at no greater distance from the Alleghenies than the wooded region it would undoubtedly have been the first settled". Bradbury, J., Travels in the Interior of America in 1809, 1810 and 1811. London, 1819, in Thwaites, op. cit., Vol. 5, p. 295.

2. See for example, Buley, op. cit., p. 147 and Bidwell and Falconer, op. cit., p. 271.

3. Timber sold at 25-30 dollars per thousand feet in the 1830's in some prairie areas which was the general price in the Corn Belt in 1900 in spite of changes in money value.

reaper. Murray quotes one example of a settler's outlay in 1850 which shows that his basic requirements were nine times the cost of the land (Table X)¹.

TABLE X Costs of Items for Prairie Settlement

Item	Approximate cost (dollars)
160 acres of land	200
Cabin	350
Sheds	100
Fencing	320
Sod-breaker	480
Thresher	200
Oxen	100
Reaper	175
	<hr/>
	1925
	<hr/>

Even accepting that this is a greater outlay than many prairie farmers could afford to make within the first year of settlement it is clear that a considerable sum was necessary to get farm operations under-way.² This meant that many migrants were forced into tenancy as a means

1. Murray, op. cit., p. 45.

2. There were ways in which some settlers reduced this outlay. Owing to the high cost of imported timber, osage and wire fences were commonly used in place of 'worm' or some other type of fencing which used large quantities of timber. Barbed wire came into general use in the 1870's. Others did without sod-breakers and contracted out for the initial ploughing.

of securing a home and occupation while it also dissuaded the migration of persons to the prairies who did not have the means to meet these costs.

While the prairies presented physical obstruction to settlement until transport, implements and suitable settlers could overcome them, Federal land acts and other means of controlling the disposal of land no longer stood in the way of the progressive settlement of the prairie Mid-West. This was somewhat in contrast to land policy in the early years of woodland settlement. The encouragement given to settlement by the 1820 Act was re-affirmed in later acts notably the 1841 Pre-emption Act, the 1854 Graduation Act and the 1862 Homestead Act which finally granted land freely to all who would settle and improve it. Since these acts were as important as the techniques in shaping prairie settlement, it is necessary to say a little more about them.

Pre-emption, Graduation and Free Land.

Squatting ahead of the official frontier of settlement had been a common practice since the first Federal lands in the Old North-west were opened up. It had been declared illegal but was a practice difficult to curb. The early, slow progress of the surveyors, the rise in the price of Federal land after 1796 and the cessation of credit facilities in 1820 had all tended to increase squatting. The risk of eviction was often well worth taking. By squatting ahead of the area which had been

surveyed and placed on sale, the pioneer was able to choose his own site and get the use of it for a season or two before he was evicted or his area was included in the next batch of land for sale. Many were then able to buy at the land sales the pieces they had already taken so that the custom of pre-emption grew up. This gave the squatter the right to purchase his selected piece of land in preference to other interested parties. As this became a widespread practice, pre-emption acts relating to specified areas were passed at different times after 1800. By these acts the squatters, or pre-emptors, were protected from those speculators and others who sought to outbid them for land which they had already partly improved and whose value was clearly above that of surrounding unimproved land.

In areas where pre-emption acts did not apply, claim clubs had often grown up. These were composed of the squatters who banded together at the land auctions to prevent speculators bidding up the prices on the land which they had already settled and hoped to buy at the minimum price.

By 1820 most of the Mid-West was covered by various acts which recognized pre-emption rights while other acts operated in some areas for temporary periods. The 1841 Pre-emption Act finally recognized the demand for the right to select one's piece of land and settle it without having to fear that the price might be raised at the auction. By the

Act pre-emption became the normal method by which land was chosen as long as the claims made were within the boundaries of the survey lines. Each pre-emptor then entered his claim and paid for it at a private sale. The act did not apply to lands which were being sold by the states, by railway or canal companies or by private individuals. Prices for these lands were inevitably higher.

The Federal Government encouraged the rapid disposal of land in other ways but tried to promote orderliness in the process. Land warrants were issued liberally after 1840. In 1847 Congress offered bounties of 160 acres to all recruits for the Mexican War. Further acts in the 1850's gave similar bounties to all who were veterans of Indian wars. Many of these warrants were unused by their recipients and were sold cheaply to speculators who exchanged them for large blocks of western land.

Under the 1854 Graduation Act some western land prices were reduced below the previous minimum. Land which had been on sale for some time, but had remained unsold, had its price reduced in proportion to the length of time it had been available. If it had remained unsold for 30 years it was offered at a minimum of $12\frac{1}{2}$ cents per acre, only one-tenth of the minimum price for newly available Federal land. There was no limit on the amount of this land which could be purchased. In the Mid-West the main drawback to most land which did not sell well was its

inaccessibility. Land of this type soon gained in value as transportation improved.

The Homestead Act of 1862 was a final inducement to settlers to the western unfilled areas. As such it might be considered a concluding stage in a liberalizing process as far as Corn Belt land was concerned, since by the time later land acts were passed the settlement of the Corn Belt had largely been achieved. Indeed, few Homestead entries were made in the Corn Belt since most of the region had either been settled by 1862 or unsettled land had already passed into the hands of State, other bodies and private individuals who were offering it for sale at much higher prices than prevailed for Federal Land.¹

Under the Act 160 acres was granted free but for a registration fee to any who would settle and "prove up" on the claim. There were some restrictions on the land available under the Act. It only applied to land outside of railway grants and as such the main drawback to most Homestead land was its remoteness. Thus one Iowa land company in the 1860's stated in its advertisements for its own land sales that "under the Homestead Law, the settler must in order to get a good location go far out into the wild and unsettled districts and for many years be

1. Shannon has calculated that only 208 farms were entered under the Homestead Act in the area east of the Mississippi River by 1904. See Shannon, F., "The Homestead Act and the Labor Surplus". Am. Hist. Rev., 41 (1936), pp. 637 - 651. More were entered west of the Mississippi but these made up a small percentage of the land settled in the western Corn Belt. The first entry under the Act was made by a settler in Nebraska Territory near Beatrice, Nebraska in the western Corn Belt. The site is now reserved as a National Monument. See, Guide to Homestead National Monument, United States Department of the Interior, Washington, 1961.

deprived of school, priveleges, churches, mills, bridges and in fact all the advantages of society."¹

The Act was also open to abuse. There was nothing to stop a man and woman selecting 160 acre plots next to each other in their own names before their marriage and so creating a 320 acre farm area. Dummy entries or entries using fictitious names were also possible.

The Act perhaps gets more attention than it deserves, certainly in its effect upon Mid-Western settlement. Much of the land in the area had already been settled by 1862 or at least sold. Most of the free land was too remote from the eastern landless and industrial poor who sought a new life in the west. Throughout the settlement of the Corn Belt the majority of the settlers were farmers who had come from adjacent states to the east and it appears that the settlers of Homestead land were no exception. This free land only attracted settlers when better, purchaseable land was no longer available or when some of the disadvantages of the homestead land had been removed by the development of communications, drainage and other improvements.

Free land did not halt the sales of higher priced State and private land which was generally more accessible and of better quality. Nor did

1. Quoted in Gates, P.W., "The Homestead Law and the Incongruous Land System". Am. Hist. Rev., 41 (1936), pp. 652 - 681.

the pre-emption and sale of federal land cease. As homestead land was not available to those who had already pre-empted land elsewhere, some took a homestead piece and then pre-empted an adjoining 160 acres to create the larger farm often needed in the west. The growth in the amount of land held for sale by speculators and states also meant that many western settlers had several sources of land open to them apart from that obtainable under the 1862 Act.

Land Sales by Speculators and States - Non-Federal Land Sources

There was very little in the methods adopted for the disposal of lands in the Old North-west which greatly discouraged speculative acquisitions, and as the frontier moved west the speculator appears to have played a bigger role in the settlement process. The revenue principle by which the early acts were operated encouraged the sale of blocks of land too large for individual settlers so that much of this land was bought up by those hoping to speculate in its re-sale. In subsequent land acts the minimum size of plot and piece of land was reduced to encourage the genuine settlers but this did little to prevent speculators who bought land and held on to it as its value rose. There was no restriction on the number of entries that one person could make until the 1862 Act when it had been realized that the supply of useful land was beginning to run out. Nor was there any way of preventing speculators buying up liberally-issued military warrants from those who

had gained them but did not want to use them.

It is hardly surprising that speculation grew as settlement spread for the line between the speculator and the genuine settler was sometimes not easy to draw. Many genuine settlers bought more land than they needed, a practice which was enforced by the nature of the early land acts. Part was then improved and farmed and part was sometimes held for later re-sale when prices in the area had risen. A sale of part of the holding would help to pay what was outstanding on the total holding. Some failed in this plan and suffered foreclosure for non-payment on their land. Some abandoned their holdings when the soil was exhausted and moved west to find new cheap land. Some who had mortgaged their land and then could not meet the re-payments left moneylenders and banks in possession of several parcels of partly improved land. Land changing hands in this way all contributed to speculation.

The amount of speculation increased also as the rate of land disposal gained momentum. By the time that the frontier had gained a firm footing in the central Corn Belt, land was readily obtainable from several sources and by several methods and it was quite clear from earlier experiences that land values were rising continuously. Prairie land, in particular, was subject to speculation. In the land boom of 1835-37 much of the Indiana and Illinois prairie land passed into relatively few hands. Gates has made a study of land policy and

speculation in the prairies and has shown that several holdings of 20,000 acres were built up in Indiana, Illinois and Wisconsin.¹ After the decline in sales in the late 1830's and 1840's speculation was again rife in the period between 1850 and 1860 when much of Iowa, Nebraska and Kansas was open for settlement. Again large portions passed into a few hands.

Table XI shows the ways in which land in Iowa was disposed of. The 14 million acres of land exchanged for warrants mainly went to persons who had bought up large numbers of warrants while some of the land disposed of for cash was similarly bought at the low Federal prices and allowed to gain in value before being re-sold. Gates estimates that 20 million acres of Iowa land went into speculative hands at some time in the 1850's. Altogether only about one-quarter of the Federal land in Iowa passed directly into the hands of genuine settlers.

These processes of land speculation altered the pattern and progress of settlement significantly in some areas. Lands in the hands of speculators would generally be unavailable for settlement or improvement for years causing genuine settlers to bypass such areas and go further west. It also enhanced the development of a more hollow frontier on

1. Gates, P.W., "Land Policy and Tenancy in the Prairie States", Journal of Economic History, I(1941), pp. 60 - 82. Part of this section is based on this source.

TABLE XI The Disposal of Public Lands in Iowa.¹

	million acres
Total area distributed	36
for cash	12
under Homestead Act	1
for warrants	14
for state improvement schemes	7
to support education	2

1. Adapted from Murray, op. cit., p. 47.

the prairie. Owners of unimproved land did not normally pay local taxes so that road-building and school development in such areas were delayed.

The control of land in this way often lasted for as long as a generation before the holding was broken up and the land brought into use.¹ This resulted in some cases from the financial failure of the owner who waited too long for the land value to rise. Other speculators sold their land at inflated prices and many installed tenants.² Some owners tried to farm their large holdings with armies of labourers. But labour was in short supply and difficult to hold without giving it at least the security of tenancy.

The prairies still have a higher tenant - farm rate than the wooded eastern and southern counties of the Corn Belt where farm tenancy did not receive an initial boost by land speculation. These higher rates are also enabled by the better returns obtainable on prairie land that allows both owner and tenant to make a satisfactory living. Higher tenancy rates also derive from the growth of grain farming in the Illinois and Iowa prairies which gave rise in the last century to the landless

1. Welby remarked of an area near Chillicothe, Ohio, which was owned by speculators "under whose baneful influence a chief part of the county remains a wilderness which otherwise would have been under cultivation". Welby, A., A Visit to North America and the English Settlements in Illinois. London, 1821 in Thwaites, op. cit., Vol. 12, p. 207.

2. Watterson, A.W., Economy and Land Use Patterns of McLean County, Illinois. University of Chicago Press, Chicago, 1950, p. 47.

farm labourer not common in the wooded east. Many of these workers in time rented a quarter-section as a step to ownership when machines made them redundant.¹ Some moved west to cheaper land while the rest remained as a core of tenant-farmers in a society which had been planned for the occupancy and operation of farms by their owners.

At the same time as private speculation in land was active, large areas were also taken up by the states themselves. These were then offered for sale to settlers at prices well above those asked for Federal land. Land was granted to states by the Federal Government in order to finance internal improvements within the Mid-Western states. Most commonly these land-financed improvements were concerned with canal and railway construction and the provision of educational facilities. This method of financing became more common later in the period of Mid-Western settlement so that greater areas of land for disposal were placed in the hands of western states than occurred in eastern parts of the region.

The earliest grants were made for canal and road building under state internal improvement acts. 1,142,000 acres were granted to Ohio from unsold Federal land in Ohio in 1823 to finance road building and a further 480,000 acres went for canals. In contrast, grants in Iowa

1. Meakin reported that the hired men were most often the new immigrants who, in time, would save up to rent their own land. Meakin, A., What America is Doing, Letters from the New World., Blackwood, London, 1911, p. 140.

totalled 7 million acres for road, rail and river schemes apart from a further 2 million acres to provide higher education in the state. Such grants were in addition to 5 per cent of the proceeds from the sale of Federal land which each state received for its own purposes.

Grants to help finance railway construction were especially large and by their nature an important influence upon settlement. No such grants were made before 1850 previous to which the railways were only allowed the right of way to lay their tracks. As settlement had reached well into the prairies by mid-century, the railways had to replace rivers as the main means of migration west. To encourage the construction of railways into these lightly settled areas, land each side of the path of the proposed railway was granted to the railway company in the same way that had been adopted to finance canal building in the 1820's and 1830's in Ohio and Indiana. Sections of land each side of the track were withdrawn from the public domain and one half were granted to the railway company for sale to settlers at the highest prices obtainable while the other sections were taken by the state to help cover their costs incurred in the construction of the lines.

The first grant of this type was for the Illinois Central Railroad which received alternate sections of land for a distance of 6 miles each side of the track. Where the line passed through land already settled or sold, alternate sections up to a distance of 15 miles from

the track were transferred. The success of the system in aiding rail construction and settlement led to a flood of subsidized lines. Not only did it open up previously poorly accessible areas but put large amounts of land into the hands of the states and railway builders who promoted its sale to settlers. The state sections could not be sold for less than $2\frac{1}{2}$ dollars per acre or twice the normal price of Federal land while the railways opened their own land offices and by widespread advertisement generally sold their land at considerably higher prices.

Although railway-side land was more expensive to buy, the accessibility of such land undoubtedly outweighed the burden of higher initial costs to the settlers. The encouragement which the new lines gave to settlement can be seen in the fact that reports and older maps suggest that much rural settlement collected close to these lines just as the wooded tongues of streamside land in prairie areas had also acted as nodes of initial farm settlement. Most village and town settlements in the western Corn Belt were sited at convenient intervals on the railways and the value of farmland declined in proportion to its distance from the tracks. These towns, which acted as local centres for the rural areas, were soon connected up with the surrounding farms by county road networks which, in time, made outlying land more accessible and spread settlement out from the railways.

Educational improvements in the Corn Belt states were similarly carried out with the help of land sales. Ever since the 1785 Ordinance the 16th section in each township had been set aside to be rented or leased to provide funds for education within the township. After 1836 most states obtained the right to sell these sections as their renting became administratively burdensome. Such funds did not provide for higher education. The Morrill Act (1862) allowed each state to remove 30,000 acres of its public land for each Representative and Senator it had. This land could be sold at the best prices obtainable to finance places of higher education. Land was also transferred to states in order to endow land-grant colleges.

These large transfers of land to the states and to railway builders, and the massive amount of speculation by private individuals, considerably reduced the amount of land which was available from Federal offices at the nominal price of $1\frac{1}{4}$ dollars per acre.¹

Woodland and Prairie Settlement

Altogether one can point to marked differences between the conditions which influenced settlement in the early years until 1820, when pioneering was confined to the eastern Corn Belt, and other factors affecting settlement in the centre and west after 1820. These factors

1. Murray, op. cit., p. 47. This source covers these aspects of land disposal fully and has been freely used in compiling this section.

divide into two types. There were those concerned with the land, the sources from which it was obtainable and the terms of its availability. During the earlier period land was mainly available from Federal land offices with the exception of certain state claims and land company grants. The cost of the land and the minimum size of lots deterred many from legal settlement. Instead, many squatted in backwoods locations. As southerners made up the bulk of early settlers in southern Indiana, southern Illinois and Missouri, this type of settlement became characteristic of them and of much of the early woodland settlement of the Eastern Corn Belt.

Later Federal land acts became progressively more liberal, released more land and aided rapid, orderly settlement within the framework of prior survey. Also, as settlement moved into prairie areas more land was obtained and sold by states, railway companies and speculators at prices varying according to the quality and accessibility of the land and according also to how much settlers were prepared to pay.

Hence, cheaper Federal land did not also mean that poorer, eastern, landless persons could more easily make a farm in the west. Indeed, as better land tended to sell at higher prices the cost of settlement tended to increase on the prairies. This favoured the migration into the Corn Belt of eastern and Mid-Western farmers of moderate means rather than the poorer southern pioneers and urban landless.

A second set of factors contributed to the change in conditions of settlement before and after 1820. These factors mainly concern changes in techniques needed as settlement moved from woodland to prairie areas. Before 1820 the main requisite for success in woodland settlement was hard labour rather than more sophisticated techniques of commercial farming, marketing and capital investment. These early, mainly southern pioneers, made their scattered clearings generally on riverside sites where creeks gave a source of water and a means of transportation. Each family pioneered in relative isolation of its neighbours apart from social occasions like "log-rolling" (i.e. cabin-building). As they lacked outside connections with markets, the pioneers farmed on a subsistence basis and the clearing, and its surrounding forest, provided most of the settlers' needs on a primitive standard of living. Corn, the main crop, was well suited to the climate, the woodland soils and the small clearings. Houses and buildings were mainly crude log structures built of the material which had to be cleared to allow farms to be made. Clearings were made by felling, firing and girdling the trees. Cultivation, for the first few years, was carried on between the stumps.¹

1. Although there are many descriptions by contemporary writers of conditions on the frontier, it is difficult to assess their representativeness. Conditions varied widely from area to area and accounts were also diverse because of the travellers' prejudices. Some were preparing guide-books to attract more settlers and so impressed the readers with the benefits of frontier life. Others, particularly European travellers, were more critical when comparing the new settlements with older societies in Europe. One example of this can be seen in the many accounts for and against Birkbeck's early prairie settlements in south-eastern Illinois. These accounts ranged from the very complimentary statements of Birkbeck himself and Flower, his associate. On the other side there was Henry Fearnon. He suggested that only the very poor in England could stand to gain by emigrating. See Flower, R., Letters from the Illinois, 1820, 1821, London, 1822, in Thwaites, op. cit., Vol. 12. and Fearnon, H., Sketches of America, A Narrative of a Journey through the Eastern and Western States of America, London 1819.

As other settlers made neighbouring clearings, much of the forest was removed over large areas. Fields, better farm buildings, roads and market centres were created as more settlement took each area out of its frontier condition. Log cabins were replaced by frame houses when saw mills were set up. Improved river, canal and road links with the south and east encouraged commercial farming although crop rotations did not develop until much later in the century.

Settlement in the central and western prairies occurred against a background of changing technological conditions and needs.¹ Prairie settlement required settlers with the means to utilize land which needed heavy ploughs and to which fuel, building and farming materials had to be brought. This meant that settlers had to have, or soon acquire, some capital and successful prairie settlement was normally dependent upon the development of commercial grain farming and a transport and market network. This in turn spurred changes in the eastern areas where the settlers had to develop commercial agriculture to compete with the prairie farmers.

The prairie frontier of settlement was more temporary and less primitive than it had been in the woodlands since it was soon linked with eastern markets which sent goods and implements into the area. Settlement consolidation soon followed on initial settlement as can be seen by a comparison of Figs. 8 and 11. Farmers from the eastern areas

1. Prairie settlement occurred mainly in states west of Indiana but even in these areas woodland was still to be found especially along river valleys. A woodland cover predominated in Ohio and most of Indiana before major clearance occurred with settlement. An approximate distribution of the original woodland is shown in Fig. 28, the unshaded areas being prairie.

made up most of these settlers and European migrants filled up untaken land. Prairie farms quickly acquired fences, timber buildings and many of the conveniences of life common in the longer-settled east.¹ Minor roads linked up farms to local market and rail centres as a regional economy developed. In return the average prairie farmer soon enjoyed, as he still does, a higher standard of living than his counterpart in the woodland.²

The Failure of Nucleated Farm Settlement in the Corn Belt

The effects of these various influences upon the forms and features of farm settlement in different parts of the Corn Belt will be considered further in later chapters. Influences which have operated in more recent decades will also be examined. But one other aspect of the historical approach to settlement development is worth brief consideration, namely, the failure of group farm settlements or farm villages to establish them-

1. Immigrants like Gro Svendsen found plenty to complain about as well as good harvests and rising wealth to be thankful for. Forseth, P. and Blegen, T.C., Frontier Mother: The letters of Gro Svendsen. Norwegian - American Historical Association, Northfield, Minn., 1950.

2. A description of prairie and timber farms in one Iowa county suggested one reason for this. The timber farms presented "a meagre appearance." The soil was only about half cultivated. "The owners are of a poorer class and not well informed". But on the rich prairie soil nearby, all the land was improved and the area presented the appearance of an old settled country even though only settled 5 years at the time of writing. The writer suggested the reason for these differences was that the wooded land was taken by the first pre-emptor settlers who had little capital but took the land since it provided wood, fuel and soil. The prairie only attracted later settlers with capital to invest in it and cash to buy timber and firewood. A letter in a Lyons newspaper, 1855, quoted in Wolfe, P.B., History of Clinton County, Iowa. Bowen, Indianapolis, 1911, p. 127.

selves in the Corn Belt. In spite of variations in the land policy and technological influences during the period of frontier and post-frontier settlement development, the dispersal of farmsteads became common across the whole Corn Belt.

Several reasons help to explain the predominance of this settlement form and the lack of farmstead nucleation. Firstly, the system of prior survey encouraged the taking up of small regular-shaped parcels of land by individual settler-families. Each located its farmstead on its own land. The sale of cheap land also encouraged migrants to move west independently and to chose their land free of restrictions imposed by group cohesiveness. This was characteristic of the prairie settlers from the east as much as the southern pioneers.

Some New England and eastern migrants did, however, organize themselves into groups and there would appear to have been some influences encouraging group settlement. The early land acts; the establishment of land companies; the tradition of New England settlement and colonization; the advantages of group migrations to the far west; the arrival of linguistic and other groups on the frontier; spates of town promotion and the value of co-operative efforts to "tame" the woodland and prairie

would all suggest that farm villages could have evolved.¹

Settlers related by regional, linguistic, religious or other ties did often settle near one another and a few nucleated settlements did develop but such villages were the exception rather than the rule. Easterners settling in the central Corn Belt often formed groups to make the journey to the new lands but they still took up their land independently often with little reference to where their friends settled. Group journeys became more common during the century as the passage west became more lengthy and costly. In the 1850's several societies arranged groups and obtained cheaper rates on the railways and other means of transport. But group cohesiveness was seldom strong enough to lead to village settlements of farmers although friends and relatives clearly sought land that would allow them to be neighbours.

Some farm villages appeared in the Connecticut Western Reserve as a result of land being set aside for particular groups in New England but more often farm village growth in the Mid-West only occurred where

1. Flint warned the would-be settler that he would find the new lands strange and difficult not least because of a lack of a sense of community feeling. The system of land division meant that the settler may be surrounded by strangers. He advised "polite and obliging behaviour, with circumspection in every transaction, becomes [the settler] in this new situation". Flint, J., Letters from America Containing Observations on the Climate and Agriculture of the Western States. Edinburgh, 1822, in Thwaites, op. cit., Vol.9, p. 253.

there was some stronger tie than common place of origin. These stronger links were mostly of a religious, political theorist or national linguistic character. Agglomerated settlements made up of persons with these common characteristics developed most commonly in the western parts of the Corn Belt but only a small number have persisted to the present.

Murray suggests that about one hundred religious group-villages were set up in parts of the Corn Belt,,most of their members coming west to avoid persecution in more densely settled eastern areas.¹ But more settlers with particular religious beliefs, who migrated into the Corn Belt as groups tended to settle in close proximity to each other without founding farm villages or other forms of settlement peculiar to what they believed. Later migrants professing the same beliefs have often been attracted to the same areas. Mennonite groups are common in parts of the Corn Belt and by their beliefs of co-operation in work, large families and a devotion to labour they have often been able to buy land from non-Mennonite neighbours and create new farms for their children.

1. These included, for example the German Rappites who moved from Pennsylvania to found Harmony on the Wabash River in south-west Indiana in 1805. One of the few to have retained some of their original identity is the Amana group of villages in south-eastern Iowa. These were set up by German settlers who belonged to the Community of True Inspiration which had moved from Germany to Buffalo, New York, in the 1840's and settled in Iowa in 1855. See Davis, D.H., "Amana, A Study in Occupance". Economic Geography, 12 (1936), pp. 217 - 230 and No author, The Story of Amana, Amana Society, undated. References to these and other groups can be found in Murray op. cit., p. 110.

Political theorist groups also flourished in the Mid-West and founded village settlements in the last century. The improvement of the land and the creation of farms attracted groups with communistic and co-operative ideals. They believed that successful settlement could best be achieved by working together while many worldly ills could be cured by the sharing of possessions.¹

Discord over the ownership of, or the sharing of, property appears to be the most common cause for the breakup of these settlements. Some simply split up into two parts while others disintegrated completely. The Icarians, who followed the ideas of Etienne Cabot, set up the community of Icaria in Adams County, Iowa. Discord led to the splitting of the Icaria settlement into two parts, one village being set up a mile from the other. In 1895 the whole community was wound up. The two English promoters of prairie settlement, George Flower and Morris Birkbeck, in

1. Examples of these were the Communia Colony of Iowa which was founded in 1847 by a group of German-speaking Swiss-Americans. Others who hoped to be examples of the reconstruction of agrarian society were the followers of Robert Owen who set up villages at Salubria, Iowa, as well as taking over Harmony as New Harmony when the Rappites failed. Other political groups did not share property but still emphasised the benefits of community life achieved by village settlements. Faurierist communities were set up in various parts of the United States. One in Iowa took land on the north bank of the Des Moines River in 1844 where a village for about fifty persons was built. Dissatisfaction between the members broke the settlement up within a year, while others like the Garden Grove Community in Iowa never got beyond a planning stage. See Nordhoff, C., The Communist Societies of the United States from Personal Visits and Observations. Harper, New York, 1875.

their disagreement, set up two rival settlements on the Illinois prairie in 1819. These at least served to popularize prairie settlement and attracted other migrants to the district.¹

General distrust of the various sects and their disagreements by the ordinary Corn Belt settlers meant that group methods of land ownership and settlement little influenced settlers who did not belong to a group. The village communities of these groups were merely scattered anomalies in a vast area where the private ownership of land and the dispersal of farm families were the common features of rural settlement.

Foreign nationals who settled in the Corn Belt in the last century also tended to gather together in particular areas but did not create agricultural villages except in the case of the political or religious groups already referred to. Areas where national linguistic groups chose to settle largely depended on the availability of land at the time of their arrival. Central and northern Europeans, who made up the bulk of the immigrants in the second half of the last century, settled

1. Much of the contemporary material on this prairie settlement venture has now been brought together in Boewe, C., Prairie Albion, An English Settlement in Pioneer Illinois. Southern Illinois University Press, Carbondale, 1962.

mostly in the central and northern parts of the Corn Belt.¹ The vanguard would often attract other settlers speaking the same language and with the same cultural ties since this would give them a group identity and also safeguarded them to some extent against deception in the buying of land and other dealings. But, again, group feeling only brought members together as distant neighbours and did not impose on them a system of nucleated settlement unsuited to the land system and other factors which encouraged dispersal.

In summary, this historical account has attempted to show that two sets of factors, those controlling land availability and those associated with changing techniques of pioneering and farming, operated as the settlement frontier moved across the Corn Belt from woodland to prairie.²

1. Studies of European settlement in the Mid-West include those by Johnson, Larson and Stephenson. These show that the Germans were to be found widely over the Corn Belt reflecting the longer period during which they were arriving as the frontier moved on. Swedish and Norwegian settlement was confined to the later years so that most of these settlers were to be found in states west of Illinois and especially in the Red River area of the northern Corn Belt, mainly settled in the 1870's. Most of these settlers were rural born and came to America to raise their living standards by land ownership. See Johnson, H.B., "The Location of German Immigrants in the Middle West". Annals Assoc. Am. Geogs., 41 (1951), pp. 1 - 41, also "The Distribution of the German Pioneer Population in Minnesota". Rural Sociology, 6 (1941), pp. 16-34. Larson, L.M., "The Norwegian Element in the Middle West". Am. Hist. Rev., 40 (1934), pp. 69-81. Stephenson, G.M., "The Background of the Beginnings of Swedish Immigration, 1850-1875". Am. Hist. Rev., 31 (1926), pp. 708-723.

2. Spencer and Horvath have suggested that six categories of cultural process operated to transform the area into a Corn Belt. In the case of the settlement aspect of the region, which is the concern of the present study, the political, historical, economic and technologic processes have been more important than the agronomic and psychological. The role of the latter cultural process, to determine how the new arrival copied the actions of established settlers, would repay more attention. Spencer, J.E. and Horvath, R.J., "How Does an Agricultural Region Originate"? Annals Assoc. Am. Geogs., 53 (1963), pp. 74-92.

A more developed post-frontier society and pattern of farm settlement was thus created.

The main elements in this farm settlement were the farm units, the dispersed farmsteads and their farmhouses, and the inter-connecting road network. Each of these local patterns was linked up with the more important lines of communication, notably the railways, along which were spaced market and rural service centres. These performed the intermediate functions of exporting the products of commercial farming and providing the farms with the goods and amenities of a developing society.

SECTION II THE FORMS AND FEATURES OF RURAL SETTLEMENT

The second section of this study, in four chapters, considers the pattern of rural farm settlement and that of the subsidiary dispersed nonfarm settlement. Features of the units of settlement, including farmsteads and house types, are also considered. The section concludes with accounts of the nature of the dispersed settlement in a selection of Corn Belt counties and an assessment of the uniformity and variety of the cultural landscape.

CHAPTER IV. CHARACTERISTICS OF THE SETTLEMENT PATTERNS

A geographic study of settlement must, as Kohn has stated, deal functionally, firstly, with the arrangement of the features placed on the landscape by man and, secondly, with the character of those features.¹ In the case of the rural dispersed settlement of the Corn Belt, the arrangement or pattern of features is composed of the characteristic combinations of roads, farm units and buildings and other settlement features which have been laid out in forms influenced by the historical, political, economic, technological and physical conditions that have already been touched on in previous chapters.

The farmstead is the most important element in this pattern. It must be considered from the point of view of its general location, its location in relation to other farmsteads and features on the landscape and, as Trewartha has stated, from the point of view of its individual components and their layout in relation to each other.² The dispersal of farmsteads, each located on the land it operates is largely the result of the pioneer attitudes and the system of prior survey and regular division of the land into fairly equal size farm units for family farming.

1. Kohn, C.F., "The Use of Aerial Photographs in the Geographic Analysis of Rural Settlements". Photo-grammetric Engineering, 17 (1951), p. 759.

2. Trewartha, G.T., "Some Regional Characteristics of American Farmsteads". Annals Assoc. Am. Geogs., 38 (1948), pp. 169 - 225.

The character of individual farmsteads reflects factors related to the agricultural development of different districts. While this chapter considers the general pattern of farmstead distribution, the internal characteristics of the farmsteads are discussed in Chapter 5 and further details of the farmhouses are given in Chapter 6.

Nucleated settlements house most of the remainder of rural persons in the Corn Belt who do not belong to the farm sector. These places vary in size from a handful of houses up to market centres and approach the size of urban places. Nearly all of these nucleations are essentially nonfarm in character and in no way similar to the European agricultural villages.¹ The smaller of these nucleations in the Corn Belt depend for their livelihood to a large extent on providing services for the surrounding farm population in the form of stores, farm supplies, specialist services and social amenities, while the larger places have other functions and are more urban in character. Only a small proportion of the persons who live in these nucleations are active farmers so that most of their population can be considered part of the rural nonfarm sector. Since these settlements are not of a dispersed type they are only considered incidentally.

1. There are a few exceptions like the Amana agricultural colonies in south-east Iowa. See Davis, op. cit., Economic Geography, 12, pp. 217 - 230.

Another part of this rural nonfarm sector of the population, of more consequence here, is that which lives in the open country. This part of the population is not distinguished from the nucleated rural nonfarm population by the Census Bureau so that its further analysis is difficult. This open-country part of the rural nonfarm population is, however, found scattered amongst the farm settlement, on the fringes of both urban and rural centres and most often around metropolitan areas and along major highways outside of such places. As this population forms part of the dispersed settlement of the Corn Belt it is considered in the last part of this chapter.

Farm Settlement

The total rural farm population enumerated in the Corn Belt in 1960 was 2,803,984 a drop of 21.3 per cent on the 1950 total (3,564,693). A small part of this fall in the total resulted from a change in the Census definition of a farm person, but the major part of the decline was the result of a loss of farms by a continuation of the processes of farm consolidation and enlargement.¹ The farm population in 1960

1. In order to determine the farm population in the 1950 Census, farm residence was decided on the basis of the response to the question 'Is this house on a farm?'. In the 1960 Census farm residence was restricted to persons living in rural territory on places of 10 acres or more from which farm sales in 1959 were 50 dollars or more, or places of less than 10 acres if the sales were 250 dollars or more. The change in definition accounted for less than 10 per cent of the total farm loss between 1950 and 1960 in the Corn Belt.

therefore represented only 38.7 per cent of the Corn Belt's total rural population as defined by the Census. Table XII shows the total sub-regional changes in the farm population, 1950 - 1960.

TABLE XII Rural Farm Population by Economic Subregions,
1950 - 1960¹

E.S.	Farm Population		% decrease
	1950	1960	
47	394,415	287,125	27.2
48	425,363	335,066	21.2
51	170,578	112,828	33.7
63	224,419	175,517	21.8
69	356,537	317,686	10.9
70	291,223	245,759	15.6
71	383,652	284,998	25.7
84	135,810	93,188	31.4
85	498,500	391,297	21.4
86	248,051	209,783	15.4
87	131,966	111,169	15.7
92	170,208	138,666	18.5
93	133,871	100,902	24.6
Corn Belt	3,564,693	2,803,984	21.3
Total			

This farm population lived in 792,041 farmhouses in 1960 which represents a drop of 17.0 per cent from the number enumerated in 1950.

1. Bureau of the Census, Census of Population, Vol. II, Characteristics of the Population, 1950 and 1960, various parts.

The subregional totals of farmhouses in 1960 are given in Table XIII together with figures for 1950 and percentage changes over the decade. The decline in numbers of farmhouses continued a trend which was marked between 1940 and 1950.

TABLE XIII. Rural Farmhouses by Economic Subregions, 1950 - 1960¹

E.S.	Occup. Farmhouses		% Change
	1950	1960	
47	109,660	85,970	-21.7
48	111,440	94,908	-15.0
51	46,275	33,496	-27.5
63	60,925	50,582	-16.9
69	87,495	80,986	- 7.4
70	76,220	68,016	-10.8
71	111,455	87,426	-21.7
84	40,185	29,692	-26.1
85	133,840	110,030	-16.4
86	63,600	56,036	-12.0
87	32,235	28,410	-11.9
92	44,060	37,151	-15.9
93	36,970	29,338	-20.7
Corn Belt Total	954,360	792,041	-17.0

This loss of farmhouses and farm persons has meant that the density of farm settlement has decreased across the Corn Belt during recent decades. Farm size has increased at the same time since relatively

1. Bureau of the Census, Census of Housing, Vol. III, Farmhousing Characteristics, 1950 and 1960.

little land has been lost to nonfarm uses. Table XIV shows the average density of farmhouses in the subregions of the Corn Belt in 1950 and in 1960. Fig. 12 shows these regional variations in farm density in terms of average farm size by counties in 1950.

TABLE XIV. Density of Farmhouses by Economic Subregions, 1950 - 1960¹

Econ. Subr.	Farmhouses per sq. mile	
	1950	1960
47	8.4	6.6
48	5.3	4.5
51	4.5	3.1
63	3.9	3.5
69	3.7	3.4
70	3.7	3.3
71	3.4	2.6
84	3.1	2.3
85	3.3	2.7
86	3.5	3.1
87	2.3	2.1
92	1.6	1.4
93	1.8	1.5

This decrease in the number and density of farmhouses and farms is the result of several economic factors which are encouraging the increase in average farm size. Greater farm mechanization requires larger farms to make the use of machinery profitable while many small

1. Calculated from housing and area data in Census volumes.

farmers have found that they can make a better living in nonfarm employment.¹ This means that some of the farmhouse losses are the result of dwellings being transferred to become the homes of nonfarm workers while in other cases there has been actual loss or destruction of farmsteads. In some areas marginal land has gone out of use. Table XIII shows that losses between 1950 - 1960 were especially heavy in the southern hill areas (Subregions 84 and 51) where more marginal land is found. Here, new farms and smallholdings were being set up in the depression years of the 1930's at a time when nonfarm employment opportunities fell away. Many of these farms are now abandoned. These southern hill areas have also experienced farm mechanization more recently than the prairie areas to the north.

The marked subregional decrease in farm settlement density from east to west can be explained only partly by the more recent changes. Similar migrations of persons from the farms had been occurring for over four decades before 1950 and had clearly happened irregularly. Losses of cultivated land have also been irregular but generally small,

1. Several regional farm studies have suggested that part-time farming or the complete withdrawal from farming can be profitable moves for the small farmer. A 1957 study in south-central Iowa pointed out that an 80 - 160 acre farmer with average management ability would generally be better off financially as a part-time farmer holding a full-time urban job and running his farm as a sideline. Part-time farming tends to be a step in the process of complete retirement. See Heady, E.O., Dean, G.W. and Loftsgard, L.D., "Farm and Nonfarm Job". Iowa Farm Science, 12 (1957), pp. 6 - 8.

so that over 90 per cent of the land in each subregion except one is still in farms, while over 95 per cent remains in farms in the four western subregions (Tables III - VI in Chapter 1).

Most of the variations in farm size across the Corn Belt cannot be explained in terms of farm enlargement but are the result of different densities of primary settlement in the last century as considered in Chapter 3. Settlers in the eastern Corn Belt took up farms of less than 160 acres, but the quarter section of land was the common entry throughout most of the period of settlement when the frontier moved across Illinois, Iowa and Missouri. When settlement reached into the drier western regions farm size had to be increased. Although no one land act made allowance for this, many settlers were able to obtain more than 160 acres by taking land from more than one source. A homestead quarter section might be taken next to a railroad entry or a piece of land bought from a speculator. The average figure for farm size in western counties hides the greater range of farm unit size which exists there than in the east. This range is partly the result of recent farm consolidation but partly also due to an unequal acquisition of land by the first settlers. Much of the range of farm size in the east, where the average size of farm is smaller, results from the development of smallholdings and part-time farms close to urban areas and alongside larger, full-time farm units.

The most common arrangement of farm settlement in the Corn Belt is typified by four quarter-section farms to the section with roads running along the section lines to provide communication between farmstead and farmstead, farmstead and non-contiguous fields and to link the farms with the local service centres and outside world (Fig. 13). Irregularities in this pattern are common especially in those areas where the physical landscape offered some hindrances to settlement and even in those areas where settlement could be spread out more evenly. Many farms are not quarter-section units any longer and adjacent sections often contain different numbers of farms. The road network along section lines is seldom complete and some roads diverge from the survey lines.

But the overall type of dispersed pattern of settlement is common at all of the densities of farm settlement which exist across the Corn Belt. The main differences are only that the average number of farms per section is less, and the distance between individual neighbouring farmsteads is greater, in western areas than in the east. There was clearly no reason why the basic pattern of settlement should change as its density decreases westwards or as farms have been enlarged in recent years. The same method of land disposal was applied under the system of prior Federal survey although land acts varied the amount of land that could be claimed by one settler. Basically, whatever the size

of entry it was to be one block of land of a fairly regular shape. The cultivable nature of most of the land and the lack of physical obstructions to movement or settlement also meant that pioneering was seldom confined or made to adapt itself to a particular space. There was also the individual initiative of those who settled and improved their own pieces of land and avoided group or village settlement. The division of the land into regular blocks allowed a grid-like road net to be laid out and so overcame many of the problems of accessibility arising from dispersed settlement.

The loss of farmsteads in recent decades by consolidation appears to have been insufficient cause to relocate remaining farmsteads nearer the centre of the enlarged farm units. This may become apparent in the future, in western counties, as individual units grow to over 1,000 acres by the consolidation of several smaller units.

Irregularities in the Settlement Patterns

There are, of course, exceptions to this regular pattern as well as disadvantages to it and one can give instances where both the exceptions and the disadvantages have made themselves felt upon the cultural landscape. The southern hill lands were not all uniformly settled because land quality varied widely within small areas. Another example can be found in the damp upland prairies of the central Corn

Belt which were at first avoided and so broke up the frontier into several discontinuous hollow tongues. These settlement prongs advanced up the wooded valleys and only went onto the prairies when techniques allowed. Both the density and pattern of farms and roads were affected by this.

Among the disadvantages of the rational systems of land disposal was the problem of setting up rectangular farm units with straight boundaries in hill areas. Some land might be cut off by a stream or be inaccessible at the bottom of a slope. One farmer might control the head of a stream on which another farmer depended. Another problem was that although the system of settlement generally resulted in a complete network of interconnecting roads, in western areas, with increased farm size, it was never economical to provide as complete a road net. With the further loss of farmers and rural taxpayers to maintain the roads, more links in the original network have since been abandoned. Other facilities like schools and churches located within townships have been given up and replaced by more centralized institutions in the local rural centres. The one-roomed schools in most Corn Belt states have now been closed. Many small churches and halls are similarly neglected. In the western Corn Belt, where the settlement is more open, there are signs that some of the farm population is now also moving into the nearest centres and farming its lands by daily or less frequent visits to the fields. The development of this type of 'sidewalk' farming has

already occurred in more lightly settled farm areas west of the Corn Belt.¹

All of these problems have tended to disrupt the common Corn Belt pattern of regular shaped farm units and dispersed settlement. It is therefore necessary to consider the irregularities which are found. For the most part these only affect localized areas of the Corn Belt but the wider effects of density variations across the region will be dealt with in a later section. In a third section the nature of the regular pattern will be discussed further both from the point of view of farmstead locations and the road net which provides the means of movement and contact between the individual units of the settlement.

In the present section examples of irregularities resulting from the following three factors will be discussed:

- 1) differences in the original survey process,
- 2) topographic difficulties which in some way limited and hindered orderly settlement, and
- 3) decisions made by farmers when acquiring their land or adding to it.

It is not suggested that these three factors can account for all the irregularities found in Corn Belt farm settlement. Clearly there

1. Kollmorgen, N.M. and Jenks, G.F., "Sidewalk Farming in Toole County, Montana". Annals Assoc. Am. Geogs., 48 (1958), pp. 209 - 231.

are other factors including the role of individual decision-making by settlers. But the three factors listed would appear to be the most important and widely effective.

1) Differences in the Original Survey

The rectangular system of prior survey was applied over most of the Old North-west and the Corn Belt but exceptions can be found especially in Ohio where considerable areas were granted to land companies in the late 18th Century. Some of these lands were prior surveyed independently and others were not surveyed before settlement. The effect on the pattern of farm settlement in each case was different but, generally, more haphazard layouts of farm units and roads resulted. In most cases major survey lines between the sections were provided, but not minor lines within sections, so that many farm boundaries and roads tended to develop without influential controls. These variations in the settlement pattern of Ohio, both within the areas of the land companies and in the other non-federal land grants, have been referred to in Chapter 3.

Similar survey irregularities are less common outside of Ohio but not entirely absent. In southern Indiana and along parts of the Mississippi River the survey lines of the areas of old French settlement can still be picked out in the direction of roads and in property

boundaries because the French survey lines most commonly ran diagonally to the main compass points.¹

In other small areas of the Corn Belt the effects of a rectangular system of survey based upon a different size township can be seen. The basic Federal system used one mile square sections by the subdivision of 6-mile square townships but in the Connecticut Western Reserve and the Virginia Military Reserve of Ohio a 5-mile square was the basic survey unit. This was adopted with the idea of quartering each square into $4 \times 2\frac{1}{2}$ mile sections and then each into 4 land units of 1,000 acres each.

Fig. 14 shows a part of Huron and Seneca counties, Ohio, where the end of the Connecticut Reserve adjoins that part of Ohio which was surveyed normally by the Federal surveyors.² The effect of the different system of survey lines on the layout of rural settlement is apparent. Apart from the main roads and railways which cut across the area, since they were laid subsequently to the settlement of the cultivable areas, it is clear that many of the rural roads follow the survey lines closely. In the Federal area the road net is laid out on the one-mile grid with

1. Gentilcore, R.L., "Vincennes and French Settlement in the Old Northwest". Annals Assoc. Am. Geogs., 47 (1957), pp. 285 - 297.

2. The data for Fig. 14 was taken from U.S.G.S. maps dated 1911 - 1913 so that the settlement information is outdated but this does not affect the point being made.

some parts omitted and other additional roads lying parallel but not on section lines. In the Western Reserve the roads also follow the section lines, which are here further apart, but an intervening set of roads has also evolved between property boundaries. These are, however, more erratic in their direction and distribution in response to local needs and a lack of survey lines to influence their location. None of the roads in the Western Reserve area are quite at right angles to each other since the original survey lines were not perfect in this respect. Farm settlement was, and still is, dispersed on both the federal and the Western Reserve land but as most farmsteads take up a roadside location the scattering of settlement on the Western Reserve side is more "linear" in form than to the west.

2) Topographic Difficulties

The pattern of settlement has been markedly disrupted where obstructions lay in the way of surveyors and settlers. The most common difficulty was steeply sloping land which in some cases led to inaccurate surveying and more often led to settlers laying out their farms and roads with little reference to the surveyors' lines. A further factor which alters the pattern of settlement in these areas was the poorer potential of some of the land which meant that a few areas were never taken into cultivation or soon were abandoned so that a more open pattern of settlement resulted. This type of settlement pattern is common over large areas of the southern

Corn Belt where the land was not affected by the last (Wisconsin) glacial advance and a uniform till cover is not found. In the upland parts of these areas roads tend to follow ridge tops and the easier gradients, and only follow the section lines where these happen to provide a convenient route. With the more limited land resources in these areas, field boundaries are less regular in outline and many fences follow contours at the base or tops of slopes rather than parallel to section lines as is common on the prairie. Although the settlers in these areas were required by the Federal authorities to take up land parcels which were regular in shape and fitted in with the surveyors lines, the utilization of these holdings and the further division and acquisition of land in more recent decades has upset any regularity which may once have existed. Each land unit often began as an improved clearing in the forest at a point where soil quality and slope allowed cultivation. It appears that ridge locations were favoured. Enlargement of the clearing would take into account the suitability of the new land for the use required of it. Undoubtedly much land which was not suitable for cultivation was cleared and soon exhausted or eroded and has since returned to scrub or woodland. Some land with greater slope was left for its timber. Altogether the field arrangements of each farm did, to some extent, reflect topographic conditions and were therefore less regular than in more level areas. With more woodland than many farmers could use for themselves patches were often sold off. This, together

with the division of holdings and the acquisition of parts of farms by others, has upset the rectangularity which once was imposed on a landscape to which it was basically unsuited.

In the hill areas settled after 1820 individual land-holdings did not have to be as regular in outline. The 1820 Act allowed blocks of as little as 80 acres to be claimed. Farmers in the hilly areas often entered their 160 acres in two blocks of 80 acres which they chose so as to give them the land qualities which they most sought. The only restriction was that the 80 acre blocks had to be half-quarter sections within the overall survey layout and the two blocks had to adjoin each other. By 1832 40 acre quarter-quarter sections could be entered up and 160 acre claimants often chose four of these contiguous to each other and arranged so as to take some account of the lie of the land.¹ This modification of the original rational land system was only made use of commonly in the hilly areas. Farmers in the prairies still entered up quarter section blocks since one piece of land was much like any other in the vicinity.

One example of the effects of terrain difficulty upon the farm settlement pattern can be seen in Fig. 15. The Johnson County-Brown County border approximately marks the southward limit of Wisconsin

1. A study of this aspect of land selection within the limits of a fairly rigid Federal system has been made by Johnson in part of south-eastern Minnesota. See Johnson, H.B., "Rational and Ecological Aspects of the Quarter-Section". Geog. Rev., 47 (1957), pp. 330 - 348.

glaciation in this part of south-central Indiana. The non-glaciated land to the south is higher and has steeper slopes and an absence of till materials to enhance soil formation. Soils suffer exhaustion quicker than in areas to the north. The Federal survey imposed a grid of section lines over the whole area which was little disrupted by the terrain. In the southern part of Johnson County these section lines formed the basis of the road network. Since most of the land was cultivable, settlement spread out fairly evenly with the farmsteads located mainly along the roads and most farms originally 80 or 160 acre blocks within the sections. The main divergences of the road pattern from the section lines is made by the main roads laid, like the railways, subsequently to the rural network. Although many of the roads in the north do not lie on section lines they are parallel to them to pass between the original regular-shaped farm units.

As the land rises in northern Brown County the lower percentage of cultivable land does not greatly affect the overall farm density since farms tend to be smaller. Land on steeper slopes is under wood. Farmsteads are mainly located in areas of cultivable land on ridges or in valleys. The road network avoids the steeper slopes and unsettled areas while the roads in the less densely settled sections are mainly of an unimproved type. This type of pattern is common in the hill counties of the southern Corn Belt and further south.

3) The Enlargement of Farm Holdings

Reference has already been made to the creation of farm holdings out of several contiguous quarter-quarter sections in the hill areas of the Corn Belt. Land entries in other parts where land variety was not so marked tended to be of square blocks of quarter section size. However, the further division and acquisition of land, in the period since settlement first took place, has allowed a previously regular pattern of land holdings in flatter parts of the Corn Belt to become less regular. It is not possible to make valid generalization about the nature of this process over the whole Corn Belt without a detailed investigation of plat books in a considerable number of counties but the amount of land redistribution would appear to be greatest in the longer settled areas and in those areas in the east where farms are clearly too small for present-day farming methods. Farmers seeking extra land have often had to accept pieces not contiguous to their own holdings and often several miles away so disrupting the original regular pattern. The division of land between heirs has created small farms in other parts. Altogether, this rearrangement of land units is making the detailed pattern of farm settlement less uniform.

An example of a small area where the process of further land division and acquisition has gone on to a marked degree can be seen in Fig. 16 showing Deer Creek Township, Cass County, central Indiana. This area

lies in a rolling upland prairie region where the Deer Creek provides the only more broken land in the whole 36 square miles of the township.¹ Corn growing and hog raising are the common farm pursuits. Most of the farms were originally a quarter-section each with some only 80 acres when the area was first settled. The division of land since then and the buying of neighbouring parcels has created the pattern in 1961 seen in Fig. 16. Only about 10 per cent of the holdings retain their quarter-section shape. With the division of some land into parcels as small as 20 acres and the creation of other units as big as 300 acres, the scattering of the pattern of farmsteads has become less regular, with some clustering in those areas of greatest land subdivision. Such subdivision appears to have no relation to soil type or topographic situation.

In 1961 the township had 185 farms which averaged 120 acres each.² It is estimated that about half of the farmers rent extra land to bring the average operating unit size up to about 160 acres. This land is rented or leased from non-active farm owners in, or outside of, the township, but the amount of rented land, and its location, varies from year

1. See also Hays, J.R., Relation of Character of Farming Units to Land Management in Two Townships in Indiana. Purdue University Agric. Extension Bulletin, 450, Lafayette, 1940. Hart, B.R., Young, E.C. and Robertson, L., Land use adjustment needed on Farms in Deer Creek Township, Cass County, Indiana. Purdue University Extension Bulletin 466, Lafayette, 1942.

2. Personal communication, Paul Rogers, Assistant County Agent, U.S. Department of Agriculture, Loganport, Indiana, Feb. 27. 1962.

to year. Other farmers are still increasing the total sizes of their holdings by purchasing pieces of land but these are seldom next to the land they already own and are sometimes up to three or four miles distant. These non-contiguous holdings are shown together with areas which are jointly owned and operated. These processes of renting extra land and buying nearby portions when they become available have been occurring for several decades. In 1936 the average operating unit was 143 acres about 20 acres larger than the average farm holding size at that time.

This process of farm consolidation appears to be common throughout the counties studied although, in western areas, much farm enlargement is by linking up two units each of considerably greater size than is the case in this example. Further farm consolidation throughout the region will probably create an even more complex land holding pattern.¹

The effects on the road networks, set up to serve individual farm units rather than scattered land parcels, may be contradictory. In the western areas farm consolidation has so far led to the loss of some roads which now get little use as farmsteads on them have gone although the land is probably farmed from a farmstead a few miles away. With the loss of rural taxpayers, county authorities are often forced to reduce the mileage of roads they maintain. Roads not served by rural mail

1. Similar developments have occurred in farm units in Knox and Clinton counties, Indiana. See Eisgruber L.M. and Janssen, M.R., Changes in Farm Organization and Operation in a Central Indiana Township, 1910 - 1955. Purdue University Research Bulletin, 686, Lafayette, 1959.

delivery or school buses, that is roads without adjoining farmsteads, are often no longer maintained. On the other hand, the movement of equipment between scattered fields under one ownership in Deer Creek and other townships will, if anything, increase so that a lower density of settlement will still require a well developed road net. A recent research study by Smith in scattered parts of Minnesota, where road patterns and farm densities are similar to the Corn Belt, also suggests that the maintenance of the rectangular county road grid is instrumental in allowing farmers to operate non-contiguous pieces of land. These pieces of land are being acquired as a necessary means of increasing farm size in order to make farming more efficient.¹

Sources of Data for Settlement Study

The physical and cultural factors already discussed set limits within which the pattern of farm settlement in the Corn Belt is very similar over large areas. A more detailed examination of these patterns

1. Smith, E.G., Road Functions in a Changing Rural Environment. Ph.D. Thesis, University of Minnesota, 1962. Abstract in Dissertation Abstracts, 23 (1962 - 1963), University Microfilms, Ann Arbor, 1963, p. 2868. Smith found less people using these roads as the farm population declines but nonfarm users are increasing.

in each county is clearly not possible or practical in this study. There are 500 counties in the Corn Belt and they contain nearly 800,000 individual farm units. Even if time allowed and some sort of classification of the counties on the basis of map examinations was considered desirable, the question of the availability of maps creates a major problem.

Fig. 17 shows the status of official topographical mapping in the Corn Belt. All scales of maps on which individual settlement features are shown have been included. It can be seen that considerable areas have not yet been mapped at any large scale and many areas have not been remapped or revised in the past sixty years. Such maps are mainly of use only in studying settlement changes, and only then if more up-to-date information on settlement is also available. Many of these older maps cover areas of Kansas and Nebraska where changes in farm settlement and farm density have been most marked. Further, of course, many of these older maps are not readily available for examination. Considerable areas are at present being mapped and re-mapped especially in the eastern Corn Belt but the inadequacy of the coverage prevented the use of these maps as a primary means of examining rural settlement in different parts of the region on a more detailed basis.

This leaves two other sources of cartographic information. Air photographic cover is available for the whole of the Corn Belt from the U.S. Department of Agriculture but the cost of the necessary number of

index sheets and larger scale prints ruled this out as a possible source in the present study.

Alternatively most of the settlement maps presented in this study are based on material obtained from county highway sheets. These also proved suitable for field observations. There is a complete coverage of the Corn Belt with these maps since they are produced by individual states on a number of scales for county administrative purposes and to classify the status of roads, bridges and other highway features according to the amount of traffic they have to bear and their standard of maintenance. Individual houses, churches, schools and other buildings are shown in the open-country parts of the maps as well as section lines, administrative boundaries, streams, and water bodies. The settlement layout of small nucleations (rural centres) is only sometimes shown and towns are not detailed. Contours and other topographical features are not shown although this is not a serious hindrance to the study of settlement in many counties.

These maps obviously have disadvantages for settlement studies. In the southern hill areas of the Corn Belt some topographic data would at least be desirable; secondly, although these maps are revised in most states every three to five years they have not been revised since 1937 in the case of Indiana and the revisions in all states are mainly concerned with changes in road condition.

Observation has shown that the data on settlement features not directly related to the roads is less accurate or up to date. Fig. 18 makes a comparison of data on the roads and settlement in part of Clinton County, Iowa for which both a highway map and a U.S.G.S. topographical map are available. The writer revised the settlement data shown on the two maps in a survey of the county in 1961 and these revisions are included in the copy of the U.S.G.S. Map. It is clear, in the area shown, that the highway map was not always accurate either as to the number of houses existing in a particular area or to their exact locations. It omits several houses mostly where they occur in small clusters. Others are mapped on the opposite side of the road to where they really stand. On most highway maps the distinction between a farmhouse and a rural nonfarm house is not made or is not clear when it is made. Individual farm buildings are not shown. The newer U.S.G.S. maps, of which few have yet been published, will be more useful for settlement studies since larger farm buildings are mapped and so allow the farmsteads to be distinguished from the nonfarm houses. But in spite of their inherent inaccuracies, highway maps make a useful tool for rural settlement studies. In Chapter 7, where some field studies are discussed, the basic data was obtained from these maps which were checked in order to remove these inaccuracies.

Examples of Settlement Patterns in the Corn Belt

At this point it is appropriate to indicate some of the variety of rural settlement patterns which can be seen in the Corn Belt. Patterns in parts of counties in three Corn Belt states, Indiana, Iowa and South Dakota are shown in Figs. 19, 20 and 21 where different sets of topographic and cultural factors influence both the density and the arrangement of the settlement features. The following descriptions are only intended to direct attention to certain features on the maps.

Fig. 19 shows the patterns seen in 7 Indiana counties, two of which, Scott and Perry counties lie south of the Corn Belt and are included for comparative purposes. One county, as far as possible typical of a bigger area, has been selected from each of the main physiographic and farming regions of the state also shown in the figure.

The southern hill and valley areas of the state were largely unaffected by the Wisconsin glaciation and show a more varied topography. These were also areas of early white settlement being taken up around the year 1800. With small farms, a fairly dense rural settlement ensued and much of the settlement occurred without much regard to the Federal system of prior survey. Farm boundaries tended to be irregular especially in more hilly areas like Perry County and roads also were developed with less reference to section lines than in later settled parts of the Corn Belt.

Perry County has the least regular pattern of the three southern counties examined in Fig. 19. This county lies at the southern end of the Crawford Upland with steep-sided valleys draining down to the Ohio River. After a century of small-scale farming much of the land has been exhausted and farming is no longer an economic proposition. Many farms have been abandoned and the land re-afforested, leaving a scatter of farmsteads occupying patches of better land. The road network, much reduced with the loss of farms, is very irregular in relation to the topography.

Scott County lies in the flatter valley lands of the Muscatatuck River where settlement occurred in the early 1800's. The development of a general system of farming and the effects of a rural nonfarm population around Scottsburg, and in the commuter zone north of Louisville, have led to an increase in the total rural settlement unlike Perry County. Part-time and nonfarm houses line the county roads which only partly follow the section lines laid out by the surveyors. Empty areas occur on the low-lying land bordering the river and its tributary east of the urban area.

Sullivan County lies in the Wabash Valley lands of the southern Corn Belt but has settlement characteristics which associate it with the counties already considered. Farm incomes are fairly low as in those parts of southern Indiana outside of the Corn Belt. Small general

farms are common. The county was settled in the early 1800's by small pioneers who took their land with some reference to the section lines but roads have tended to develop unevenly, though straight, since the topography in this part of the county presented no obstacle to road building. As in Scott County the density of rural settlement is high but varies since some areas are settled mainly by farmers with 100 - 200 acres of land each while smallholders and rural nonfarm persons are more common in other parts. In the latter areas settlement tends to line the roads and this occurs mainly in parts of the county close to the small coal mines which employed many of the rural nonfarm persons and gave additional income to the part-time farmers.

The counties selected from central and northern Indiana show less variety as is typical of large parts of the Corn Belt. The topography is developed on glacial tills and is less varied than further south. Soils are of more uniform quality. Settlement occurred up to 30 years after its development in the south and by this time the Federal system of survey was well tried. Land was registered by settlers in terms of quarter and half-quarter sections with more of the roads running along the section lines between farm units. The main variety in settlement pattern is due to differences in farm size and the amount of nonfarm settlement. Farms have always tended to be smaller on the eastern side of the state than the west. At the same time, both Henry and Kosciusko

counties have a considerable amount of rural nonfarm settlement which lines the county roads in connection with the industrial development of Newcastle in Henry County and the attraction of lake and other resort facilities in Kosciusko County. Farms are larger in both Pulaski and Benton counties. Both are also more rural counties lacking major county seat towns or manufacturing enterprises so that there has, as yet, been little development of a rural nonfarm population. Benton County has a very regular road layout which is more typical of central Illinois and is undoubtedly associated with the eastern extension of the Illinois prairie into this part of Indiana and the late settlement of the prairie land. Pulaski County has a less regular road pattern due to the need for roads to avoid ill-drained areas in between the morainal ridges which cross the county.

Fig. 20 shows parts of five counties in Iowa, one being taken from each of the main physiographic and farming regions of the state. All of these examples, but for Monona County, have densities of rural settlement and patterns which are similar to those in Benton County, Indiana, just considered. In the same way they also share the characteristics of flat or rolling prairie land which was taken up in medium sized farms under the Federal system in the middle or later part of the last century. The drift cover forms good soils with a high percentage of the land in cultivation and enabling an even spread of settlement. None of the

counties shown contains a major city around which much rural nonfarm settlement might gather. Monona County only partly differs in that the county is marked by more relief along the loess bluffs bordering the Missouri River flood-plain. The road pattern across this land is less regular and farmsteads operating land on the plain tend to gather on the bluffs. Section line roads are less common although many farm boundaries, not shown in Fig. 20, reflect the regularity with which the land was originally apportioned.

The effects of topography upon the settlement are less marked in the other counties shown. It is limited to the avoidance of water-bodies in Emmett County, where some land remains poorly drained, and the breaking up of the road network by the Cedar River valley in Cedar County. In the former instance, the upland level prairie was largely artificially drained in the late 19th Century when much of the land was taken up in quarter-section farms for cash-grains and livestock farming. Cedar County lies in the loess-covered prairie area close enough to the Mississippi River Valley to have tributaries of that river cutting deep into the loess, so providing steep slopes and floodable plain avoided for the siting of farmsteads. Chickasaw County shows a very similar pattern although farmsteads tend to cluster together more since dairying is common here and the clusters favour the collection of milk.

A small part of southern Iowa escaped the effects of the later

Wisconsin (Mankato) stage of glaciation and therefore has a landscape characterized by thinner soils and more sloping land. Lucas County lies partly in this area where average farm size is not markedly different to the rest of the state, but there has been some farm abandonment as a result of soil erosion. This has led to the closure of some roads and parts of the county have less dense settlement. At the same time greater relief has interrupted the grid-like pattern of roads which is so well developed in many Iowa counties.

Finally Fig. 21 shows parts of three counties in South Dakota, one of which lies outside of the Corn Belt and is included for comparative purposes. As in Iowa most of the topography of eastern South Dakota is level or undulating and does not hinder the development of the settlement pattern directly, although the presence of ill-drained areas and solonchic soils does introduce some variety. The rectangular survey was continued right across the Corn Belt and onto the Great Plains but as the density of settlement declined into the drier areas, the road net, fully reflecting the positions of the survey lines, was not completed with fewer farms to be serviced. The drop in farm density, which occurs as farm size increases, is made gradually as one moves westwards until a marked fall in density occurs close to the western Corn Belt border. This can also be seen in Fig. 12. which shows the average farm size for the counties in the Corn Belt.

The three counties in Fig. 21 illustrate this point. Lincoln County has a very regular grid of roads in accordance with the one mile intersection of the section lines. Most of the land is gently rolling and under cultivation and average farm size, at 221 acres in 1959, was little larger than in many parts of Iowa. Most sections can be seen to contain two or three farmsteads. Aurora County, on the other hand, has a far lower density of farmsteads and a much less even scatter due to the drier conditions, ill-drained lands and solonchic soils where the land is mainly used for grazing. Here farm size in 1959 averaged 584 acres. With the less even scatter of farms the road net varies in its completeness but nearly all the roads follow the section lines. In Sully County, beyond the Corn Belt, farms are large (1728 acre average in 1959) and farmsteads well scattered. Much land is not under cultivation but has returned to state or Federal ownership as the farm population has declined. The incomplete road net has been further reduced and in these areas only remains more dense close to the towns and local centres. There is very little rural nonfarm settlement outside of service centres in these western counties. Many farmers in Sully County now live in the town and travel daily to their farms in order to enjoy the amenities which cannot be locally provided for a rural population as sparse as this.

These maps point especially to the variations found in the road patterns and the distribution patterns of the farmsteads and other

dispersed dwellings. These two aspects will be further examined in the next part of this chapter.

An Examination of Road Patterns

It appears that the dispersal of farmsteads is closely related to the presence of a grid of county roads across the Corn Belt. Farmsteads normally face onto these roads and stand beside them so that they tend to lie in 'lines' across the land. This is a result, in turn, of the rectangularity of the roads, most of which follow the section lines laid out by the Federal surveyors. Land between the section lines was divided into private units mainly of a regular quarter-section shape and size. Farmsteads were located on these units but the road layout between the farm units greatly reduced the isolation of the dispersed farmhouses.

Not only does the rectangular grid of roads allow one farmstead to be in direct contact by the shortest distance with other farms to the north, south, east and west, but the intersection of roads at right angles at one mile intervals also allows movement conveniently on any intermediate heading by following two major compass point headings successively. Thus to move directly north for five miles in an area where the road

grid is perfectly developed requires a journey distance of five miles, if the departure and arrival points are situated convenient to the north-south route. To move five miles to the north-north-east requires a journey of about $6\frac{1}{2}$ miles and a point 5 miles to the north-east requires a journey of nearly 8 miles. Other points are similarly accessible where the road net is well-developed.

But the pattern of county roads is seldom perfectly regular in any part of the Corn Belt. Even in areas of level or undulating prairie where there are few obstacles to the laying out of all roads on the survey lines, it is invariably found that some roads diverge from the section lines or have been omitted altogether. The absence of roads along some section lines, so that the network is less complete than in a model situation, is most often found in western parts of the Corn Belt. The lower density of farm settlement in these areas did not call for as complete a road system while the fewer farmers per county reduced the possibility of maintaining a dense network.

The divergence of county roads can take several forms including the placing of a road across a section but parallel to the section line. Adequate reasons cannot often be given and have not been recorded for such positioning, but in some cases it seems to be a result of land in two adjoining sections being acquired by the one settler so that the road was laid along the side of the property rather than through it.

The objection to roads passing across one's property was a valid one in that a 24 foot road and ditch along the side of a section (1 mile) can take up 3 acres of land. Individual land entries had to be adjusted so that land could be set aside for the county roads.

In other cases roads diverged from section lines to avoid poorly drained land or a difficult bridging point on a stream. The regular road pattern most commonly breaks down in hilly areas where roads were laid less in relation to survey lines and more in relation to slopes and useful land.¹ In these areas roads tend to wind along valleys and ridges and seek easy gradients between high and low land. Such patterns have already been noted in southern Indiana and especially where farm units had been created before a prior survey system had been fully established. In these areas farm units tended to be a less regular shape and roads were laid between them and where they could best serve the scattered farmhouses. Even in the less hilly areas of the Corn Belt, the road grid is less regular in the vicinity of river valleys where the amount of land in farms is reduced and where rivers are only bridged at intervals of a few miles. Examples of these local disturbances in the regular pattern in parts of Iowa were given in the preceding part of this chapter.

An examination of certain aspects of the road networks has been made in selected Corn Belt counties where county highway maps could be used. The networks of some counties bordering the Corn Belt were also

1. A brief study of road patterns has been made in Indiana by Starkey, O.P., "Road Patterns of Indiana". Proc. Indiana Academy Science, 66 (1957), pp. 192 - 194. He found that the presence of hill land and water bodies most frequently upset the rectangular road grid.

studied for comparative purposes. Three main sets of measurements were made in each county:

1) The total length of road was measured and compared with the land area of the county to obtain a density figure expressed as miles of road per square mile of land.

2) The total length of road was also related to the number of farmsteads in order to arrive at the average number of farmsteads served by each mile of road. The number of farmsteads in each county was obtained from 1950 Census data since most of the road information on the highway maps was revised to about that year.

3) The length of road laid along section lines and that not so aligned was expressed as a ratio to obtain a crude measure of the 'shape' of the county road networks in comparison with the model rectangular system outlined earlier.

In each case major roads as well as county roads were counted together, although much of the traffic on these major paved roads is inter-urban rather than local county traffic. These highways also tend to cross counties by the shortest routes to link cities outside of the counties in question and are therefore often not laid along section lines. Nevertheless it was thought inadvisable to exclude them from the total road measurements since some do follow section lines and have

been laid on the line of a pre-existing county road. This is especially the case in the eastern Corn Belt where many more paved or metalled roads are to be found. Further, nearly all major roads allow access from the county roads so that local traffic can use them. In this way they form part of the total network of roads for movements between farms and within the counties.

Equally it was not possible to subdivide the total mileage of road in each county on the basis of road type, that is into paved, metalled graded, dirt and primitive. This data is given on the county highway maps but it was found that there was little uniformity between states as to what constituted a standard of surface and maintenance. Roads of all types were better maintained in the more densely settled eastern Corn Belt than further west.

Table XV presents the three sets of data on the density and 'shape' of the road nets in selected counties arranged according to subregions. Most counties were found to have between 1.5 and 2.0 miles of road for every square mile of land area in the county. In a model situation where every section line had a road on it there would be about 2 miles of road per square mile. Counties examined in the eastern Corn Belt came closest to this density where farms are generally smaller and farm settlement denser, but it is also noticeable that the density is less both in the southern hill counties and in the less heavily settled west.

In the latter case, but not in the former, a lower density was expected. The density of farm settlement in the southern hill areas is considerably greater than in most of the western counties examined. Counties bordering the Corn Belt showed similar densities to nearby counties within the Corn Belt although densities fell off markedly west of the Corn Belt.

The relationship between miles of road and number of farmsteads brings out similar variations. In most cases each mile of road serves between $1\frac{1}{2}$ and $2\frac{1}{2}$ farmhouses with higher figures common on the southern hill fringe of the Corn Belt where the density of roads in relation to area has already been seen to be low. Figures are also high in some eastern counties where there are heavy densities of farmsteads. Roads with strings of small-holdings and part-time farms fronting on to them are common. On the other hand, the ratio of miles of road to number of farms is low in the west since large, scattered farms still need a reasonably complete network to make each farmstead accessible from its lands and from the rural service centres.

The ratio of roads laid on section lines against those which diverge shows that there is much more variation in the shape of road nets than there is in their density in the counties examined. Very regular networks are found in the western prairie counties but on the other hand most roads lie off section lines in the southern hill counties for reasons already given. In the eastern and central Corn Belt counties,

/were
intermediate values obtained for this ratio with section line roads generally more common than others.

Although there is no firm reason why the density and the shape of these county road networks should be related, the graph in Fig. 22 would suggest that they are not independently variable. In the graph the density of roads in terms of farmhouses per mile of road is plotted against the shape of the road network for the counties listed in Table XV. Western Corn Belt counties show low road densities and a high degree of regularity of shape. These were the last parts of the Corn Belt to be settled and the level prairie topography allowed section lines to be laid out accurately with most farms being a quarter or half-section in size and shape. Roads were laid along section lines but the network was less than the mileage of section lines since larger, scattered farms made some roads unnecessary. Further losses of farm population and farmsteads have led to the decay or closure of other roads in the last half century.

In the well settled eastern and central Corn Belt the selected counties are widely varied. This variety includes the regular-shaped networks of prairie areas settled about mid-century or before as in Benton (north-western Indiana) and Livingston (north-central Illinois), with fairly low ratios of farmsteads per road-mile. Also included are the much higher densities and irregularly-shaped networks in counties

like Henry and Kosciusko (central Indiana) where many roads do lie on section lines but the density of settlement has led also to other roads being laid in between them. Most of these counties were settled earlier. Several of these counties are also crossed by major river valleys as in Clinton and Fremont Counties (Iowa) where locally undulating conditions or river flood plain are marked by less regular road patterns.

The southern counties, both inside and beyond the Corn Belt, also have a moderately high density of farmhouses per road mile with many small farms and considerable areas of land not in farms. These roads are irregular in their layout due to the topographic conditions, early settlement and the scattered nature of the better land. Many low income farms pay fewer taxes to help maintain a greater mileage of roads. With a low density of roads to county area, many farms also maintain their own driveways connecting them with the county road networks. There are, then, indications that the eastern, southern and western parts of the Corn Belt have road patterns that mark these off from the much larger central core of the region.

The Nature of the Dispersed Pattern and the Scattering of Farmsteads

It is clear that dispersed settlement patterns are more difficult to measure and analyse than settlement which takes on some form of agglomeration. Village or nucleated settlements can be classed according

TABLE XV Data on County Road Networks

	<u>Road Miles</u> <u>Area</u>	<u>Farms</u> <u>Road Miles</u>	<u>Section Lines</u> <u>Roads/</u> <u>Non-Section line</u> <u>roads</u>
Eastern Corn Belt			
Benton (Ind. 47)	2.0	1.5	9.3
Henry (Ind. 47)	2.0	3.1	1.2
Pulaski (Ind. 48)	2.2	2.0	2.6
St. Joseph (Mich. 48)	2.0	2.7	1.5
Kosciusko (Ind. 48)	2.0	3.1	1.8
Central and Northern Corn Belt			
Moultrie (Ill. 63)	1.9	2.1	1.7
Logan (Ill. 63)	1.7	2.1	2.5
Livingston (Ill. 63)	2.0	1.7	9.6
Cedar (Io. 70)	1.6	2.5	2.4
Clinton (Io. 70)	1.5	2.7	2.0
Warren (Ill. 70)	1.9	2.0	3.1
Nicollet (Minn. 69)	1.5	2.5	.8
Chickasaw (Io, 69)	1.8	2.2	6.4
Carroll (Ill. 69)	1.5	2.4	1.1
Emmett (Io. 86)	1.9	1.8	7.2
Hamilton (Io. 86)	2.0	2.0	3.2
Western Corn Belt			
Lincoln (S.D. 85)	2.1	1.6	21.8
Deuel (S.D. 85)	1.6	1.2	22.4
Monona (Io. 85)	1.5	2.2	1.4
Fremont (Io. 85)	1.6	2.2	2.1
Clinton (Mo. 71)	1.6	2.5	.9
Phillips (Kans. 93)	1.6	1.1	10.1
Thayer (Nebr. 93)	2.0	1.3	18.7

Table XV Continued

Aurora (S.D. 92)	1.8	1.4	39.9
Southern Corn Belt			
Sullivan (Ind. 51)	1.6	2.7	.5
Pike (Ill. 71)	1.6	2.4	.5
Adair (Mo. 71)	1.5	2.5	.5
Lucas (Io. 71)	1.7	2.2	1.8
Audrain (Mo. 71)	1.6	2.0	1.6
Henry (Mo. 84)	1.4	2.7	1.0
Linn (Kans. 84)	1.6	2.0	3.0
Counties South of Region			
Perry (Ind.)	1.6	2.3	.02
Scott (Ind.)	1.7	2.9	.7
Wayne (Ill.)	2.0	2.3	1.0
Franklin (Mo.)	1.4	2.8	.1
Counties West of Region			
Sully (S.D.)	1.1	.4	22.8
Tregoë (Kans)	1.3	.6	14.5

to size, range of functions and distance between neighbouring nucleations. In the case of scattered settlement made up of single farmsteads of similar sizes and functions, it is generally only possible to indicate regional variations in terms of density of the farm population or farmsteads per square mile of cultivated land area or similar criteria. More can be done where only small areas are studied.

Attempts have been made in related sciences, notably plant ecology, to distinguish types of dispersed patterns ranging from a random scattering through to a pattern made up of open clusters.¹ Measurement of these patterns has been possible by use of the concept of the nearest neighbour. It seems worthwhile to pursue further two aspects of the dispersal of Corn Belt farm settlement, namely (1) the refinement of density figures for farm settlement, and (2) the nature of the scattering of farmsteads with reference to nearest neighbour measurements.

1) A Consideration of the Density of Farm Settlement

The writer has avoided where possible reference to farm population densities for parts or the whole of the Corn Belt. In a study of rural settlement this average expression can be very misleading since the

1. Clark, P.J. and Evans, F.C., "Distance to Nearest Neighbour as a Measure of Spatial Relationships in Population". Ecology, 35 (1954), pp. 445 - 453. Nearest Neighbour measurements have more recently been applied by geographers, for example, King, L.J., "A Quantitative Expression of the Pattern of Urban Settlements in selected areas of the United States". Tijdschrift voor Economische en Sociale Geografie, 53 (1962), pp. 1 - 7.

farm population is too easily thought of as evenly spread across the landscape. Rather the farm population is grouped into households which form points of settlement in each township or county. Further, households are generally larger in the central and northern Corn Belt counties than in the south. Thus an average farm population density of 12 persons per square mile could well represent three farmsteads in one area and four in another.

What also becomes apparent in the field is the difficulty of estimating the density of farmsteads in a particular area. An average density figure does not vividly indicate the average distance between one farmstead and the next but one tends to judge density according to how far apart, on average, are the individual units. One tends to distinguish one area of settlement from another in terms of distance between units rather than the number of units in a particular area.

Barnes and Robinson have already put forward the point that the average distance between farmsteads is a more illustrative measurement of the amount of settlement in an area than are ordinary density calculations.¹ They applied the formula $1.11\sqrt{\frac{A}{n}}$, where A = the total area and n = the number of farmhouses, to calculate the average

1. Barnes, J.A. and Robinson, A.H., "A New Method for the Representation of Dispersed Rural Population". Geog. Rev., 30 (1940), pp. 134 - 137.

distance between farmhouses over major sections of the United States. Mather modified the formula slightly when he developed the method by presenting the data in the form of isarithmic maps.¹

It has not been considered necessary to compute the average distance between farmhouses in each of the Corn Belt counties but the Mather formula was used to equate the farm size figures used in Fig. 12 with other figures indicating the average distances between settlement units implied by these densities. These are given in Table XVI which also presents the density and average inter-farmhouse distances for five counties with different farm densities. It is immediately clear that density figures tend to give the impression of much greater variations in settlement than would be seen by the ground observer basing his estimate on average distances between houses. An area with four farmsteads per square mile would have an average inter-house distance of .54 miles while an area with only half this density would still only have .76 miles between each unit.

2) The Nature of the Scattering of Farmsteads

As the scattering of individual farmsteads is not uniform, so that one farmstead is likely to be nearer to one of its neighbours than all its others, the figures for average inter-house distance clearly have

1. Mather, E., "A Linear Distance Map of Farm Population in the United States". Annals Assoc. Am. Geogs., 34 (1944), pp. 173 - 180. Mather modified the previous formula to $1.07 \sqrt{\frac{A}{n}}$

TABLE XVI Density Figures Equated with Inter-House Distances

(See Fig. 12.)

Average Farm size	Average distance between farmsteads
Less than 120 acres	less than .46 miles
120 - 159 acres	.46 - .54 miles
160 - 199 "	.54 - .59 "
200 - 239 "	.59 - .64 "
240 - 320 "	.64 - .76 "

Five Selected Corn Belt Counties

	No. Farms/sq. m.	Inter-house distance (miles)
Kosciusko (Ind.)	6.4	.42
Moultrie (Ill.)	4.1	.53
Monona (Io.)	3.3	.59
Thayer (Nebr.)	2.7	.65
Aurora (S. Dak.)	1.4	.92

limitations. The study of the inequality of distances between neighbours is, however, only possible where accurate maps show the locations of each farmstead over township or county areas.

The patterns of scattering can take several forms with innumerable variations as distances between neighbouring houses are varied. Some of the more obvious forms of scattering are shown in Fig. 23. Each farmstead may be located uniformly in relation to all its neighbours so that all the distances between neighbours are equal (Fig. 23a). This pattern would suggest that the best arrangement of private landholdings should take the form of hexagonal units with the farmstead at the centre of each hexagon. This is clearly a long way from reality in the Corn Belt and no farmstead patterns approach such marked uniformity. But this is the pattern represented by the average inter-house distances first put forward by Barnes and Robinson and referred to earlier.

Alternatively, the scattering could be entirely random as in Fig. 23 b where the same number of farmsteads are represented as in Fig. 23 a. Such a random distribution implies that there have been no factors influencing the positioning of the farmsteads and all points on the landscape had an equal chance of being a farmstead site. The result is a far less even distribution of points with some having neighbours much nearer than others. From a visual impression this partly approximates to the pattern of farmsteads found in some Corn Belt counties.

Thirdly the pattern can be clustered or approaching agglomeration as in Fig. 23c but this is not found in the Corn Belt as it would imply a farm village pattern and the separation of most farmsteads from their land. Fig. 23d shows the typical Corn Belt arrangement again with the same number of farmsteads as are shown in other parts of Fig. 23. With regular-shaped farm units and farmsteads situated excentrically on most of them, the overall pattern appears to lie somewhere between the uniform and the random scattering. At the same time minor clusters of three or four farmsteads can occur in places. Each farmstead tends to have one neighbour closer to it than its others indicating an approach to randomness but the variation between these distances is not as marked as in a random pattern and no part of the area is far from a farmstead indicating both a tendency to uniformity and a lack of agglomeration.

One way of attempting to unravel the Corn Belt pattern is to use the nearest neighbour statistic. This is based on the mean distance between nearest neighbours using the formula $\frac{1}{2\sqrt{p}}$ where $p =$ the density of farmhouses in the area being examined.¹ Since the Corn Belt patterns do not appear to be entirely random, a ratio (the nearest neighbour statistic, R) can be determined for the actual mean distance between nearest neighbours and the mean distance expected in a random distribution. This ratio can indicate how far an observed pattern diverges

1. Clark and Evans, op. cit. p. 445.

from randomness. The observed mean distance between nearest neighbours is referred to as r_A , and the expected mean distance is r_E . In an entirely random distribution the nearest neighbour statistic R (that is r_A/r_E) would be 1 whereas in an uniform distribution as in Fig.23a the figure for R has been calculated as 2.15. In a nearly agglomerated pattern R would approach 0.

The actual measurement of distances between nearest neighbours in order to obtain the mean observed distances (r_A) proved impossible in several cases. The technique was therefore only applied to parts of a handful of counties since the success of the technique depends upon the accurate measurement of distances between farmsteads on the county highway maps. As most of these maps were only available at the scale of $\frac{1}{2}$ inch to one mile these measurements tended to be very crude. Further the maps have been shown to have inaccuracies in their placing of individual farmsteads with some represented as much as a quarter-mile from their actual positions. Since the main purpose of these maps is to present information on road type, the road symbols are greatly exaggerated in their width. Some roads were mapped with symbols which represented them at 10 times their real width. As a result the symbols for farmsteads are set back to make room for the road symbols and to separate the roads from the farmsteads for the sake of greater map clarity. In this way two houses opposite each other on a county road which are

really 100 yards apart may appear to be 200 - 300 yards apart on the map.

The effect of these major map errors could only be restricted by using larger scale maps where the positions of houses had been roughly checked and where allowances could be made for map inaccuracies. This immediately greatly reduced the number of areas where the technique could be tried. Table XVII presents the results of measurements and the application of the formula in townships in three Iowa counties and one in Illinois.

TABLE XVII Nearest Neighbour Measurement

	No. Nearest Neighbours Observations	Township P. Area. sq. miles	rA	rE	R	Pattern	
Scott Township (Hamilton Co.)	155	36	4.3	.291	.242	1.2	Approaching random; slightly uniform
Washington Township (Fremont Co.)	145	54	2.7	.271	.306	.89	Approaching random; slightly clustered
Dora Township (Mountrie Co.)	93	34.5	2.7	.259	.262	.99	Approaching random,
Orange Township (Clinton Co.)	108	29.5	3.7	.295	.305	.97	Approaching random

In each case the results obtained for R confirmed that the pattern of farmsteads was approaching random with a slight tendency towards

clustering in Fremont County where houses do tend to locate on the loess bluffs overlooking the Missouri River floodplain. Such clusters are less marked in Dora and Orange Townships although they still appear to have more than a random distribution. No small clusters were found in Scott Township so accounting for an R figure indicating slightly more uniform conditions. Other township maps were similarly measured but without the preliminary fieldwork to check on the accuracy of the maps. In spite of a wide range of types of scattering, including the wide scattering in western areas and the rather irregular road and farmstead pattern in southern hill areas, the results obtained suggested that in each case the pattern was near random.¹ Though this also confirmed what had already been suggested by visual interpretation it would appear that the method of measurement was not sufficiently refined. It did not clearly pick out the tendencies of the patterns of settlement in some townships to deviate from the more typical Corn Belt situation and overall to be more than purely random scatterings of farmhouses.²

In view of the inconclusiveness of the nearest neighbour measurements it was decided to further examine the nature of the scattering in

1. Even in Prairie Township, Henry County, Indiana the clusters of non-farm houses failed to reduce the nearest neighbour figure below 1.26, again indicating non-uniform and non-nucleated conditions.

2. Refinements of the method include the measurement of second and third nearest neighbours as well as the first, or the dividing of the zone around each farmstead into segments to take the nearest neighbours in each. In view of the short-comings of the basic map material and the time involved in measurements, these refinements were not attempted.

some counties by cartographic means. The results could only be partly quantitative but it was hoped that this would suggest more about the patterns than they were approaching randomness.

A simple cartographic method were devised to show this. If the farmsteads were scattered uniformly across an area where all the land was in farms and it was assumed that all the farms were of the same size and shape and had equidistant neighbours, then each farm unit would have to be hexagonal with the farmsteads located at the centre of each hexagon in the manner pointed out earlier. In any less uniform distribution where the farms were all the same size the hexagons would overlap each other. There would also be other spaces not included within hexagons and these would indicate where the distribution of farmsteads diverges from the uniform condition.

Two types of observation can be made about these unoccupied spaces.

1) The area of the space outside of hexagons compared with the space occupied by the hexagons can indicate how far the pattern of farmsteads diverges from the uniform where all space would be occupied by hexagons. For example, in an area of 100 square miles there may be 200 farms occupying all the land. They are all the same size and shape and have equi-distant neighbours and must therefore form hexagons of $\frac{1}{2}$ square mile each across the landscape with a uniform distribution of farmsteads at their centres. Therefore the percentage of space outside of hexagons

= 0, and the percentage of space inside hexagons = 100. In this situation the farmsteads are uniformly dispersed. If we now assume the farmsteads are grouped next to each other, the hexagonal area of each farm would greatly overlap that of its neighbours and much space would lie outside of the hexagons indicating the agglomerated nature of the farmsteads. Thus, the percentage of space outside of hexagons = 90, and the percentage of space inside hexagons = 10. These figures indicate agglomeration of farmsteads.

In Fig. 24 parts of 4 Corn Belt counties have been mapped with a hexagon centred upon each farmstead. The area of each hexagon was based upon the average size of farm in the county concerned. Thus, within the limits of mapping accuracy, if all the hexagons were placed so that they did not overlap they would cover the whole of each figure with the exception of land not in farms. The fact that the hexagons overlap and spaces are left shows that non-uniform distributions exist. The area covered by hexagons has been shaded in to contrast with the unoccupied space. The percentages of space in each of the county areas is as follows:

	per cent unocc.	per cent occ.
Thayer Co.	35	65
Livingston Co.	27	73
Adair Co.	57	43
Henry Co.	43	57

The result on this small sample of counties confirms the results obtained by the nearest neighbour statistic, namely that the degree of

tendency to depart from uniformity towards non-uniformity is not taken to a point where the patterns could be thought of as approaching agglomeration since the occupied space still considerably exceeds the unoccupied space. Adair County presents a different pattern partly because a greater proportion of the land is not in farms so that non-overlapping hexagons would only fill about three-quarters of the area of the figure.

2) The second set of observations on the unoccupied spaces are entirely qualitative being concerned with the shapes of the unoccupied spaces. The placing of a hexagonal farm area around each farmstead emphasises the linear arrangement of the settlement along each of the county roads. This also confirms the visual impression that the location of roads, largely placed along the section lines, has exerted a considerable influence upon the positioning of farmsteads which have mainly been set up close to the roads. It also agrees with an impression noted when making measurements of the nearest neighbours that these are frequently on the same road but not necessarily on the same section of land. In the two prairie county examples (Livingston and Thayer) this grid of roads is regular and the farmsteads tend to line up on these. In the case of the part of Livingston County shown in Fig. 24 more farmsteads tend to lie along the east-west roads than on the north-south intersections. More gaps exist in the Thayer County pattern probably as a result of the unequal loss of farmsteads in recent years particularly in those parts which are less well served by roads or are further from a rural

centre. Adair County is more hilly, the density of farmhouses to miles of road is characteristically high and partial agglomeration results along the roads which follow irregular paths in relation to the topography. Large empty areas also indicate the presence of unfarmed land as, for example, under wood. Slight agglomeration also intrudes into the rectangular pattern in Henry County as farmsteads line the dense network of county roads. Many of these are very small units and the unoccupied spaces represent land mainly operated by the bigger farmers.

In summary, it is suggested that the randomness of scattering indicated by nearest neighbours measurements is conditioned by the effects of roads upon farmstead location. This also immediately denies the possibility of a uniform pattern. It shows as well that agglomeration is limited to a tendency to cluster besides the roads and not for farmsteads to gather together towards each other since each farmstead is located on the land that it farms. This location is normally excentric with regard to the land with the farmstead at the roadside and the land spread out behind it. Hence a wide and even scattering of points, varying in density from county to county, combines non-uniformity with characteristics of linearity.

Rural Nonfarm Settlement

Most of this chapter has been concerned with the amount, density and dispersed patterns of farm settlement in the Corn Belt. The farm population is, however, only part of the total rural population as listed by the Census Bureau. The rural nonfarm sector of the population includes persons who live in nucleations too small to be classed as urban and in rural nonfarm settlement of a more dispersed nature. Since this study is concerned with the dispersed rural settlement only the dispersed part of the nonfarm population will be considered.

Defining the Rural Nonfarm Population

While the rural farm population and its housing are fairly easily defined on the basis of occupation and, generally, settlement type, the rural nonfarm population and its settlements do not fit into any neat category.¹ This sector of the population is made up of persons who cannot be classed as urban on the basis of residence and yet who do not fit into the rural farm class because of their nonfarm, and frequently urban, forms of occupation. Most of the rural nonfarm persons, as listed in the Census of Population, live in the scattered rural service centres and are employed in providing services for the surrounding farm people. Some also live in these places and work in nearby towns.

1. Hart found this for Indiana. Hart, J.F., "The Rural Nonfarm Population of Indiana". Proc. Indiana Academy Science, 65 (1955), pp. 174 - 179.

Others live outside of these rural centres often occupying houses which were once farm family dwellings. Indeed, much of the growth of the rural nonfarm population in the Corn Belt would appear to be due to some farmers taking up nonfarm employment without moving from their old farmhouses. Others live on the outer fringes of towns outside of the town limits and the more densely settled suburban zone. Considerable numbers of rural nonfarm houses now line some major highways on city fringes. Such a location has the advantage of country-living and yet easy access to the urban place of work. Overall, nonfarm persons tend to live in the country for reasons different from those of the farm family, reasons which include cheaper housing and less crowded conditions.

The rural nonfarm population of the Corn Belt and its component subregions has been growing over the last four decades at the same time as the rural farm population has been decreasing.¹ The rural nonfarm populations for these subregions in 1960 is given in Table XVIII together with percentages of the total population which this represented.

The rural nonfarm population makes up about a quarter to a third of the total subregional populations with the farm populations only greater in the less urbanized western subregions. Further expansion of

1. Data on the growth and decline of these two parts of the rural population before 1920 is not available since the Census Bureau did not divide farm persons from nonfarm persons before that year. The only division of the rural population was by size of place.

the rural nonfarm population had occurred between 1950 and 1960 at the same time as farm population losses continued.

TABLE XVIII Rural Nonfarm Population by Economic Subregions, 1950 - 1960¹

E.S.	Total Rural Nonfarm, 1960	% Increase 1950-60	% Total Population 1960
47	917,217	34.6	22.4
48	721,981	23.8	35.5
51	279,358	23.2	34.5
63	408,701	18.2	27.5
69	331,442	12.6	25.2
70	317,124	12.3	23.6
71	318,416	9.9	32.6
84	104,467	23.1	32.8
85	508,739	14.4	16.7
86	193,079	6.7	22.6
87	90,420	7.6	33.6
92	124,848	1.9	32.4
93	106,357	2.2.(decrease)	37.8
	<u>4,422,149</u>		

The overall effect of this rural nonfarm growth was to compensate for the rural farm losses but nonfarm gains only fully balanced these losses in the three eastern subregions. Most of the early growth of the rural nonfarm population resulted from the setting up of many thousands of small service centres in the farming areas. Some of these grew to become towns but many more remained as small nucleations. With

1. Calculated from Census of Population volumes, 1950-1960, various tables.

the decrease of the farm population after 1900, many of the centres also declined. There has, however, been renewed growth in some centres. The chance for farmers, and other persons previously employed in providing farm services, to take up urban employment has tended to stabilize the populations of rural centres in the eastern Corn Belt. On the other hand, in the rest of the Corn Belt farm persons have tended to move into the distant industrial centres so that the growth of rural non-farm settlement, both in the service centres and in the open country, has been more limited.

The diverse nature of the persons who are included in the rural nonfarm category and the variety of their nucleated and dispersed types of settlement are major hindrances to the further analysis of this sector of the population.¹ Another obstacle is the lack of detail in the census data on the nonfarm population.

The Nature of Nonfarm Census Data

Although the rural nonfarm population of the Corn Belt forms over a quarter of the total population of the region and exceeds the farm population, little precise data about the various parts of this sector of the rural population is available. Demographic and occupational data on nonfarm persons, according to the size of places they live in, is less detailed than for persons living in urban places. Similarly, Census housing data is no more detailed for the rural nonfarm population

1. In short, the rural nonfarm population is that which is neither urban by residence (because it lives in small settlements) nor is occupied in farming. It is therefore made up of the nonfarm persons living in rural service centres and the nonfarm persons living in the open country. The latter group most concerns us here.

than for the farm sector even though the former group is far more diverse in its economic and settlement characteristics. Further, detailed data on farmhousing by economic subregions was first compiled at the 1950 Census but similar tabulations for rural nonfarm housing only appeared for the first time with the 1960 Census.

Most of this sector still lives in small nucleations (rural service centres) scattered across the Corn Belt but the number living in the open country and forming part of the fabric of dispersed settlement is growing. In many ways this whole sector of the rural population is more akin to the urban sector than the rural farm sector.

The settlement and housing characteristics of the rural nonfarm population which lives in nucleated settlement do not come within the scope of this study, but because of the nature of the census data it will be necessary to refer to this part of the nonfarm population in order to see how far the rest of the nonfarm population contributes to the dispersed pattern of settlement.

The Rural Service Centre

The rural service centre is a distinctive form of nucleated settlement in the Corn Belt and it can ordinarily be separated off from the areas of dispersed settlement. Not only is there the differentiating factor of the form of settlement, nucleated as opposed to dispersed, but

most of the persons in rural service centres are engaged in nonfarm employment. These places are scattered across the Corn Belt generally at fairly regular intervals of a few miles from each other. An indication of the density of these places in the eastern Corn Belt is given in Fig. 25. This figure only maps the places listed by the Census. More eastern centres developed and have expanded as they have taken on new nonfarm functions including the provision of commuter housing close to urban areas. Fewer rural centres were set up in the central and western Corn Belt where the farm settlement was less dense and fewer still have survived as farmers became able to travel further to larger centres and as the total numbers of farm persons declined. Centres in these areas have been less successful so far in acquiring other functions to replace their dependence on the farm population.

These centres are defined as rural places by the Census Bureau if they have a population of less than 2500 persons. Places with more than this are termed urban. All rural places with between 1000 and 2499 inhabitants are listed separately in the Population Census. Places with less than 1000 inhabitants are only listed if they are 'incorporated'.¹ Most of the larger rural places were incorporated but the amount of incorporation among places with less than 1000 persons varies considerably from state to state. This means that one can readily obtain from the Census only an indication of how much of the rural population lives in

1. An incorporated place is one with legally prescribed limits and local powers.

the larger rural places and a very incomplete indication of the number living in smaller places. Figures for the nonfarm population resident in the open country are not obtainable by any direct means.

The Dispersed Rural Nonfarm Settlement

Forming another part of the rural nonfarm population are the more dispersed groups who live on the outermost fringes of urban centres beyond the suburbs and in an area where much of the land is still in farms and most of the fabric of settlement is composed of farm dwellings. This type of mixed settlement is becoming increasingly common around eastern Corn Belt cities as pieces of farm land are sold for building and as farmhouses are taken over by urban or nonfarm persons. There is no simple means of distinguishing this part of the nonfarm population from that in the rural centres and, so far, local studies are the only means of throwing some light on the nature of these recent settlement changes.¹ The development of small linear clusters of nonfarm houses and bungalows along major roads close to urban areas appears to be a settlement type different from that just outlined since the clustering is more distinctive and the houses were built for the commuting person rather than being taken over by a nonfarm family from a previous farm

1. See, for example, Mather, E.G., "One Hundred Houses West", Canadian Geographer, 7 (1963), pp. 1 - 12, There is also a growing literature on the rural-urban fringe but mainly in terms of the concept rather than its forms of settlement. See Wehrwein, G.S., "The Rural-Urban Fringe". Economic Geography, 18 (1942), pp. 217 - 228, and Martin, W.T., The Rural-Urban Fringe, University of Oregon, Eugene, 1953.

family. Bungalow clusters of this type are also found edging the smaller urban places in the Corn Belt. Most of the rest of the scattered nonfarm persons live in areas predominantly settled by farm persons and they tend to occupy, like them, older-type rural houses. Again there is no separate population or housing data on these various types of rural nonfarm settlement although their economic and demographic characteristics are probably as diverse as their forms of settlements.

The Census of Population presents one further difficulty hindering any attempt to arrive at totals of nonfarm persons living in the open country as against those who live in the rural nucleations. It has already been stated that the populations of rural nucleations can be considered predominantly, but not entirely, nonfarm in occupation. Census data on this is not complete since the populations listed by size of place are not, in all cases, divided into farm and nonfarm persons. Figures for the status of persons living in larger rural centres (1000 - 2499 inhabitants) shows that they are overwhelmingly nonfarm in employment but observations would suggest that the proportion of farm persons increases as the size of place decreases. Even so farmers living in these places cannot form more than a few per cent of all Corn Belt farmers, the majority of whom make up the greater part of the dispersed settlement fabric.

Arriving at an Estimate of the Open Country Non-Farm Settlement: 77

The ordinary census figure for the total of rural nonfarm population or housing in any one area is of little value, then, in a study of the settlement of the dispersed rural population since the nonfarm class is heavily weighted by that portion which is found in the rural service centres. Two other methods are available for the further elucidation of this part of the dispersed settlement fabric but both involve more detailed analysis and can therefore only be applied in limited parts of the Corn Belt. The first method relies entirely upon field investigations of the nature of rural nonfarm settlement. This will be referred to in Chapter 7. The second method involves the arduous calculation of an estimate of the dispersed rural nonfarm population in a limited area from census data on minor civil divisions together with other non-census data.

A calculation of the dispersed rural nonfarm population has been made for the whole of Iowa, the only state which lies entirely within the Corn Belt and for that part of Indiana included within the region. Iowa displays the more regularly dispersed farm settlement pattern which is common over most of the Corn Belt as well as an even scatter of rural service centres in which the bulk of the rural nonfarm population resides. Indiana displays the effect of a more densely settled farm population, and a more industrialized part of the region, where one can expect a greater amount of rural nonfarm settlement in rural service centres,

edging large towns and in the open country.

The method and the results of these calculations for Iowa are laid out more fully in Appendix I while only the final results, which more directly concern the rural nonfarm dispersed population, are considered here. These results are summarized in Table XIX.

TABLE XIX Rural Population and Settlement Characteristics in Two Corn Belt States, 1960

	<u>Indiana</u> ¹	<u>Iowa</u>
Area (sq. miles)	26,215	56,045
Total population	3,049,715	2,757,537
per cent urban	58.0	52.9
Total rural population	1,276,791	1,295,025
Total rural farm population	363,437	662,239
per cent rural population	28.5	51.1
Total rural nonfarm population	913,354	632,786
in nucleated places (2)	369,000	511,000
outside of nucleated places(2)	544,000	122,000
Per cent rural nonfarm population outside of nucleated places	59.5	19.3

The total population of the 66 Indiana counties in the Corn Belt in 1960 was considerably greater than that of Iowa which covers an area more than twice as large. This greater population density in Indiana resulted especially from a much larger urban population which made up 58.0 per cent of the total population compared with 52.9 per cent in

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1. The 66 Indiana counties within the Corn Belt.
 2. Estimated (See Appendix I).

Iowa as well as a greater density of rural persons. In both states the urban proportion of the population has been rising.

This disparity between the rural populations of the two states is well marked. The farm sector made up 51.1 per cent of Iowa's rural population in 1960 but only 28.5 per cent in Indiana. The rural nonfarm population, traditionally associated with the nucleated rural service centres, is clearly an important factor in the total rural settlement fabric but this does not fully explain the difference in the sizes of this sector of the population between the two states.

Detailed calculations were made to discover how much of the rural nonfarm population is grouped into rural service centres and how much is more dispersed outside of these places. In 1960 Iowa had an estimated 122,000 rural nonfarm persons living outside of these places, This represents about 19 per cent of the total rural nonfarm population and 15 per cent of the dispersed population, the remainder being farm persons. In Indiana there were an estimated 544,000 rural nonfarm persons living outside of the rural service centres; or 59.5 per cent of the total rural nonfarm population. This means that the rural nonfarm population outside of nucleations is nearly twice as numerous as that living in the nucleations. This also suggests that the dispersed rural nonfarm population is considerably greater than the farm population and makes up 60 per cent of the dispersed population.

Although dispersed, the non-nucleated part of the rural nonfarm population in both states is clearly less evenly scattered than is the farm population. Although very numerous in Indiana, most of the settlements of the dispersed rural nonfarm population tend to gather on the fringes of cities and along the highways leading into the major urban centres. In this way much of the rural nonfarm population is semi-nucleated in its settlement patterns. Observations would suggest a similar pattern concentrates much of Iowa's dispersed nonfarm settlement into a few areas of the state.

Insufficient field data has been gathered on these nonfarm non-nucleated settlements to attempt to analyse them further in order to draw conclusions which have wider relevance. Nor have map studies been possible in view of the limitations of the sources. It is, however, clear that the dispersed nonfarm settlement is much more variable than the farm settlement in its density, forms and features. Further reference will be made to this in the next chapters which concentrate upon some of the features of farm settlements.

CHAPTER V FEATURES OF FARM SETTLEMENT

The Corn Belt Farmstead

Since a major feature of the rural farm settlement pattern of the Corn Belt are the many scattered farmsteads, it is appropriate here to consider the nature of these farmsteads with particular reference to their individual locations, their nucleated form and layout, the individual buildings and other features. Regional variations in these aspects will also be discussed. The types of farmhouses on these farmsteads will also be described and discussed. In Chapter 6 other regional variations in farmhouse size, age and condition will be considered.

It has not been possible to deal with the rural dispersed nonfarm housing in the same way. This part of the dispersed settlement is both less numerous and more diverse in its distribution while the census data on nonfarm housing is not in a form suitable for detailed analysis.

Farmstead Location

It has already been pointed out that the dispersed pattern of farm settlement resulted from the system of land disposal which created medium-sized family farms. This scattering was aided by the settlers themselves, many of whom chose to live and work on their own land, and helped also by the high percentage of useable land throughout the Corn Belt which nowhere greatly constricted settlement. With most settlers

taking out claims for a quarter-section of land, four farmsteads to each square mile became typical over large areas. More recent farm consolidation to a point where many farms average about 200 acres has reduced the number of farms which one would expect to find in each section. The acquisition of more land by some farmers to make their farms larger than average and the tendency for these pieces to be non-contiguous with the main holding have meant that what was once probably a more even scattering of three or four farmsteads to the section has become less regular with four or more farmsteads in some sections but as few as one in adjoining sections.

The local variations in number of farmsteads to the section is largely a matter of variations, between neighbours, in size of farmholdings. But the individual locations of farmsteads in relation to other features on the landscape can be examined a little further.

The most obvious of these relationships is between the farmstead and the road which leads to the linear development in the dispersed pattern. Since the Corn Belt farmstead is typically nucleated, with all the farm buildings and the farmhouse occupying a 2 to 4 acre plot of land, a roadside position has obvious advantages. The farmstead, as the centre of farming operations, becomes more accessible to people and places outside of the farm while the fields and tracks can be arranged to bring

them all within reach of the farmstead.¹ Further, as some farmers have acquired non-contiguous pieces of land, the roadside location of the farmstead allows machinery to be moved more easily to distant fields,

Trewartha has pointed out that 55 per cent of the 218 Corn Belt farms for which he had data fronted onto a road.² Data for 13 Corn Belt counties presented in Table XXIII would largely confirm this.³

In spite of this large percentage of farmsteads so sited with accessibility in mind, it has already been noted that there appears to be little tendency for them to gather together in small clusters either at the intersection of county roads or where farm property boundaries meet at the roadside. Rather, each farmstead tends to locate at some intermediate point along the road. Although this may mean that the nearest neighbour is a few hundred yards away, such a location about midway along one side of the farm property can make all parts of the farm more accessible than would be the case with a farmstead located in

1. For a fuller discussion of land accessibility in relation to different farm and road layouts, see Barnes, C.P., "Economics of the Long-Lot Farm". Geog. Rev., 25 (1935), pp. 298 - 301.

2. Trewartha, G.T., "Some Regional Characteristics of American Farmsteads," Annals Assoc. Am. Geogs., 38 (1948), pp. 169 - 225. He found that 55 per cent of the farmsteads fronted onto a highway, 37 per cent were set back and 8 per cent were bisected by a road.

3. The writer's impressions and observations suggest a slightly higher proportion than Trewartha for roadside locations but a lower percentage for farmsteads bisected by a road. The former difference may arise from the interpretation placed on "roadside" location. The writer included in this category all farmsteads that were obviously not situated on a private driveway which detached the farmstead from the road by a strip of land large enough to be counted as farmland.

the corner of the property. Most locations therefore appear to be a balance between accessibility to the outside and to the rest of the farm.

As farm size increases westward more farmsteads take up locations away from the roadside. Trewartha gives a figure of 37 per cent of farmsteads set back from the road for the Corn Belt areas he examined. The writer has arrived at similar percentages but figures are lower for some eastern counties. The reason for the increase of farmsteads in the west which are located off the road, but connected to it by a driveway, is that on the larger farm the buildings can be more usefully located near the centre of the unit rather than excentric to it. The variation in this feature between counties would also seem to be related to the form and completeness of the road net. The number of these farmsteads increases in western counties also because the net is less complete and a farmstead may be up to a mile from the nearest road. Drives are also more common on the hilly southern borders of the Corn Belt where land qualities vary more markedly and the topography limits the siting of farmsteads as well as reducing the amount of useful farmland. Yet roads do not necessarily lie along section lines or pass close to the better land. Drives are also common in some eastern counties where the road net is complete and no single reason can be suggested for this.¹

1. For one example of a Corn Belt beef farm with a farmstead on a drive in northern Illinois, see Highsmith, R.M. (edit.) "Case Studies in World Geography". Prentice Hall, London, 1961, pp. 47 - 54.

A second relationship between the farmstead and the local relief could not be examined conclusively. A very high percentage of the farmsteads observed occupy flattish or only moderately sloping land which is, of course, the predominant type of land in the Corn Belt. Farmsteads were less often found in valleys, on floodable land or on slopes when flatter land was available above the valley. Ridge and valley sites avoiding steeper slopes were common in southern districts to which reference has already been made. In the gently undulating areas there appeared to be no preference to locate farmsteads in the swales to gain some slight protection from the wind since most farmsteads have their own windbreaks. Nor was there any particular location common in the wet, and now drained, upland prairies. Site selection in relation to water supply could not be examined properly but wells are fairly ubiquitous and some farms now receive supplies from the local town or nucleation. All of these factors appear to be subordinate to, or allied to, the need to be positioned by the road.

The Nucleated Farmstead Layout

Generalizations about the Corn Belt farmstead can be misleading. Wide variations are possible between neighbouring farmsteads as well as between major parts of the Corn Belt where the dominant types of farming vary sufficiently to alter the character and number of farm buildings. But the nucleation of farm buildings into farmsteads of about 2 to 4 acres and oriented to the compass points is a fairly universal feature.

The nucleated farmstead probably owes itself to both historical and economic factors. The settlement of the wooded eastern Corn Belt entailed the clearance of forest by felling, girdling and firing the trees. The first buildings on each farm were erected close together in the clearing and the first crops planted between the stumps. Other historical factors are also probably significant. The grouping of buildings has advantages for the efficient operation of the farm. The adequacy of the road network often allows the farmer to have access to his block of land from more than one side and the generally smooth terrain means that equipment can easily be moved to any part of the farm from one central point. The nucleated set of buildings allows work to be continued throughout the winter when the fields cannot always be reached.

The farmstead is most frequently a square, rectangular or semi-rectangular area surrounded by a fence. The farmland around is often left to pasture and also serves as a way to the other parts of the farm which will generally be composed of 5, 6 or more fields of about 10 to 40 acres each. Few farmsteads are non-contiguous with a group of buildings separated off in another part of the farm and individual buildings are seldom found in fields, apart from portable hog and chicken sheds. The farmstead includes the farmhouse, one or possibly two barns, various other livestock buildings, corn stores, sheds for machinery and equipment

and a garage. These buildings are most commonly constructed of timber. Silos and wind-driven water pumps are found on some farmsteads.

The buildings are generally arranged around a central court. To the sides are other open spaces for cattle and hog yards, garden, house yard and possibly an orchard. A short gravel drive connects the court to the public road and lanes lead from the farmstead to the fields. Trees may be scattered about the farmstead, although in the prairie areas the only trees are generally in the form of a windbreak on the northern and western sides.

One possible arrangement is shown in Fig. 26 and other examples are shown in Plates A-E at the end of the volume of figures. Fig. 26 is of a farmstead in Story County, Iowa, in the central Corn Belt. This example is better arranged than many in that there is more space between buildings. It shows, however, the proximity of the house to the road, the house often being closer than any other building.¹ The garden or yard is a very common feature and it helps to give Corn Belt farms a typically neat appearance.

The farm court is generally to one side of the house although its exact location will vary, partly in accordance with the direction of the

1. The distance is often no more than 50 feet but farmstead planners recommend 100 feet to avoid dust from vehicles on the unmetalled county roads. See Agricultural Extension Service Pamphlet, 149. Farmstead Layout Types. Iowa State College, Ames, 1949.

prevailing winds at that time of the year when livestock are up around the buildings. The farm buildings which group around the court vary in size from a barn with a ground space of about 2000 square feet down to chicken houses, the total number of buildings being between 5 and 8 in most instances. Their locations vary greatly but the livestock buildings are often at more distance from the house and have adjoining feed yards or paddocks placed in the shelter of the buildings. If hogs are kept the hog house is often near the cattle quarters with a corn crib conveniently close to both to allow feeding direct to the yards. Hay may be stored in the upper floor mow of the barn. Tower silos of pre-cast concrete and with a capacity of 150 to 200 tons are increasingly appearing next to cattle barns. Of the other buildings, the machine shed is placed to allow the convenient movement of equipment into the fields while portable hog houses may be seen adjacent to the farmstead or on other parts of the farm.

The Farm Buildings

The internal layout and number of buildings clearly vary from farm to farm but it is also obvious that most Corn Belt buildings were constructed in past decades for specific purposes. Each livestock building will tend to have its attached feeding area, feed store and preparation space.¹ The cattle barn, with its attached yard in which

1. This point favourably impressed a group of British agricultural scientists who visited North America to study farm buildings. Farm Buildings in North America. H.M.S.O., London, 1946, p.2.

the animals will spend much of their time even in mid-winter, is the largest building. Most examples appear to be 30 or more years old. The typical type is more modest in size and style than in the Wisconsin dairy belt to the north but some are similar being up to 100 feet in length with a substantial mow in the roof.¹ The more modest barn generally has a gable roof and may have wing sheds while the hip-roofed barn is a much larger building and is most common in the beef and hog areas on the prairies. Most barns and other buildings are painted, red and white being the common colours. Other smaller livestock sheds are similarly arranged with attached feeding areas. These, with a central corn crib or granary, allow farm work to go on in all weathers close to the house and farm office.²

There are major disadvantages in this type of single-purpose building. Any move towards farm diversification requires a considerable modification of existing buildings. Changing methods are already making some buildings difficult to use or causing their location on the farmstead to become less favourable.³ The two storey barn is a heavy and expensive structure not least because the arch or hip-roof is often

1. Durand, L., "Dairy Barns of South East Wisconsin". Economic Geography, 19 (1943), pp. 37 - 44.

2. One Minnesota estimate suggests that 73% of the farmer's working time is spent in the farmstead. Cleland, S.B., Farmstead Planning. University of Minnesota Agricultural Extension Service Folder 135, Minneapolis, 1945.

3. Some agricultural technicians, for example, doubt the value of the mow and gravity feeding since it creates a dust hazard to stock.

built of laminated timbers. The fire risk is also high. The increased use of fertilizers, improved seed and similar products means that more storage is needed by most farmers but these specialized buildings do not easily provide it. Replacement buildings on Corn Belt farms are more often of a flexible type whose use can be changed without much loss of efficiency. Many farmers still erect their own barns and copy old styles. Some even find enough timber on their own woodlots. But clear span buildings in timber and steel are being introduced. Even so, modern farm buildings are not yet appearing in sufficient numbers to alter the traditional aspect of the Corn Belt farmstead.¹ The modern concrete silo is, perhaps, the only exception and is becoming common in stock-keeping areas. Feeding silage to cattle is now very common and is well suited in the region as corn handles well, yields heavily and can be moved in and out of the silo by machine.

Regional Variations

Observation of features of farmsteads in 13 counties scattered across the Corn Belt included the recording of the presence of barns and sheds, their number, type and colour as well as the presence of silos and wind pumps. The counties are listed in Table XX together with an indication of the predominant farming types. Farmstead location was

1. A useful discussion of certain aspects of farm building investment can be found in Barlowe, R. and Hartmans, E.H., Some Aspects of Farm Housing and Service Buildings in Michigan. Michigan State College Technical Bulletin 232, East Lansing, 1952 p. 14.

also examined and these results have already been referred to in this chapter while observations on windbreaks are dealt with in the next section. The data on farm buildings collected from the 3946 farms observed in the selected counties are presented in Tables XX - XXIV. The data for 8 of the counties is divided into two parts,

1) that for a sample of farmsteads which were observed along a series of road traverses arranged so that a fair areal coverage of the county was obtained.

2) that for farmsteads in one selected township in the county where the features of every farmstead were recorded. Some of the townships gave results considerably at variance from the county sample. This was the result of the township being in an unrepresentative part of the county and could not be avoided in those counties where land types vary markedly in a small area.

The data for the other 5 counties is based entirely on the traverses. The positions of the 13 counties are shown in Fig. 27. The counties were selected so that one lay in each subregion and were, on the basis of physical, demographic and economic data, fairly representative of the surrounding subregion. But no statistical tests were carried out to ensure the most representative county, from this evidence, had in each case been chosen. Where townships within individual counties were studied, these were selected at random.

Barns are common to most of the farmsteads examined. Data on them is given in Table XXI. They were lacking on a proportion of farms in Sullivan County (Indiana), Fremont County (Iowa) and Adair County (Missouri). Other farms in the same counties had two barns and so raised the average number of barns per farm. Farms with two barns were especially common in the selected Iowa and Illinois prairie counties where livestock feeding is more common (Hamilton, Chickasaw and Clinton Counties, Iowa; Moultrie County, Illinois).

The most common type of barn is a modest sized structure of less than 2000 square feet ground area and a gable roof (Type A in Table XXI). It is most frequently seen in the eastern counties (Henry and Kosciusko Counties, Indiana) and in the south (Sullivan and Adair; Linn County, Kansas). These are areas of generally lower farm incomes and a tendency towards more general types of farming. This barn type is, however, also found frequently in the prairie counties as well.

The hip-roofed barn (Type B in Table XXI) with an upper mow is also common but it is generally a much larger structure involving a solid foundation and a basement in some cases. It is nowhere as frequently found as in the dairying area of Wisconsin but is common in Big Stone County (Minnesota) to the north as well as in the central counties where farm incomes are generally high and stock are kept. In the Minnesota

TABLE XX Selected Counties and Townships

	<u>Main Farming Type</u>	<u>No. of steads observed</u>
<u>Eastern Corn Belt</u>		
Henry (Indiana) Prairie T.	Hog and Soft Winter Wheat	184
		193
Kosciusko (Indiana)	Livestock, Dairy, Soy, Cash Grain	271
<u>Southern Corn Belt</u>		
Sullivan (Indiana) Haddon T.	Hogs and Soft Winter Wheat	159
		385
Adair (Missouri)	Livestock and Pasture	376
Limn (Kansas)	Livestock, Cash Grain, Dairy	207
<u>Central Corn Belt</u>		
Moultrie (Illinois) Dora T.	Cash Corn, Oats, Soy	165
		109
Chickasaw (Iowa) Dresden	Hogs and Dairy	214
		147
Clinton (Iowa) Orange T.	Cattle Feeding and Hogs	244
		103
Fremont (Iowa) Washington T.	" " " "	208
		113
Big Stone (Minn.)	Livestock and Cash Grain	160
Hamilton (Iowa) Freedom T.	Cattle Feeding and Hogs	252
		116
<u>Western Corn Belt</u>		
Aurora (S. Dak.)	Livestock and Cash Grain	112
Thayer (Nebr.)	" " " "	124
Chester (East half only)		32

county many of these barns have a curved Gothic Arch roof style (Plate D. Lower photograph).

In some central and western counties, where the gable-roofed barn is common, a variant with wing sheds at the side is also found. These give extra space for stock so that they tend to be less frequently seen in the cash grain counties or those which concentrate on hogs. This barn is referred to as Type C in Table XXI. A fourth type (Type D) has a shallow gable roof and wing sheds often on the sides and the rear of the barn. It occurs most frequently in western stock-feeding counties but its distribution appeared to be more patchy.

Barn colour is also listed in Table XXI. Red is generally a more common colour than white mainly, it would seem, because it is a cheaper and hard-wearing paint. White barns appear to become slightly more common in areas of higher farm income. What is more noticeable is that many more barns in southern Corn Belt counties are left unpainted and often in a poor state of repair. These are, of course, areas of lower income and less specialized farming. Unpainted barns are listed separately in Table XXI.

The number of sheds on each farmstead varies considerably but most farms have between 5 and 8. On the present survey only the larger sheds were counted thus omitting fuel stores and garages and reducing the

TABLE XXI. Number, Type and Colour of Barns on Farmsteads
in 13 Corn Belt Counties

County Township	% with barns	No. barns per stead	per cent				per cent		
			A	B	C	D	red	whi.	unpaint
Henry	96	1.01	69	26	3	1	21	47	32
Prairie	89	1.04	74	18	4	3	27	46	27
Kosciusko	95	1.00	86	12	-	2	37	34	29
Sullivan	81	1.03	59	22	16	4	24	22	54
Haddon	80	1.01	65	8	24	2	31	14	53
Adair	82	1.02	57	29	9	4	23	44	31
Linn	86	1.00	53	20	22	5	29	19	52
Moultrie	90	1.10	74	7	13	3	28	32	39
Dora	95	1.21	78	12	6	4	54	32	14
Chickasaw	92	1.21	38	47	13	-	48	21	25
Dresden	94	1.20	54	32	13	-	78	14	7
Clinton	98	1.08	47	22	6	25	53	32	14
Orange	92	1.18	53	24	1	22	48	37	15
Fremont	74	1.07	40	20	27	11	21	45	34
Washington	60	1.12	35	25	27	13	29	21	50
Big Stone	93	1.06	42	58	-	-	57	29	14
Hamilton	90	1.45	48	37	9	5	46	37	17
Freedom	99	1.23	30	58	7	3	49	41	10
Aurora	92	1.03	35	39	14	11	74	10	16
Thayer	91	1.06	53	9	29	9	52	34	14
Chester	84	1.08	48	6	13	27	45	7	48

average number per farmstead. Farmsteads in the Iowa livestock counties tend to have more sheds and other small structures than in the cash corn and general farming counties. A higher proportion of the sheds is unpainted than is the case with barns. Again the proportion of unpainted sheds is higher in the southern counties. Details of the number and colour of sheds on farmsteads in the 13 selected counties are given in Table XXII.

TABLE XXII Number and Colour of Sheds on Farmsteads in 13
Corn Belt Counties

County Township	% with sheds	no. of sheds per stead	red	per cent colour	
				wht.	unpaint
Henry	88	2.03	12	50	38
Prairie	88	2.35	19	36	45
Kosciusko	96	2.93	29	29	41
Sullivan	81	1.96	13	20	67
Haddon	96	2.12	14	12	74
Adair	96	3.00	12	31	55
Linn	85	2.67	14	9	76
Moultrie	91	2.54	19	31	50
Dora	100	2.37	30	36	34
Chickasaw	92	3.87	45	15	40
Dresden	91	4.39	57	19	22
Clinton	96	3.52	52	31	16
Orange	97	3.40	39	34	27
Fremont	85	3.40	6	21	73
Washington	91	3.05	4	9	87
Big Stone	91	2.66	50	33	17
Hamilton	88	4.12	26	42	32
Freedom	89	3.60	40	38	22
Aurora	96	3.13	66	12	22
Thayer	75	3.42	22	12	64
Chester	94	3.06	30	10	60

TABLE XXIII

Drives, Windpumps and Silos on Farmsteads in
13 Corn Belt Counties

County Township	% on drives	% with pumps	% with Silos
Henry	33	5	5
Prairie	31	4	9
Kosciusko	13	5	14
Sullivan	18	4	3
Haddon	13	2	8
Adair	25	2	5
Lin	36	1	4
Moultrie	27	9	4
Dora	8	16	4
Chickasaw	6	20	45
Dresden	11	30	46
Clinton	30	31	15
Orange	20	22	5
Fremont	34	17	1
Washington	38	29	2
Big Stone	43	26	25
Hamilton	31	36	6
Freedom	45	21	14
Aurora	39	56	2
Thayer	29	46	5
Chester	13	59	6

The presence of windpumps becomes more common in the prairie and western sections of the Corn Belt as can be seen from Table XXIII for the selected counties. Between 10 and 50 per cent of these pumps appeared to be seasonally or permanently out of use. In some cases

pumps are found in the fields rather than on the farmstead. Silos are, of course, limited largely to major livestock producers and especially dairying enterprises which are common in Chickasaw County, Iowa and Big Stone County, Minnesota, but they are becoming familiar on other livestock farmsteads. The occurrence of farmsteads on drives has been discussed earlier in this chapter.

Windbreaks

Planted windbreaks are a fairly common feature around farmsteads on the prairies but are far less so in the eastern Corn Belt since trees are found in and around most farmsteads and these provide a certain amount of protection in winter. Windbreaks provide shelter to allow stock to be kept out longer in the winter in the feed yards and can also reduce home heating fuel costs by as much as a third.¹ In Table XXIV is reported the percentages of farmsteads with different types of windbreaks in the 13 counties examined. These figures are much higher than reported by Trewartha probably because the present writer considered as a windbreak any belt of trees which gave some protection whether they were originally planted for the purpose or not.

Most of these windbreaks did not appear to live up to the ideals put forward by agricultural extension workers who state that a good windbreak should be on the sides of the farmstead which face the prevailing winds. They should also be planted about 100 feet from the

1. Campbell, R.B. and Grau, R.B., Windbreaks for Iowa Farmsteads. Iowa Agric. Experiment Station Bulletin p. 88, Ames, 1955, p.3.

useful area of the farmstead so that snow can drift without interfering with farming conditions. Several rows of conifers are recommended which at a height of 50 feet can give protection for about 300 feet in their lee.¹ Although windbreaks were often seen to be planted with conifers they were seldom as closely spaced as suggested and the more scattered trees around eastern Corn Belt farmsteads made far less effective shelters although wind protection is often less necessary here and a conifer belt could create pockets of dead air in summer.

Table XXIV shows that windbreaks on the north-western sides or on either the north or the west are common in the prairie and western counties where high percentages of the farmsteads had planted shelters. Rather fewer farmsteads in the eastern counties had windbreaks while in the south most of these belts were only composed of trees scattered around the edges of the farmsteads. In all counties some farmsteads had scattered trees or had planted breaks on sides from which protection would appear to be less necessary. Fig. 28 presents in diagrammatic form some of the data given in Table XXIV, It clearly shows the incidence of windbreak planting in the selected prairie counties and the use of woodland and scattered trees in eastern and southern counties.

1. Anderson, P. and Smith, M., Planting the Farm Shelterbelt. University of Minnesota Agricultural Extension Service Bulletin, 196, St. Paul, 1960.

TABLE XXIV Types of Windbreaks in 13 Corn Belt
Counties

	<u>Nature of</u> <u>Landscape</u>	<u>No. of</u> <u>observations</u>	<u>% with</u> <u>w. breaks</u>	100%				
				<u>scattered</u> <u>trees</u> <u>all around</u>	<u>NW</u>	<u>N</u>	<u>W</u>	<u>other</u>
<u>Eastern County</u>								
Henry	Rolling, Wooded	377	51.9	38	5	6	13	38
Kosciusko	" "	271	69.6	32	13	13	11	31
<u>Southern</u> <u>County</u>								
Sullivan	" "	544	23.1	57	8	4	8	23
Adair	" "	376	72.6	43	20	7	9	21
Linn	" "	207	72.4	53	19	6	13	9
<u>Central</u> <u>County</u>								
Moultrie	Open prairie	274	73.7	20	16	10	25	29
Chickasaw	" "	361	81.7	13	54	14	10	9
Clinton	" "	347	81.8	21	26	9	25	19
Fremont	wooded	321	84.1	42	28	10	9	11
Big Stone	Some wood	160	87.5	26	56	9	6	3
Hamilton	Open prairie	368	91.6	18	50	11	8	13
<u>Western County</u>								
Aurora and Charles Mix	Open prairie	184	88.7	23	32	32	8	5
Thayer	" "	156	94.9	33	38	17	6	6

Rural Housing in the Corn Belt

The purpose of this part of the chapter is to examine more closely the characteristics of the houses found in the rural parts of the Corn Belt and, more especially, those found on the farmsteads. This seems, to the writer, a logical development of the study of settlement patterns since the house is a basic component in those patterns.

The first section concerns itself with a brief review of American architectural ideas as far as their development affected the vernacular styles of ordinary houses in the Corn Belt. Previous research by geographers and other workers in the field of house types in the Corn Belt is referred to. The rural house types commonly found there are then described and this is followed by a discussion concerning the regional variations observed in the occurrence of these types.

A Review of the Development of Domestic Architecture in the Mid-West.¹

Domestic architecture, that is the design and style of dwellings, is most commonly thought of as being the privilege of the more wealthy at least as far as housebuilding in previous centuries was concerned. Only the larger houses were deliberately designed to meet special needs.

1. The main points of the architectural history in this section are based on the following sources: Melvin, B.L., Report of the Committee on Farm and Village Housing. The President's Conference on Home Building and Home Ownership. Washington, 1932. Pickering, E., The Homes of America. New York, Crowell, 1951. Newcomb, R., "Regionalism in American Architecture". Chapter 9 in Regionalism in America. Jensen, M., University of Wisconsin, Madison, 1952. Newcomb, R. and Foster, W.A., Home Architecture. Wiley, New York, 1932.

Nevertheless the more ordinary houses built in the Mid-West in the last century did tend to follow a certain styles and layouts and their construction was guided by plans obtained from plan-books which were published in considerable numbers.¹ In more recent decades smaller houses have been more carefully planned in order to incorporate into them better conditions for comfortable living as well as technical points which allow many units to be built from the one design and individual parts to be pre-fabricated. This has resulted in more standardized house types and it is this method of construction which characterizes many suburban developments in the United States. Similar house types are also becoming common in more rural areas.

But most of the farmhouses in the rural parts of the Corn Belt are fifty or more years old. They were not planned to quite the same extent as many modern houses but a few styles are common amongst them since most were erected with the aid of plan-books. They were built by local timber contractors and carpenters often with the help of the farmers for whom they were being erected and, since timber was the material used throughout their construction, the builder and the client were able to make considerable modifications to the basic plan.² Most of the designs

1. For example, Hodgson, F.T., Hodgson's Low Cost American Homes. Drake, Chicago, 1904. Plan-books like this one gave views, layouts and the approximate cost in labour and materials for the construction of about a hundred different houses.

2. The Hodgson Plan-book points out, for example, in an introduction that the prospective house owner should ensure that the carpenter erects the interior walls to fit the sizes of the owner's carpets. Hodgson, op. cit. p. 19.

were for simple, large but compact houses which could make the best use of the rather inefficient house heating arrangements then in normal use. Most of them had six or more rooms for living or sleeping to suit the large families which were common then.

Types varied in popularity as the Corn Belt was settled but they are not a good indicator of the length of settlement in any particular area since most of the present houses, in spite of their age, replaced cruder structures which existed for at least the first few years on the frontier. Three generations of houses have existed on some farmsteads from the first cabin and the replacement frame house, to a more modern structure built in this century. The cruder original structures, generally log cabins, were unplanned and derived many of their basic features from the earlier houses of the eastern and southern parts of the United States and the areas from which the pioneers originated. Some of the features in these early shelters appeared to survive in the houses which replaced them. As one American architectural writer pointed out nearly a century ago, the house types prevalent then were clearly evolved from the gable-roofed log cabin.¹

The main changes in house type which have gone on in the last 150 years since the Corn Belt was first settled have resulted as methods of construction and materials have improved, as housing needs have altered

1. Jacques, D.H., A Manual of Rural Architecture. Excelsior, New York, 1866, p. 10.

with rising living standards and also as fashions have changed. In particular, the structure of the American house had to become more complex in order to allow the installation of more complicated internal equipment like plumbing and heating. These factors together account in the main for variations in house size, shape and detail. The large compact prairie house type built in the central and northern Mid-West in the later part of the last century was erected with the winter heating problem in mind. Houses built in the same areas today do not need to be so large as family size has declined. Nor do they need to be so compact because heating systems are more efficient. Roofs also can be set at a lower angle as load bearing capabilities have improved. Styles have clearly changed in these examples but, in both cases, the types are in part influenced by the capabilities of the structure and its equipment and by the needs of the occupants. Fashion, or change for the sake of change, would seem to be less important.

The tendency for the standardization of house types to occur over wide areas has resulted from several factors of which the effective reduction of distance-barriers by better transportation and other forms of communication are perhaps the most important. Distances have been reduced faster than the westward spread of settlement could increase them. Modern house types tend to be more uniform over the national area than were the houses of the original, and much more compact, thirteen colonies. Similar types of houses were built on the western

Corn Belt prairies in the latter part of the last century as were also being built in other newly settled parts of the Union. On the other hand, when the eastern Corn Belt was first being settled the isolation and primitiveness of life there forced the pioneers to build crude shelters of a type which had largely passed out of existence in longer-settled areas to the east and south. Not least as a factor enhancing the uniformity of housing over wide areas of the region has been the relative similarity of income of farmers. With little distinction in farm size or land quality between neighbours, most had similar tastes in housing and could afford the same standard of housing.¹

Factors Influencing the Domestic Architecture

The main factors which set one house off from another are the type and style reflecting the changing conditions outlined above. American houses in the 17th Century were crude and experimental at a time when the environment had not been fully "tamed". By the 18th Century, American Georgian and Colonial styles developed as ideas were brought in from Europe and were applied in a landscape which had become sufficiently "humanized" to allow people more comfort than the more primitive cabins

1. The use of the terms 'house style' and 'house type' may need some explanation. 'Style' refers to the architectural refinements such the details and decoration of doors, eaves, porches and so on. By such detail one can pick out certain periods of architecture and possibly date the structure. 'Type' refers to the total exterior form of the house and the general arrangement of the parts of the house. House type is most commonly distinguished on the basis of floor plan, number of storeys, the type of foundation and the shape of roof. Certain house types are characteristic of specific periods so that houses can also be approximately dated by this means.

had offered. The Federal period of architecture developed as settlement spread out and wealth increased, but neo-Classical and Victorian forms became common during the middle part of the 19th Century.¹ These were partly made possible by the application of machinery to building decoration and also stimulated by a revolution against the changes brought about by the growing industrialization of society.

Many of the house types found in the Corn Belt date from this period, but many others built a little later after the Civil War show the effects of a period of eclecticism when earlier styles of architecture were re-introduced. This eclectic period has lasted until recently and is seen, in particular, in the copies of Cape Cod cottages and other earlier styles more especially in suburban areas. Contemporary styles have broken away from this tradition with the intention of making the style fit the function of the modern house.²

These changes in house design paralleled similar developments in Europe in that many of the American ideas were only variants of what was happening in European architecture. The transfer of these ideas

1. Pickering, E., The Homes of America. Crowell, New York, 1951, p.7. The Federal style is little seen in the Mid-West as the Greek revival style took hold after the 1820's when the first settlement was rapidly being consolidated in the Corn Belt.

2. Gebhard, D., "Fifty Years of the American House". Landscape, 8(1958), pp. 5 - 9.

across the Atlantic came about partly as a result of European immigrants who often built their American homes with some of the features they were accustomed to in Europe. It was partly also because leading European architects had a considerable following in the United States. American architectural ideas did also develop along independent lines since the different climatic environment and sources of building material led to the production of house types which were, to some extent, alien to Europe.

This amalgamation of European and American architectural ideas was going on against a background of rising living standards, changing family needs and methods of construction. At the same time, the spread of settlement westwards meant that the people who went to the frontier zone had to endure harsher living conditions and cruder shelters at least for a few years. The consolidation of settlement and rising standards in the frontier zone then would allow better houses to come in. In this way there was a contrast in housing conditions from the long-settled east to the frontier at any one time in the last century. This contrast would have been more marked in the earlier part of the century than the later by which time railways allowed saw-mills, timber and house fittings to be moved to the frontier almost as soon as settlement occurred. The later settled parts of the Corn Belt thus escaped much, but not all, of the frontier "cabin" period which

characterized the development of settlement in the eastern Corn Belt. The development of the settlement in this way from cruder shelters to well-built houses, with more reasonable standards of comfort, also meant that house styles in the Mid-West appeared to lag behind those of more populated areas further east where the styles were being set.

Three main sets of influence can be said to have affected the house types that are now found in the Corn Belt:

1) The effect of the introduction of house types and individual features of houses from outside of the region. In particular the eastern seaboard, the south and Europe were the source of most migrants into the Corn Belt who brought housing ideas with them.

2) The influence of the frontier settlement period in each part of the region which created harsher living conditions for a time before better housing could be provided.

3) The development of house types in the Corn Belt out of the medley of influences including the cultural conditions, the ideas of the settlers and the effects of the environment at the time of settlement.

1) The Introduction of House Styles from Outside

By the time settlement first reached into the Corn Belt a set of fairly refined house styles had evolved in the eastern seaboard and

southern regions of the United States. The Early American frame houses which developed in New England and on the eastern seaboard were of very simple design. They were reminiscent of the houses of Tudor England. Many of the New England settlers had originated from parts of rural England where these styles were still common in the 17th Century.¹ The similarity was most marked in the method of construction, the common type being a structure of heavy frame walls which were assembled on the ground before being raised into position. There were other points of similarity in the small windows, the second storey overhang and a general symmetrical arrangement. Other features were, however, entirely American in origin. Wattle and daub infilling was quite unsuited to the east coast climate so that the frame was covered with split boards or, later, sawn weatherboarding or clapboarding which became the common walling material in most American houses and is found on most Corn Belt houses. Thatch was little used and was replaced by wooden shingles, another almost universal roofing material until recent decades.

This heavy framed Early American structure gave rise to several house types, some of which spread over wide areas, including the Cape Cod cottage which evolved in New England fishing villages. Another is sometimes referred to by social historians as the "Saltbox". This was two

1. Wertenbaker, T.J., The Puritan Oligarchy, The Founding of American Civilization. Scribner's, New York, 1947, p. 116.

storeys high but the roof came down to the first storey at the rear. Both of these types spread out of New England into other areas including the Corn Belt in a later period.

Individual features of architectural styles were also taken westwards. By the time settlement had reached beyond the Appalachians, the Early American house style had become more decorated as society became more affluent. This Colonial style, first applied to several more wealthy homes, also later influenced the style of smaller houses. These were most often houses with a simple square or rectangular floor plan, of two storeys and with a central stairway around which the house was arranged symmetrically. Decoration in the form of bracketed cornices, pedimented doorways and window shutters were all common. Houses of this and the succeeding Federal styles appeared in the eastern Corn Belt but they would seem from the evidence of prints and engravings to be limited in extent and they were soon replaced in the second and third decades of the 19th Century. In Ohio they were also less decorated than they commonly were in the east probably because most of the types of decoration were more suited to execution in stonework whereas the majority of Corn Belt houses were timber-built. Newcomb also suggests that the Early American house style was still common in northern Ohio a century after the style went out of fashion in the east.¹

1. Newcomb, R., Home Architecture, op. cit., p. 285. Northern Ohio was also influenced by the neo-Classical movement as can be seen in some of its place names.

The settlement of the Corn Belt occurred when marked variations in house style and type existed along the seaboard. The plantation-style house of the south did not penetrate north of the Ohio River since it reflected an agricultural and social system which did not take hold in the area but houses of this general type were built in Kentucky.¹ But certain features of the southern house did influence housing in the Corn Belt. In particular, the southern house tended to extend laterally instead of being compact and two stories high as was the case with most northern houses. This lateral spreading was partly to house servant quarters in the larger plantation houses, but even in the smaller house the kitchen was either attached to the rear of the house or was quite separate. Most southern houses were smaller and only of one storey since winter conditions were less harsh and heating not so necessary. Traces of other direct influences, like those of various Middle Atlantic house styles and immigrant groups, are only tentative and will not be pursued further here.

2) The Frontier Influence

Nearly all of the Corn Belt experienced, at some time, the development of the frontier of settlement where conditions were sufficiently primitive for a few years to cause most pioneers to build simple cabins which were only later replaced by larger, more comfortable houses. Over much of the region the cabin was a simple log structure which often was

1. Newcomb, R., Architecture in Old Kentucky. University of Illinois Press, Urbana, 1953, p. 23.

enlarged and improved before being finally replaced. It was a very suitable form of shelter in the eastern and wooded parts of the Corn Belt since it used some of the wood that had to be cleared before the land could be cultivated.

Contemporary accounts and the few remaining cabins in the Corn Belt would suggest that the type of cabin built on the frontier was not related to the vertically logged shelters which existed in New England in the early 17th Century.¹ Rather it was based on the horizontally logged cabins which were brought to the eastern seaboard by Finns and Swedes in the 18th Century.² (See Fig. 29). This type also appears in Kentucky and Tennessee where it was taken by other groups like the Scots-Irish. From there it penetrated the Corn Belt when settlers spread north of the Ohio River. Old prints of early clearings and settlements in the wooded eastern Corn Belt suggest that the cabin was the universal form of shelter. It was also found further west at least into the western Iowa prairies where timber was generally available along stream banks, but undoubtedly wood was more scarce in these areas and some settlers would have built shelters of other materials.³

1. Very few cabins remain in the Corn Belt and of those that do it is not always possible to authenticate their age. Some are preserved in state parks and these are all of the horizontally logged type. Prints and engravings of frontier scenes, often of a lyrical and inaccurate nature, are to be found in early histories but there appear to be few contemporary paintings. The folk artists of the 19th Century seems to have preferred to record the well cultivated landscape.

2. Wright, M., "Antecedents of the Double Pen House Type". Annals Assoc. Am. Geogs., 48 (1958), pp. 109 - 117.

3. Peterson, W.J., "The Pioneer Log Cabin". Palimpsest, 41 (1960), p. 502.

The first cabins were generally just a single room or pen about 12 to 15 feet across which suited the available log length. According to some accounts these replaced even more primitive 'half-faced' shelters with which the settler made do for the first season until he could clear some land and collect logs for the cabin.¹ The single pen cabin then underwent a process of improvement. A second pen was often built beside the first with an open passage, the so-called dog-trot, separating the two pens (See Fig. 29). This passage in time might be roofed over and made into a kitchen or washing area. As the doors to the two pens opened onto the passage it was so arranged that the passage could catch the breeze and provide some ventilation to the whole house. Other refinements included porches, puncheon floors, windows and stone chimneys. Early cabins were built of unhewn logs which were in some cases clap-boarded over. Squared log walls which were jointed and caulked became more common since they provided better protection from the weather. These cabins were, in large part, a temporary form of house although some are still existing after 150 years.

In spite of the loss of the great majority, the simple plan of these early houses has been copied by some of the smaller old houses which still stand in the Corn Belt and other parts of the interior United States.² Neither has the tradition of building one's own house,

1. Lillard, R.G., "Some Factors which enabled Europeans successfully to settle the American Forests". Proc. Indiana Academy Science, 55 (1945), pp. 92 - 95.

2. Schofield, E., "The Evolution and Development of Tennessee Houses". Journal of Tennessee Academy of Science., 40 (1936), pp. 229 - 240.

and adding rooms to existing houses, been lost entirely.

It is possible that the early French settlements in the Illinois country provided another source of influence upon the cabin development in the Corn Belt. Belting has pointed out that the common cabin type built by the French settlers there was "la maison de poteaux en terre".¹ With upright logging, as the phrase signifies, they were often two or three rooms in size and surrounded by a porch. The doors opened out on to this porch and so the house appeared to have more than one main door. A small proportion of the smaller cabin-type farmhouses which are common in the southern parts of the Corn Belt have two doors opening on to a front porch although they could be nothing but single family houses.²

In the western Corn Belt and on into the High Plains where timber was often scarce, sod houses were sometimes built in place of cabins.³ They were constructed out of prairie sods which were cut and piled up and then held together by stakes driven down through them. The roof was often of timber with a turf covering (see Fig. 29). These crude

1. Belting, N. M., "Kaskaskia under the French Regime". Illinois Studies in the Social Sciences, 29 (1948), p. 30.

2. Kniffen believes that there may be a double origin to the two-door house feature. In Louisiana he has found that it relates to the French areas of settlement but it is also probably a feature derived from two pen cabins which were built without the central passage. Kniffen, F. Private Communication, May, 1961.

3. Dutcher, F., "A Sod House". Journal of Geography, 48 (1949), pp. 353 - 362.

shelters weathered more quickly than cabins and also proved less comfortable to live in. Most were soon replaced by timber frame houses when the railways were able to bring in the necessary supplies. As a result the sod house is now rare and certainly not lived in.¹

3) House Development within the Corn Belt

It is not, of course, possible to trace out accurately the origins of any one particular style of house design or type of house, although in an earlier section reference was made to two particular types which are generally recognized to have New England origins just as the developed form of log cabins seems to have its antecedents in Scandinavia. For most of the common types of houses found in the Corn Belt, and discussed in a later section of this chapter, it is only possible to suggest that they are more native to the interior of the continent than to the east.

The most important change in house construction witnessed in the Mid-West was the development of lighter framed buildings. The heavy frame system of building which characterized the Early American and Colonial styles was largely replaced before the middle of the 19th Century when the lighter-weight system of balloon structures was developed and

1. Butler County, Nebraska, had 9/10 of its settlers living in earthen houses at one time before the railways brought in timber for frame houses. Dick, E., The Sod-House Frontier, 1854 - 1890. Johnsen, Lincoln, 1954, p. 110.

widely used in the growth of Chicago.¹ Using lighter frames and less timber this system of building made farmhouse erection simpler and produced new house types in those areas where house-building was in full swing, notably in the Corn Belt prairies. The house types that developed on the prairies took some ideas from the east and New England especially as these areas were the source of most of the settlers. The houses retained their two storeys and were large and compact as were the earlier eastern styles copied in Ohio. Different ground plans and roof lines were developed which, to this day, are more common in the Illinois, Iowa and western prairies than they are in more easterly parts of the Corn Belt. Steeper angled roofs and the gambrel roof, which had earlier appeared with the Colonial style, were also re-introduced.

Minor variations in these types appeared in different parts of the Corn Belt and at different periods when fashion inspired decoration. But most were simple and uncluttered, in the neo-Classical style, over large areas. Decoration seldom went further than carved porches and decorated bargeboards which became more popular after the Civil War when machinery made "gingerbread" trimmings of the Carpenter's Gothic style possible and popular. More extreme forms of decoration, such as turrets, are not found on Corn Belt farmhouses erected after the Civil

1. Tunnard, C. and Reed, H.H., American Skyline. Mentor, New York, 1956, p. 69. Balloon-frames were first used in 1833 in Chicago. Plates and studs of 2 x 4 inches replaced the 16 inch beams. Nails largely replaced joints yet the structures remained as firm on the open prairie as on the sheltered city street.

War although some townhouses of that period do display such features.

This apparent lack of basic change in house style over the whole Corn Belt during much of the period when settlement was being consolidated does hide the fact that important changes in house interiors were going on. House cellars became a near universal feature prompted by the bulkiness of hot air and steam heating systems needed in the extreme climate.¹ Internal water tanks with pumped supplies were in use by mid-century in the better equipped houses and the plumbed bath and W.C. came before the end of the century for some.²

Houses built towards the end of the century tended to be smaller and this trend has continued to the present as family size has declined and living space has been sacrificed for other forms of household comfort. In the Corn Belt this has mostly meant that newer houses are only one storey in height. These houses become more common on the western borders of the Corn Belt which were settled as this trend began. This period is also marked by an eclectic development of styles following upon the Baroque and Victorian of the post-Civil War period. The use of plan-books was again partly the cause of this development. The Early American Cape Cod cottage re-appeared and the mansard roof was re-introduced and other styles were inspired from house types outside of

1. Allen, E.A., American Housing. Manual Arts Press, Peoria, 1930, p. 96.

2. Langdon, W.C., Everyday Things in American Life, 1776-1876. Scribner's, New York, 1941, p. 199.

the United States.

Houses built in rural areas since 1940 are very similar to the suburban bungalows and ranch houses of any American city. The sturdiness with which the farmhouses were built in the last century and the decline in the farm population means, however, that relatively few of these newer urban-style houses are yet to be seen in the open-country settlements of the Corn Belt. The next part of the chapter will consider some of the types which developed in the Corn Belt, and are still found there, as a result of these influences.

Rural House Types in the Corn Belt.

Little systematic geographic research has been conducted so far into the house types of the Corn Belt or any other major American region. Architectural writers tend only to consider the occasional large house and estate of which there are few in the Corn Belt, so that the architecture of the ordinary farmhouses has not got a rich literature. Among geographers, Garland only briefly refers to the 'typical' Corn Belt houses.¹ Finley and Scott carried out a transect from north to

1. Garland, J.H., op. cit., p. 31.

south part of which crossed the Corn Belt and they derived from an examination of roadside farmsteads the main types of house found on each leg of the transect.¹ Trewartha has carried out a more detailed survey of about a thousand farms in the Wisconsin-Illinois Driftless area and showed that there was little major variation in house style and type in an area of fairly uniform farming conditions but that there were marked contrasts with areas outside of the Corn Belt.²

These studies, and others carried out in other parts of the United States, suggest that it is practical to examine geographical variations in house types in three ways, namely, by regions, by type, and by chronology. The regional approach has been the most commonly used in order to find what distinctive house types occur in an area and can help to set that area apart from surrounding regions.³ The analysis by house types traces out where a unique type of house occurs over a wide area.⁴ Little use has been made of the chronological approach in

1. Finley, R. and Scott, E.M., "A Great Lakes to Gulf Profile of Dispersed Dwelling Types". Geog. Rev., 30 (1940), pp. 412-419.

2. Trewartha, G.T., "Some Regional Characteristics of American Farmsteads". op. cit. pp. 169 - 225.

3. This approach has been used by Spencer, J.E., "House Types in Southern Utah". Geog. Rev., 35 (1945), pp. 444 - 457, and Kniffen, F., "Louisiana House Types". Annals. Assoc. Am. Geogs., 26 (1936), pp. 179 - 193.

4. See for example, Zelinsky, W., "The Log House in Georgia". Geog. Rev., 43 (1953), pp. 173 - 193.

spite of the popularity of sequent occupance studies but it tries to classify and map houses by type and age.¹

In the case of the present study the aim has been to discover what types of houses occur commonly in the Corn Belt not only in order to better define the region's cultural landscape. The study also allows a better understanding of the relationships between house types and the regional variations in house size, age, condition and internal quality which can be seen in the census data. The data on house types which follows has been obtained in two ways. Firstly, detailed observations of rural housing were made in selected counties in conjunction with other observations on the settlement. Reference has already been made to farm buildings in those counties. Thirteen counties were chosen so that one lay in each Economic Subregion. These counties are shown in Fig. 27. The results of some of these county studies are also reported in Chapter 7 but general reference will be made here to the house

1. A recent example is Brush, J.E., "A Succession of House Types and Styles in Central New Jersey." An unpublished paper submitted to the Symposium on the Evolution of Rural Morphology, Vadstena, Sweden, 1960.

types observed.¹

A second means of collecting data on house types consisted of making a series of traverses by car across the Corn Belt to record observations on the houses which could be seen from the roadside. This enabled observations to be conducted over much larger areas than was possible with the county studies. A northern traverse ran roughly from central Indiana to southern Nebraska through northern Illinois and Iowa. A second, more southerly, traverse (the return section of the first) ran between central Indiana and northeastern Kansas through central Illinois and Missouri. Two other shorter sections ran off from the northern traverse, one northwards from northern Iowa to western Minnesota and a second north-westwards from Iowa into South Dakota.

1. The house studies made in the selected counties noted characteristics apart from house-type. Printed sheets were used to record the observations all of which were based on the external examination of the houses. These characteristics included a general classification of each house on the basis of its external condition into 'dilapidated', 'normal' or 'good' condition in the manner used by the 1950 Census enumerators. A more detailed examination of each house on the basis of adequacy did not prove possible in view of snags found elsewhere (Mosier, C.I., Evaluating Rural Housing, University of Florida, 1942). A grouping of houses by approximate age was also made but this proved difficult since one house type was often fashionable over a considerable period and no more than an estimate of age by external examination was considered profitable in the time available. Individual features of each house such as house plan, number of storeys, approximate number of rooms, colour and material of construction and the presence of porches were also recorded as well as the general location of each farmhouse in relation to the farmstead and the road. Some of the features of farmsteads which were similarly recorded have already been referred to in an early part of this chapter.

These traverses are shown in Fig. 30.

House types for both farm and nonfarm settlement outside of nucleations were recorded for each mile of road traversed and a check was kept on position with maps and by noting towns, county borders and other points.¹

1. Other points about the method of observation were as follows. Houses inside the limits of towns and other nucleations were not counted. In nearly all cases these limits are sign-posted but in the case of some smaller places where they are not marked observations were not made where the houses were clearly nucleated. In this way only dispersed houses were considered. Secondly, no maximum limit was placed on the proximity of houses to the road in order for them to be recorded but 200 to 300 yards was generally the greatest distance at which the type could be discerned. Houses hidden by windbreaks could nearly always be seen from some point on the road. Thirdly, it should be emphasised that the grouping of houses into farm and nonfarm categories on the traverses is not related to the method of classification used by the Census Bureau. The Bureau classed a house as a farm dwelling if it stood on farm property and if the occupier made most of his income from farming. The division adopted for the traverses was based entirely on external observation of the house and its surroundings. The presence of maintained barns or sheds can generally be taken as the sign of a farmer-occupied house. In cases where only sheds were seen in the house-yard the house was judged a farm if the sheds were probably used for keeping stock, poultry or farm equipment. If the sheds were probably only useful for gardening or other purposes the house was designated nonfarm. If the barns and sheds were clearly disused this was taken as a sign that the farm was now being used as a nonfarm residence and it was classed as such. Where barns or sheds stood alone in a farmstead, indicating that the house had been removed at some time, no record was made since the farm buildings would generally be used by a neighbouring farmer who had taken over the land. Dilapidated, empty houses whose previous use could not be determined were listed separately. These formed less than 2 per cent of the total observations.

Observations were carried out over a total distance of 2764 miles on the traverses in 106 counties. The counties crossed are shown in Fig. 31. This yielded records on 6611 houses of which 3694 (55.8 per cent) were judged to be farmhouses.¹ The division of these observations between the four traverses is shown in Table XXV.

TABLE XXV Number of House Observations

<u>Traverse</u>	<u>Farm</u>	<u>% Total</u>	<u>Nonfarm</u>	<u>Dilap.</u>	<u>Total</u>
North (832 miles)	1442	56.0	1114	17	2573
South (695 miles)	1270	47.0	1376	62	2708
N. extension (550 miles)	512	65.6	262	6	780
N.W. extension (513 miles)	470	85.5	78	2	550
<hr/>	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>
2764 miles	3694	55.8	2830	87	6611

The traverses were further divided into 28 legs in order to examine the house type variations in more detail. Each leg was composed of several counties some of which had only provided a few observations. Each leg was created so that it contained at least 100 observations and

1. It is probable that several of the houses which were grouped as nonfarm because they lacked major outbuildings would have been classed as farms by the Census Bureau since the housing Census criterion for a farm would allow the inclusion of some houses and gardens where the occupier sold a certain amount of produce from his garden. Secondly, it is not possible to compare house-type findings for houses in the nonfarm group with Census data on rural nonfarm housing. The Census includes both open-country housing and houses in small nucleations in this category whereas the traverse purposely excluded the latter.

yet did not lie across an Economic Subregion boundary. This number of observations was achieved in all but three legs. Fig. 30 shows these legs and Table XXVI gives further details. House types observed on each leg are listed in Tables XXVII-XXVIII later in this chapter.

The placing of each house observed into a type category did not prove difficult. The writer had already carried out trials in parts of the Corn Belt for the recognition of house types and some of the types already recorded by Finley and Scott, Kniffen and others, in other parts of the United States, proved distinguishable in the field. An examination of plan-books also showed the basic designs which led to some of the common types.

It is difficult to assess the value of the picture presented by this traverse data as a basis for generalization about areas in the Corn Belt not examined. The use of the route traverse has already been pointed to by Platt as a means of obtaining regional generalization,¹ but the traverses carried out here clearly involve certain dangers. Firstly, in spite of the relatively large number of observations which were possible, less than 1 per cent of the farmhouses in the Corn Belt were observed so that it would be foolish to try to draw detailed conclusions about regional variations in house types. Secondly, even in the counties crossed, which represent about one-fifth of all the

1. Platt, R.S., Field Studies in American Geography. University of Chicago Press, Chicago, 1959, p. 163.

TABLE XXVI Details of Traverse legs (see Fig. 30)

<u>Traverse</u>	<u>Leg</u>	<u>Location</u>	<u>Econ. Subr.</u>	<u>Miles</u>
North	1	C. Ind.	47	91
	2	N. Ind.	48	80
	3	N. Ill.	63	141
	4	NW. Ill.	69	68
	5	E. Ia.	70	59
	6	V. Ia.	70	74
	7	C. Ia.	86	129
	8	SW. Ia.	85	99
	9	SE. Nebr.	85	82
	10	S. Nebr.	93	46
South	11	C. Ind.	47	57
	12	SW. Ind.	51	80
	13	EC. Ill.	*	37
	14	C. Ill.	63	75
	15	WC. Ill.	71	79
	16	NE. Mo.	71	64
	17	C. Mo.	71	100
	18	C. Mo.	*	70
	19	W. Mo.	84	126
	20	NE. Kan.	*	144
N. Ext.	21	N. Ia.	69	92
	22	SE. Minn.	*	138
	23	WC. Minn.	87	101
	24	W. Minn.	*	219
NW. Ext.	31	NW. Ia.	85	171
	32	SE. S.D.	85	78
	33	SE. S.D.	92	118
	34	C. S.D.	*	146
				2764

* These legs lie outside of the Corn Belt.

counties in the region, the route generally did not take in more than 5 per cent of the farmhouses in any one county. Thirdly, all of the traverses were conducted along main metalled roads. This may well introduce a bias in the results especially with regard to rates of dilapidation, numbers of open-country nonfarm houses and other general impressions. One can expect farms situated on major roads to have slightly higher incomes and better access to markets than farms located on poorer county roads. This bias would certainly account for the high proportion of open-country nonfarm houses recorded as these tend to group along metalled roads with good access to local towns.

Nevertheless the traverses did succeed in obtaining data on house types over a wider area than is possible by detailed local area studies. The reality of the general picture obtained is borne out by the fact that the more detailed areal house-type studies in the selected counties have produced results similar to those obtained from traverses in adjacent counties. The observations of the two sources allow some conclusions to be drawn as to the common rural house types which can be found in the Corn Belt.

The house types can be divided into seven main groups:

1) Mid-West Rectangular Types

This group comprises houses with a rectangular floor plan. A sketch of one type is shown in Fig. 32b. They are always lightly built

on timber frames and the walls are most often clapboarded, but shingles are also common and composition wall coverings are found in parts of the southern Corn Belt. There is often no proper brick or concrete foundation and basements are unusual. A gable roof is universal and most commonly the ridge of the roof is parallel to the front of the house. The ground plan is often narrow so that the house is only one-room deep but all the houses in this group which were examined had a small rear addition which most often served as a kitchen. The 'lean-to' character of this addition served to differentiate this house type from the Inverted Tee form discussed under 3) below. Porches were also a common feature. Within this group it is possible to distinguish one and two storey types.

The one-storey house is small and contains only two or three rooms. It is lightly constructed and cabin-like in its general appearance.¹ It is this house type which sometimes has two doors opening to the front and has other features which suggest that basically it is a refinement of the type of log cabin which was common in the Corn Belt. The roof of the rear lean-to extends from the main gable but at a lower angle. Porches are universal and may run across the whole front side of the house. Some porches are enclosed within the main roof-line. A few examples of this house type are a little larger and have

1. Birch, B.P., "A Note on a Common American House Type in the Eastern Mid-West". Journal of the Durham Colleges Geographical Society, 4 (1961-2), pp. 16 - 19.

extra roof height so that an attic space is available. Others have a proper attic with front windows and a roof line which continues down at the back to the level of the lower rooms and this type seems to owe its features to the New England Salt-box house type.

The common two-storey type is the one referred to by Kniffen as the Mid-West or 'i' type since it is common in Indiana, Illinois and Iowa (See Fig. 32b)!. Basically it is a four-roomed house with a central door and stairway. The rear addition is always only one storey high. Porches on the two-storey type seldom stretch across the whole front of the house as they do on the one-storey form.

A less common two-storey form is arranged with a narrow side of the rectangle forming the front of the house with the front door and porch in this gable-and wall. The floor area is generally greater with this type and there is often space for two room widths. Although it seems to date from a later period than the other Mid-West types, it is included for convenience with the 'i' type (2 storey) in the tables.

All of these types are found throughout the Corn Belt but more especially along those parts of the traverses not crossing prairie country and better farming areas. The one-storey form is about three

1. Kniffen, F.B., "Louisiana House Types" *op. cit.*, pp. 179 - 193.

times more common than the two-storey versions and tends to occur more commonly in the southern parts.¹ Their ages vary widely with some examples being over 100 years old but owing to this, and their light construction, many of them are in poor condition.

2) Prairie Tee Types

Trewartha has noted that the tee floor plan is most common amongst his sample of Corn Belt houses and the writer's observations would endorse this view.² Most commonly the tee is placed on its side so that the front of the house is formed by the main stroke of the letter. The basic form has been referred to as the Prairie House elsewhere.³ Houses in this group are more substantially constructed than the Mid-West types. Foundations are made up and basements are very common. Clapboarding of the timber frame is most frequently found. Porches are generally found in the angle of the tee and extend the whole length of the stroke of the letter. The roof is always of the gable form but the angle of the gable is more shallow than on the Mid-West types. Rear additions are also found. In some cases the floor plan forms an excentric tee shape or may even become an L plan with the front door in the angle. Finley and Scott, on their survey, separated this type from the tee

1. Finley and Scott found this type, called by them a 'shed-type' most common in the southern states.

2. Trewartha, G.T., "Some Regional Characteristics of American Famsteads", op. cit., pp. 169 - 225.

3. Szarkowski, J., The Face of Minnesota, University of Minnesota Press, Minneapolis, 1958, p. 126.

form but a whole range of variation between the tee and the L form was observed and classification is impossible.

Several types exist in this group since there are two main parts to each structure and one part can have more floors than the other. Two-storey forms are most common but many are only two storeys high in the crossbar part of the plan. Others have lower roofs which allow attic rooms partly within the roof and some are entirely one storey in form.

An example of the two-storey form is shown in Fig. 32a and Plate A (lower photograph). These date mainly from the post-Civil War period and are most common in the prairie areas. They are soundly constructed on the 'balloon' method and are generally maintained in good condition. Intermingled with these are the part two-storey type of house; these are totalled with the two-storey type in Table XXVII. A one-storey type is far less common being found on both the southern and northern parts of the traverses. Finley and Scott also found that this type occurred more frequently in the southern legs of their northern traverse.¹

3) Inverted Tee Types

These have a similar floor plan to the Prairie Tee types but it is arranged so that the cross-bar of the tee forms the front portion of the house. These are substantially built structures and are well

1. Finley R., and Scott, E.M., "A Great Lakes to Gulf Profile of Dispersed Dwellings Types". op. cit., p. 415.

maintained in most instances. They appear to have been popular about twenty years earlier than the Prairie Tee types and may derive their shape from eastern influences. Two storey, one storey and mixed types were observed ubiquitously along the traverses but the one-storey form was more frequently seen on the southern traverse.

4) Prairie Square Types

Houses in this group are among the best maintained of the older houses in the Corn Belt. The floor plan is square and the roof is pyramidal in shape. Examples of two types in this group are shown in Fig. 33. A two storey type is most common but a two-storey type with an additional attic room, with dormer window, is also frequently seen in the more prosperous prairie farming areas. In all cases these types are strongly constructed and clap-boarded. Basements are common as are porches which sometimes occur at the sides or rear of the house as well as at the front. Such additions are more common on the two-storey and dormer form. Some of the two-storey houses have the mansard roof form. (See Fig. 33b.) These houses were popular in the Civil War and post-Civil War decades.

On the western parts of the traverses a one-storey type was occasionally seen. The ground plan was smaller and the whole construction less sturdy. Another type had a square floor-plan but with a cross-gable roof which gave attic rooms above the ground floor (See Plate A).

This type was common in the early years of this century. The occurrence of these two smaller types was not sufficiently frequent to include them separately in Table XXVII where they are listed with the miscellaneous types.

5) Cross-Plan House Types

Large two-storey houses with a general cross-shaped floor plan are fairly common in the Corn Belt without being predominant in any one part. The variable size of this house type, some of which can contain as many as nine rooms, together with the frequent addition of porches on all sides make this type difficult to recognize so that some have probably been classed with the miscellaneous types. An example is shown in Plate D (top photograph).

6) Bungalow Types

Two main types of bungalow were commonly built between the World Wars. The first is a 'shot-gun' type shown in Fig. 34b. The deep rectangular plan allows space for two room widths so that this fact, and the generally good standard of construction and maintenance, may make the name inappropriate.¹ These houses were a common type of replacement for older farmhouses in most parts of the Corn Belt but especially in the eastern areas and on the southern parts of the traverse. Two examples

1. Kniffen uses the term 'shot-gun' for a narrow house type found in Louisiana and generally in very poor condition.

are seen in Plate C.

The chalet type illustrated in Fig. 34a is a larger and more ornate type also built in the inter-war period. The floor plan is roughly square but the roof is of a deep gable form. This gives room-space above the ground floor. The ridge of the roof is always parallel to the front of the house and may enclose the porch. This is a four-~~tr~~-five-roomed house and occurs most frequently in some of the better farming areas.

7) Post World War II Types

Houses built in the last twenty years in the Corn Belt are mainly based on imported styles from California and elsewhere. They are all bungalow types but vary in size and other features according to taste, design and cost. Most, however, can be classed as a partially pre-fabricated type with three or four rooms to be seen in most parts of the Corn Belt and along the traverses. The larger ranch-style bungalow which employs other building materials as well as wood is less commonly found although is frequent where an older farmstead house has been replaced (See, for example, Plate E, top photograph). The standard type is especially common where nonfarm dwellings are found in rural areas. Examples of both types are shown in Fig. 35 but they are not separated in the tables.

Nearly all of the types listed above were originally constructed as farmhouses but with the rise in the open-country nonfarm population some of the farmhouses have become nonfarm dwellings either by a change of ownership or where a farmer has changed to a nonfarm occupation. But, since this population has grown especially after World War II, many modern bungalows were built originally for nonfarm persons. The use of trailer homes by a proportion of the nonfarm persons also serves to distinguish the settlements of these people from the farm families. An example of a permanently established trailer home is shown in Fig. 36b. The tradition of building one's own home is still strong in rural areas as can be seen from the appearance of a few houses which are not easily classed in any one group. One example of this is to be seen in the 'cellar' house of some open-country nonfarm persons. (See Fig. 36a). The cellar has been dug and is now occupied until the time comes to place a partially prefabricated bungalow above.

Results of the house type traverses outlined earlier in this chapter are given in Tables XXVII-XXVIII for farm and nonfarm houses. The less regular occurrence of nonfarm observations on each leg of the traverses has necessitated the linking together of some legs in order to obtain a reasonable number of recordings. Table XXIX presents the occurrence of the same farmhouse types in each of the 13 selected counties, but some counties yielded too few nonfarm observations for useful tabulation.

TABLE XXVII Percentages of Farmhouse Types Along Traverses

Leg of Traverse	No. of observations	Mid-West		Prairie Tee		Inverted Tee	
		2 st	1 st	2 st	1 st	2 st	1 st
<u>North</u>							
1	224	10	25	6	3	8	10
2	169	8	21	8	25	7	8
3	194	8	17	16	3	14	2
4	84	16	17	22	12	7	1
5	96	9	5	10	10	15	4
6	139	7	5	16	8	7	5
7	219	7	13	20	14	10	4
8	132	8	13	31	5	8	2
9	136	5	21	9	10	15	4
10	64	6	22	11	14	9	-
<u>South</u>							
11	125	6	31	3	5	6	6
12	171	5	24	2	10	12	10
13	83	2	18	3	7	12	13
14	108	12	14	2	8	14	7
15	133	9	11	7	8	11	3
16	110	8	11	4	13	16	6
17	149	6	27	7	16	10	4
18	54	11	32	9	11	9	4
19	219	9	25	14	12	9	6
20	136	7	28	5	8	13	3
<u>North Ext.</u>							
21	128	9	9	21	12	4	2
22	196	11	17	5	21	1	2
23	74	7	35	3	20	-	10
24	114	2	33	1	14	-	9
<u>N.W. Ext.</u>							
31	240	10	17	15	10	4	6
32	78	9	26	12	11	5	3
33	114	6	34	8	14	6	7
34	47	-	30	6	13	2	17

TABLE XXVII Percentages of Farmhouses Continued

Leg of Traverse	Prairie Sq. 2 st./attic	2 st	Cross 2 st.	Bungalow Shotg.	Chalet	Modern Bung.	Misc.
<u>North</u>							
1	1	3	6	1	4	5	18
2	1	3	4	3	3	7	2
3	5	9	4	3	4	6	9
4	2	4	4	2	4	4	5
5	16	8	6	-	5	10	2
6	16	10	3	-	1	16	1
7	5	9	4	1	1	8	4
8	6	10	2	1	1	5	8
9	7	5	2	-	5	12	5
10	-	1	3	-	6	9	19
<u>South</u>							
11	1	1	13	3	6	5	14
12	1	1	7	9	5	9	5
13	-	2	10	9	4	12	8
14	2	2	2	1	3	13	20
15	1	6	2	-	2	12	28
16	-	6	7	1	1	10	17
17	-	2	1	2	1	13	11
18	2	-	-	3	4	11	4
19	2	3	2	1	4	13	-
20	3	5	2	-	6	10	--
<u>North Ext.</u>							
21	12	14	4	-	3	9	1
22	3	8	5	1	1	15	10
23	1	3	-	-	-	19	2
24	3	5	1	1	-	22	10
<u>N.W. Ext.</u>							
31	8	5	5	1	4	10	13
32	3	10	-	1	5	12	6
33	8	9	1	-	5	10	-
34	1	3	-	-	2	13	4

TABLE XXVIII Percentages of Nonfarm Houses by House Type
along Traverses

Leg of Traverse	No. of Observations	Modern Bung.	Trailer Homes	Mid-West 2 st	Mid-West 1 st	Shotg. and Chalet
<u>North</u>						
1	431	69	9	1	12	1
2 - 3	372	59	6	1	21	1
4 - 6	138	28	36	7	23	1
7 - 10	163	52	5	3	14	2
<u>South</u>						
11	126	44	15	2	18	3
12 - 13	208	43	1	-	26	8
14	267	70	2	1	11	2
15 - 16	192	31	26	3	15	4
17	195	48	28	-	13	5
18	231	68	7	2	12	1
19 - 20	162	56	4	2	15	2
<u>North Ext.</u>						
21 - 24	226	76	3	3	8	2
<u>N.W. Ext.</u>						
31 - 34	78	60	1	8	13	1

TABLE XXVIII (Contd.....)

Leg of Traverse	Prairie Tee	Inverted Tee	Prairie Square	Misc.	% of Total that are 1 storey
<u>North</u>					
1	2	3	1	3	96
2 - 3	5	2	1	4	96
4 - 6	1	-	1	2	90
7 - 10	8	2	1	10	88
<u>South</u>					
11	5	2	1	10	93
12 - 13	5	10	1	7	97
14	3	4	2	6	93
15 - 16	3	7	-	10	87
17	4	2	-	1	98
18	3	3	-	4	97
19 - 20	4	7	2	7	78
<u>North Ext.</u>					
21 - 24	2	-	1	5	93
<u>N.W. Ext.</u>					
31 - 34	5	1	4	6	87

TABLE XXIX Percentages of Farmhouse Types in Selected Counties

County	No. of Observations	Mid-West		Prairie Tee		Inverted Tee	
		2 st	1 st	2 st	1 st	2 st	1 st
Henry	180	10	10	2	2	6	4
Kosciusko	273	4	15	7	21	2	5
Sullivan	207	3	12	1	11	10	14
Adair	242	2	19	6	11	10	8
Linn	227	5	11	13	6	11	6
Moultrie	182	3	13	7	3	10	9
Chickasaw	220	15	3	45	5	-	7
Clinton	243	6	6	17	10	7	5
Fremont	204	4	6	12	7	8	9
Big Stone	169	7	15	4	20	1	8
Hamilton	252	3	4	11	20	7	11
Aurora & Charles Mix	195	4	24	3	17	2	8
Thayer	132	2	12	18	16	2	8

TABLE XXIX (Contd.....)

County	No. of Observations	Prairie 2st/a.	Sq. 2 st	Cross 2 st	Bungalow Shotg.	Chalet	Mod.
Henry	180	1	4	6	-	-	16
Kosciusko	273	1	4	1	2	4	8
Sullivan	207	2	1	1	6	3	4
Adair	242	-	1	1	5	1	14
Linn	227	1	3	3	4	1	11
Moultrie	182	-	1	1	3	2	7
Chickasaw	220	9	10	3	-	-	1
Clinton	243	12	7	3	2	-	6
Fremont	204	2	5	1	-	3	13
Big Stone	169	2	7	1	2	2	8
Hamilton	252	7	7	2	-	-	6
Aurora & Charles Mix	195	4	11	1	5	1	3
Thayer	132	3	5	1	-	6	2

Regional Variations

The first variation noticed is the much more regular occurrence of farm than nonfarm houses along the traverses. This can be more readily seen in Table XXX which records the frequency of farm and nonfarm observations per mile along the various legs of the traverses. The number of farmstead observations differed for each part of the Corn Belt as would be expected with regional changes in average farm size, but over most of the traverses between one and two observations were recorded every mile which is the expected frequency where the farmstead density is between three and four to the square mile. The frequency of observations was higher in the eastern parts of the Corn Belt where farms tend to be smaller and where the growth of part-time farming has led to the development of smallholdings which are largely found along main roads. The number of farms observed in central Missouri (legs nos. 17 and 18) was less than the farm density would lead one to expect. The nonfarm frequency there was, however, high and this would suggest the discrepancy resulted from the presence of many small residential and part-time farms which do not have the buildings to give an indication of farming activity from a passing inspection. The frequency of farm observations was higher in parts of the western area. This resulted from the pattern of dispersed farm settlement being less regular with more farms found along the major roads than on the secondary roads of the less complete rural road network.

Nonfarm housing frequencies in the open country fluctuate much more than those of the farms. Few nonfarm houses were observed very far outside of the towns and rural centres along the traverse route in the northern and north-western extensions. Counts were also low on the western parts of the main traverses. Only 78 nonfarm houses were counted along the 513 miles traversed between central Iowa and central South Dakota (legs 31 - 34). Only 163 nonfarm houses were found on the 356 miles between central Iowa and southern Nebraska (legs 7 - 10). There was little more nonfarm development on the northern extension except for concentrations around cities like Minneapolis, Rochester and Waterloo (legs 21 and 22). The counts of nonfarm houses on the northern traverse were low in northern Indiana, where the route went across predominantly rural counties with few towns large enough to attract an overspill of nonfarm housing along the highways. But the frequency rose markedly in northern Illinois around Rock Island through to Cedar County, Iowa with the metropolitan area of Cedar Rapids. The legs of the traverses in central Indiana yielded many nonfarm observations and these remained frequent along the southern traverse in Illinois, where suburban style nonfarm houses lined the route on the outer fringes of such cities as Newcastle (Indiana), Decatur and Springfield (Illinois). This concentration of open country nonfarm housing continued westwards along the southern traverse into central Missouri in an area of small farms and associated cottage and holiday

TABLE XXX Frequency of Farm and Nonfarm Observations along
Traverses

Leg of Traverse	No. of Farm Observations	Frequency per mile	No. of Non farm obs.	Frequency per mile
<u>North</u>				
1	224	2.5	431	4.7
2	169	2.1	50	.6
3	194	1.4	322	2.3
4	84	1.2	67	1.0
5	96	1.6	58	1.0
6	139	1.9	13	.2
7	219	1.6	93	.7
8	132	1.3	24	.2
9	136	1.7	29	.4
10	64	1.4	17	.4
<u>South</u>				
11	125	2.2	126	2.2
12	171	2.1	141	1.7
13	83	2.3	67	1.8
14	108	1.2	267	3.5
15	133	1.7	116	1.5
16	110	1.7	76	1.2
17	149	1.5	195	2.0
18	54	.8	231	3.3
19	219	1.7	113	.9
20	136	1.0	49	.3
<u>N. Ext.</u>				
21	128	1.4	79	.9
22	196	1.4	111	.8
23	74	.7	12	.1
24	114	.5	24	.1
<u>N.W. Ext.</u>				
31	240	1.4	40	.2
32	78	1.0	24	.3
33	114	1.0	9	.1
34	47	.3	5	.04

home development in the vicinity of the Lake of the Ozarks recreational area.

The traverses showed that this open-country nonfarm settlement is very patchy and almost entirely confined to the fringes of larger nucleations as suggested in Chapter 4. It seems to have grown especially in the last two decades around metropolitan and other city areas where urban growth has occurred faster than the city limits could be extended. Smaller and slower growing areas have been more able to absorb the new resident without him going outside of the city to build his house along the highway. Even on the fringes of the larger cities the ribbon development of these houses is not uniform and may only occur on certain highways leading into the city. In the case of Waterloo in Iowa (leg no. 5) this development has gone on along the northern route (Iowa Route 63) but not along the east-west route each side of the city.

The second regional variation which should be noted is the tendency for a greater proportion of two-storey farmhouses to occur along the northern traverse. On five of the ten legs of the southern traverse over 60 per cent of houses recorded by types were single-storey but only one of the northern legs showed as great an occurrence of smaller houses. The main areas where larger (two-storey) houses were most frequently recorded were the same counties which the 1950 and 1960

Housing Censuses showed to have farmhouses with a high medial room number well above the average for the Corn Belt. These are also areas of high farm incomes and prairie areas of settlement. These larger dwellings are mainly the Prairie Tee and Prairie Square types which occur less frequently at the eastern and western ends of the northern traverse and on the traverse extensions.

The difference in occurrence of the two-storey forms along the northern and southern routes was at least 15 per cent with the exception of those parts of the southern traverse which crossed prairie areas in central Illinois where two-storey houses became more common. This evidence, together with that gathered by Finley and Scott, and that obtainable from Census number-of-room tables would suggest that two-storey houses are most common in the high income prairie areas and decrease in frequency in all directions away from this central core. The data obtained in the selected counties confirms this. A series of north-south traverses between the northern and southern route to obtain more information on this point was not possible in the time available.

Several reasons can be suggested to account for the more frequent occurrence of larger houses in this area. These prairie areas were settled later than areas further east at a time when new house types had been evolved. They were only fully settled after railways had

brought these areas into contact with eastern markets for the agricultural products which allowed good returns on farm sales within a few years of initial settlement. Railways also brought sawn timber and saw mills in. Substantial houses were being erected in the 1850's and the following decades as settlers consolidated the settlement pattern and took up the wet prairies. Many of these houses were built well and compactly to withstand cold winters and to house large families.¹ Many have existed to the present. They are amenable to conversion to suit modern living standards so that few have been replaced although more have been lost as the farm population has dwindled. Some now appear in the nonfarm inventory as their occupants have changed over to nonfarm employment.

One-storey houses are common throughout the Corn Belt but increase in frequency along the southern traverse and extensions and generally towards the edges of the region. Most of these houses are also small with only four rooms which again relates to the concentric arrangement of farmhouse size. One of the most frequently recurring types is the rectangular cabin-house. Along some legs of the southern traverse it accounted for more than a quarter of the total farm observations and is

1. Prairie farms in the early years of production often employed additional labour which generally lived in with the farm families.

also common as a nonfarm dwelling. More recently-constructed house types, including the inter-war and post-war bungalows, are also frequent. In these areas more house replacement appears to have gone on, partly, no doubt, because of the shorter life of the previous structures, and their being less suitable for modernization.

Over the whole traverse route it is clear that farmhouse replacement has not been very active in spite of the considerable age of many of the existing structures. Houses built since 1920 made up less than 20 per cent of the farmhouses observed on most of the legs. Even so, the number of houses considered to be in poor condition was not high although it is clear from census data that many of the houses which appear structurally sound and well-maintained are often lacking in basic facilities. This would appear to be a major reason for replacement rather than the structural defects of the older dwellings.

The nonfarm housing observed on the traverses is dominated by post-war bungalow types which made up more than half of the nonfarm houses noted on 19 of the 28 legs of the traverses. They were especially common where large numbers of nonfarm houses were recorded on the fringes of metropolitan areas. Trailer homes were also frequent in these areas and common on parts of the southern traverse to add room to existing houses and as holiday homes. Apart from these two main house types the nonfarm housing does not have a distinctive set of

house types. The cabin-house has frequently become a nonfarm dwelling, as have other smaller farmhouses, but the larger prairie houses have proved less suitable for nonfarm families possibly because of their size or their general location. The overall effect of these preferences is that over 90 per cent of the nonfarm housing observed was made up of one-storey dwellings.

This chapter has attempted to consider certain regional variations in housing, notably house types, on which little data has previously been available. Other aspects of farmhousing, on which census data can be obtained, will be discussed in the next chapter.

CHAPTER VI OTHER CHARACTERISTICS OF FARMHOUSING

Field observations on rural housing in the Corn Belt could be expected to yield only a limited amount of data as a supplement to housing information provided by the 1950 and 1960 Censuses of Housing. This chapter, therefore, extends the analysis of variations in farmhousing by making use of the census material, especially to discover more about the regional variations considered in Chapter 5.

Although a large body of census information is now available on farmhousing, remarkably little use has yet been made of it.¹ One reason for this is probably the short time-span over which this data has been collected. The first full census of Housing was only authorized in 1949 although there had been a preliminary census in 1940 and some housing data was collected in earlier population and agricultural censuses. The presentation of cross-tabulated housing data for Economic Subregions was not begun until 1950, to be repeated in 1960. Apart from this, public responsibility in the field of farmhousing improvement has been far more limited than in the case of urban residential renewal and government-sponsored research has been largely

1. There has been only the one national analysis of the 1950 data by Beyer, G.H. and Rose, J., Farmhousing. Wiley, New York, 1957.

restricted to the work of farm extension agencies and land-grant colleges.¹

The farmhousing data presented, for Economic Subregions, in the 1950 Census ranged over a wide field of housing characteristics including the size and age of houses, their structural condition, their plumbing and heating equipment as well as the types of household and occupancy found within each subregion. The 1960 Census increased the range of data and the number of cross-tabulations between housing and household characteristics (e.g. the cross tabulation of size and age of house; and type of plumbing related to household income). The aim of this chapter is to examine some of these relationships and their regional variations. For this purpose both 1950 and 1960 data are used

1. In the prosperous Corn Belt it has for long been known that the farmhouses had many shortcomings in terms of their average age, their size and equipment. Research in the past 30 years has been mainly limited to the distribution of plans for well-designed replacement houses and the study of farm household needs in terms of household space, the greater flexibility of houses and the overall needs for improvement. Regional variations in farmhousing "quality" in relation to physical, economic and social factors have, so far, been little touched. Details of this work in the Corn Belt, and its larger Mid-Western area, can be found in: Carter, D.G., and Corbin, M.R., Development of Co-operative Farm Housing Research in the North-Central Region. University of Illinois Agric. Experiment Station Circular 699, Urbana, 1952; Nickell, P., Budolfson, M., Liston, M. and Willis, E., Farm Family Needs and Preferences in the North-Central Region. Iowa State College Agric. Experiment Station Bulletin, 378, Ames, 1951. Similar research work has been published for individual states. For Nebraska this includes: Trotter, V.Y., and Liston, M.I., Farm Family Housing Needs and Preferences in Nebraska. Research Bulletin 175 (1954); Trotter, V.Y., The Existing Space in Nebraska Multistorey Tee Houses. Research Bulletin 186 (1958); Withow, J.L. and McKinney, F., The Existing Space in Nebraska Multistorey Square Farm Houses. Research Bulletin 187(1959). All published by University of Nebraska Agric. Experiment Station, Lincoln.

to indicate certain trends and because much of the 1950 data had been analysed before the 1960 Census became available.

Data on rural nonfarm housing has not been similarly treated because it includes, under one heading, both the housing in rural service centres and that in the open country. Like the rural nonfarm population, this group of houses has very diverse characteristics and much of it falls outside the scope of this study.

Regional Variations in Corn Belt Farmhousing Characteristics

Size of Farmhouses

The only means by which regional variations in house size can be measured by means of census material is to use the data on number of rooms in the house. All living, sleeping and working rooms, but not halls, bathrooms and pantries, were counted by the census enumerators to determine the number of rooms in each dwelling.

On this basis most Corn Belt farmhouses can be considered large, the majority having seven or more rooms. This is related to the age of most of the units which were built at a period when large dwellings were both necessary and fashionable. In 1950 about three-quarters of the farmhouses still standing in the Corn Belt had been constructed before 1920. The 1960 Housing Census does not allow a comparative

figure to be given but the low rate of farmhouse building which went on in the 1950-1960 period would suggest that the proportion of older houses had declined to only a limited degree. Table XXXI gives the percentages of houses standing in 1950 which had been built before 1920 and the proportion of those houses which had seven or more rooms. This was the most common size group in all but three of the Corn Belt subregions.

The next most common size group in each subregion was farmhouses with 5 or 6 rooms. These were more numerous than the larger houses in the southern subregions (E.S. 51, 71 and 84) where average farm incomes have always been lower and less money was available to construct elaborate houses. Smaller houses with between 1 and 4 rooms were the least numerous group in all subregions.

Newer houses built since 1920 were mainly of the 5 and 6 room size in all subregions so that housebuilding in recent decades has tended to reduce the average size of Corn Belt farmhouses. In most areas, however, houses built since 1920 have not been sufficiently numerous to have a very marked effect on the total inventory. At the same time, there have been considerable losses of older farmhouses by decay and replacement as the total farm population has fallen. Among the older houses most of the losses have been of the less numerous smaller dwellings.

TABLE XXXI Farmhouse Age and Size, Percentages by Economic Subregions, 1950¹

	<u>% Houses built before 1920</u>	<u>% pre - 1920 houses with 7 or more rooms</u>
47	78.5	45.3
48	88.1	62.5
51	68.0	23.0
63	78.5	51.0
69	78.7	61.2
70	80.4	59.7
71	76.7	33.2
84	74.9	26.1
85	76.0	47.5
86	77.2	56.4
87	75.3	52.4
92	71.0	43.4
93	81.1	44.2

1. All of the tables used in this chapter have been compiled from data in the Censuses of Housing, 1950 and 1960.

This overall reduction in the total numbers of farmhouses is of far more importance here in determining the common characteristics of Corn Belt dwellings than any process of house replacement in recent decades. There was a net decrease of over 162,000 units in the Corn Belt between 1950 and 1960. This loss represented 17 per cent of the total number of farm dwellings in the Corn Belt in 1950. During the same period only 54,000 units were erected, largely as replacements. The characteristics of the houses lost from the inventory have numerically had a greater effect in changing the total picture over the decades than the new houses added. Meanwhile the continued construction of medium-size farmhouses and the further rapid depletion of the older, smaller houses is producing a more uniform inventory made up largely of medium and large houses although the ages of the units vary widely.

Fig. 37 presents a composite picture of the sizes of houses (by rooms) in each subregion of the Corn Belt in 1950 subdivided according to the ages of the units. Pre-1920 houses were clearly dominant in each subregion with the more moderate sized dwellings commoner in the Lower Wabash Valley (E.S.51), Missouri (E.S.71) and the Missouri-Kansas border (E.S. 84). In those areas the older houses tended to be less large than to the north and there was a larger proportion of newer houses which are of more moderate size in all subregions. The figure also shows the contrast between these southern areas and the

parts of the central Corn Belt where a far larger proportion of the houses were large pre-1920 units. In some counties in the central Corn Belt subregions, the modal house size in 1950 and 1960 was one with 8 or 9 rooms. Relatively few of these units have decayed or been replaced by newer, more moderate size houses. Table XXXII shows that further decay and replacement are favouring the medium and larger size houses.¹

The tendency for contemporary houses to be smaller and different in style to those erected half a century ago has been touched on in the last chapter. These changes in house size and style are not surprising. The large houses built between the Civil War and the early years of this century were especially common in the prairie areas of Ohio, Indiana, Illinois, and Iowa where farm incomes were high, average farm family size large and imported sawn timber plentiful. In spite of being large, most of the common house types were also compact. On the southern parts of the traverses outlined earlier it was found that southern fringe areas commonly had more small, one-storey structures which suited the lower farm incomes and the less harsh winter conditions

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1. One difficulty with the use of the Housing Census data is that it is not possible to determine what percentages of houses of different sizes were actually built in previous decades since it can, clearly, only enumerate those houses which were still standing at the time of the count. It is possible that many more small houses were built before 1920 than large houses and that the small houses have been lost very much more rapidly. This seems unlikely from their present numbers and from other historical evidence which suggests that in the prairie areas the larger types of house were almost as common half a century ago as they are today. The higher decay rate for smaller, old houses has only served to accentuate the predominance of the larger houses.

TABLE XXXII Percentage Distribution of Different Size
Farmhouses, by Economic Subregions,
1950 and 1960.

	1 - 4 rooms		5 or more rooms	
	1950	1960	1950	1960
47	14.2	10.0	88.2	90.2
48	9.3	6.5	88.6	93.5
51	37.8	27.0	60.6	73.0
63	13.2	9.4	84.6	90.0
69	8.6	6.4	88.4	93.5
70	9.7	7.5	89.3	92.5
71	28.2	17.4	73.8	82.5
84	29.6	21.5	68.0	78.2
85	15.6	10.6	82.3	89.0
86	10.7	7.0	87.6	92.7
87	12.8	7.5	84.6	90.6
92	17.2	12.1	80.2	88.3
93	13.1	9.6	84.8	89.9

which allowed farm families to live in smaller and less stoutly constructed dwellings. These houses were subject to more rapid decay and so have needed faster replacement.

Low income was only one reason which encouraged the erection of smaller houses after 1920. Family size among farm households declined and the major improvements in household equipment led to a greater proportion of the farm income being spent on equipping the house rather than on the structure itself. 5 and 6 roomed houses have been most commonly erected but smaller houses were also built after 1920 especially in the southern areas where new farms were set up in the depression years of the 1920-30 period. Many of these hill farms only provided low incomes so that most of the houses built on them were also of poor quality.

Since 1940 there has been very little regional variation in the sizes of new houses although some subregions have maintained more prosperous farming conditions and higher farm incomes than others. Table XXXIII gives the sizes of houses erected in three of the Corn Belt subregions between 1950 and 1960 according to number of rooms. E.S. 47 is an area of moderate farm incomes in Ohio and Indiana, E.S. 93 is an area of moderately high incomes in the western Corn Belt and E.S. 51 is a lower income area in southern Indiana. But there was

little variation between these three subregions in terms of houses erected.

TABLE XXXIII Sizes of Houses Built 1950 - 1960 in Three Subregions.

	1 and 2 rooms	3 and 4 rooms	5 and 6 rooms	7 or more rooms
47	2.7	28.5	56.0	13.0
93	3.1	21.5	59.0	16.6
51	3.0	33.4	56.0	7.5

The median number of rooms for farmhouses built in the 1950 - 1960 decade only ranged from 4.9 in E.S. 51 to 5.4. in richer subregions like 93. It seems that among recently built farmhouses differences in the amount of money available to be spent on dwellings is expressed less in the size of the units than was the case in past decades. On the other hand variations in farm income may well be expressed in terms of the quality of the structure and its internal facilities. These aspects will be examined in a later section.

Overcrowding

The tendency for farmhouses built in the last 40 years to be of more moderate size has helped to create overcrowding in a small

proportion of the Corn Belt farm dwellings. The commonly accepted measure of overcrowding is where there is more than one person per room. This is, clearly, an arbitrary criterion since the family composition and the arrangements of the rooms will do much to determine if an individual household is overcrowded. Areas overcrowded on the basis of this criterion include those in the southern fringes of the Corn Belt. In 1960 11.0 per cent of the farmhouses in E.S. 51 and 9.0 per cent of those in E.S. 92 and 87 were overcrowded. In each case these are subregions where smaller houses form a larger section of the total inventory. Overcrowding is also more common among rented farmhouses than those which are owner-occupied since the addition of an extra room is often a priority improvement where owner-occupied houses are too small for the families living in them. Such enlargements are less likely to be carried out by the landlords or tenants of rented houses. Overcrowding is not entirely absent in the central Corn Belt and other parts where larger houses are generally found. Even in these subregions as many as 10 per cent of the farmhouses have only 3 or 4 rooms or less. Median farm family size is also higher than in the southern subregions at 3.3 - 3.7 persons per household compared with 2.7 - 2.9 in the south.

Farmhouse Condition

Whereas the size of farmhouses in the Corn Belt is related to the

age of the units and therefore reflects past economic and social conditions, one can clearly expect the condition of these units to be influenced more by the availability of farm income in recent years to maintain and improve these houses whatever their age. Some farmers would, of course, decide that the money was better spent on building a replacement house rather than improving an unsuitable older structure, but one would expect the internal facilities and structural condition of the new house to be as good as, or better than, the house it replaces. Since 1950 there have been big strides in farmhouse replacement and improvement at a time of higher incomes. During the inter-war years when farm incomes were lower than at the present time there was less new construction as well as less maintenance and improvement of existing structures. The improvement of farmhouse condition or the replacement of existing houses would thus appear to depend on decisions made in the light of the farm income situation.

The relationship between farm income standards in various parts of the Corn Belt and the condition of the farmhouses is suggested by the 1950 and 1960 housing data. The percentage of farmhouses classed as 'non-dilapidated' in 1950 or 'sound or deteriorating' in 1960 was higher in each of the central and eastern subregions than in the border areas of lower income on the west, south and north of the Corn Belt.

Several factors contribute to this relationship. The areas of higher farm incomes are also areas with more of the large and well constructed prairie-type houses which are less likely to become dilapidated than the smaller, more lightly constructed houses in the border areas. Secondly, farmers who are able to spend a limited amount of their income on improving their houses are likely to spend some of that money on enlarging a house which is too small for their families, as well as to spend more of it maintaining the fabric of the structures. Since smaller houses and overcrowding are more common in the southern areas, maintenance is likely to be sacrificed to some extent where house enlargement is a prior need.

Smaller farmhouses thus tend to be less well maintained and a larger proportion are in poor condition in spite of the fact that many of them are of recent construction. Table XXXIV shows that in 1960 more of the larger houses in two subregions were not dilapidated and had plumbing than was the case with smaller houses. These two subregions were typical of the others. At the same time, full data for all the Corn Belt would show that even the large houses in the less prosperous subregions were less well maintained and equipped than similar size houses in more prosperous areas.

TABLE XXXIV Percentage of Farmhouses not Dilapidated and
with full Plumbing Facilities, by Size.
1960.

E.S.	1 and 2 rooms	3 and 4 rooms	5 and 6 rooms	7 or more rooms
48	36.1	70.0	80.5	84.0
51	18.5	39.0	63.2	71.0

Much of the improvement in the overall condition of Corn Belt farmhouses in the 1950 - 1960 period has occurred because many of the houses lost from the inventory were poor or dilapidated as well as being small. At the same time the farmhouses built in this period, although only representing 6.8 per cent of the 1960 farmhouse total, were generally of sound quality.

Houses built in the preceding decades between 1920 and 1950 had a less marked effect on overall house quality due to the low rate of building and because many of the houses were little better than those already existing. For example, 8 per cent of the houses built between 1940 - 50 in the southern subregion 84 were already dilapidated at the end of the decade. However, houses built in each subregion in the 1950 - 60 period have suffered far less dilapidation indicating better

initial construction and maintenance.

Another major factor accounting for the general improvement in house condition which occurred between 1950 and 1960 as farm incomes rose was the rapid rate of improvement to existing houses, many of which have been standing over 40 years. The value of such repairs rather than actual house replacement has been seen by the farm extension agencies as the more important way to raise farmhouse standards.¹ Douglas has shown for Iowa that about half of the timber used in recent years for farm dwellings has gone on the repair and improvement of existing houses rather than the construction of new ones.²

Farmhouse Replacement

Reference has already been made to the slow rate of farmhouse building and replacement since 1920 with little more than a third or a quarter of the houses in each subregion under 30 years old in 1950. Table XXXV shows that less than 10 per cent of the units in each subregion (with the exception of E.S. 51) had been built in the ten years immediately before the 1950 and 1960 censuses. The small percentages of houses built in the immediately previous decade 1930 - 39 and still

1. See, for example, Carter D.G., Hinchcliff, K.H. and Meyer, O.C., When you Build or Remodel your Farmhouse. University of Illinois Agric. Experiment Station Circular 620, Urbana, 1948.

2. Douglas, E., An Estimate of the Volume of Farm Dwelling Construction In Iowa. Iowa State College Agricultural Experiment Station Research Bulletin No. 414, Ames, 1954, p. 34.

standing in 1950 would also suggest that building rates were slow then. Houses built between 1920 and 1930 which were enumerated separately in the 1950 Census were slightly more numerous so that there would appear to have been a falling off in farmhouse construction from the later part of the 19th Century and the first twenty years of the present century through the 1920's when construction dropped rapidly during the economic depression. The high levels of farmhouse building in the years before 1920 have not yet been reached again.¹

Table XXXV also shows that house building in these decades has been going on more in the south than in the central and border areas of the Corn Belt. The southern fringe was, and still is to some extent, the area where house condition and house equipment were at a lower standard.² The more rapid replacement of housing in the southern Corn

1. Estimates of private farm construction outlay for the whole nation show that this expenditure fell to a low point in 1931 and rose throughout the 1940's. By 1945, however, it had not attained the levels reached before 1920. See Historical Statistics of the United States, 1789 - 1945. (Series H 1 - 26). U.S. Department of Commerce, Washington, 1949, p. 168.

The national figures from this source run as follows:

1915 - 1920	1893	(Million dollars)
1921 - 1925	1187	
1926 - 1930	1281	
1931 - 1935	474	
1936 - 1940	1072	
1941 - 1945	1270	

2. Green has noted that the two main factors inducing farmers to replace their old houses are when they are too small for their family needs and in a state of dilapidation. Both of these conditions are more common on the southern border of the Corn Belt than elsewhere in the region. See Green, J.W., "Factors Inducing Decisions to Build Farmhouses". Rural Sociology, 19 (1954), pp. 263 - 270.

TABLE XXXV An Indication of Farmhouse Construction since 1920, by Economic Subregions

	% units standing in 1950 built			% units in 1960 built
	<u>1920 - 29</u>	<u>1930 - 39</u>	<u>1940 - 49</u>	<u>1950 - 59</u>
47	7.3	5.5	7.5	7.3
48	6.5	4.4	6.0	6.7
51	11.0	8.9	10.4	10.9
63	8.1	5.6	6.4	7.3
69	9.1	4.6	5.8	6.3
70	8.0	4.3	5.5	6.5
71	10.4	5.9	6.3	7.4
84	11.8	6.7	6.2	8.1
85	10.9	5.5	5.7	6.1
86	11.1	6.4	8.1	6.9
87	10.4	5.6	7.3	6.6
92	13.6	3.5	4.0	5.0
93	10.6	4.3	3.3	4.8

Belt has brought about some general improvement and lessened the gap between average farmhouse conditions in the southern fringe and the main parts of the Corn Belt. On the other hand, many of the houses built in the south since 1920 were of poor quality as has already been pointed out, giving considerable leeway to catch up.

In none of the subregions have house replacements kept up with losses of houses by decay and destruction in the period 1950 - 1960 which followed a trend set in previous decades. Total losses represented 22.6 per cent of the 1950 inventory and new houses only succeeded in cutting this to a net loss of 17.0 per cent. These losses, of course, parallel the overall reduction of farm population with out-migration and by a change of occupation on the part of the heads of many farm households to nonfarm employment. These losses of farmhouses and farm people have been evenly spread across the Corn Belt so that about the same percentage of farmhouses were found in each subregion in 1960 as in 1950. Losses were slightly above the regional average in the southern areas and in Ohio. This resulted from some marginal land going out of use and an increase in nonfarm work especially in the east. The per cent distribution of farmhouses and the losses between 1950 - 1960 are given in Table XXXVI. Actual totals have already been given in Table XXII.

TABLE XXXVI Percentages of Total Farmhouses in Each
Subregion, 1950 - 1960

	% total 1950	% total 1960	% loss 1950 - 1960
47	11.5	10.9	- 21.7
48	11.7	12.0	- 14.5
51	4.8	4.2	- 27.6
63	6.4	6.4	- 17.0
69	9.2	10.1	- 7.5
70	8.0	8.5	- 10.7
71	11.7	11.0	- 21.6
84	4.3	3.7	- 26.0
85	14.0	13.9	- 17.8
86	6.7	7.1	- 11.9
87	3.4	3.4	- 11.9
92	4.6	4.7	- 15.7
93	3.9	3.7	- 20.7

Equipment

The equipment contained in the farmhouse is also a good reflection of prevailing income conditions, although past influences cannot be entirely discounted where a backlog of improvements has been allowed to build up during years of lower income. This appears to be the case in comparing the equipment of farm and urban housing in the Corn Belt where farmhousing was not so quickly replaced or improved in the 1930's as was the case in urban areas.

Most improvements in house equipment have come about by adding facilities like plumbing and heating into existing houses so that the age of the house does not necessarily reflect the quality and amount of equipment it contains. Many of the old, well-built houses of the prosperous prairie counties are now better equipped with plumbing, heating and other forms of household equipment than more recently constructed houses in other parts of the Corn Belt.

Certain pieces of house equipment are now nearly universal in Corn Belt farmhouses whereas other items, which were found in a few houses some decades ago, are still not very common. An electricity supply had become an almost universal feature in Corn Belt farmhouses by 1960 so that it was not even enumerated in the census of that year. In 1940 only 31 per cent of the nation's farms had electricity but

this had risen to 77 per cent by 1950 and 87.6 per cent in the Corn Belt with the help of rising farm incomes and rural electrification schemes.¹ The situation in the Corn Belt subregions in 1950 is given in Table XXXVII. It will be noticed that there was a considerable range of household electrification from over 90 per cent in most subregions to about three-quarters of the farmhouses in the southern areas with lower percentages westwards in the less densely settled areas. It is also apparent that an electricity supply was to be found in many of the houses which were classed as dilapidated so that the condition of a dwelling does not necessarily clearly indicate the type of equipment it might contain.

TABLE XXXVII Percentages of Farmhouses with Electricity
Supply, 1950.

47	96.4
48	95.2
51	79.3
63	92.2
69	92.3
70	93.0
71	78.8
84	72.3
85	88.4
86	94.0
87	85.2
92	66.3
93	76.6

1. The national figures are taken from Malotky, L.D., "Better Housing in the Country". in Yearbook of Agriculture 1963, Department of Agriculture, Washington, 1964, pp. 185 - 188.

Other pieces of household equipment have come into Corn Belt farmhouses more gradually than electricity. These include the more costly items like full plumbing and central heating for which federal subsidies are not available. In some cases a basic service such as an electricity or water supply must clearly come before the more sophisticated equipment can be considered. Some central heating systems, for example, require an electrical supply in order to function.

The Housing Census lists plumbing equipment according to the completeness of the system so that a running water (cold) supply is differentiated from a hot water system. Each is also enumerated along with the presence or absence of a private toilet and bath.

Since 1950 the improvement in the number of farmhouses in each subregion with the basic cold running system has been considerable. Table XXXVII summarizes the changes. Only 14.5 per cent of the Corn Belt's farmhouses in 1960 still lacked this basic facility. The southern fringe is again worse off in this respect but has made some overall improvement compared with the more prosperous areas of the Corn Belt.

This lack of basic plumbing in 14.5 per cent of the farmhouses is not entirely a problem of the age of many of the farmhouses which were frequently built without such a supply. A quarter of the houses

TABLE XXXVIII Percentages of Farmhouses by Plumbing, 1950-1960.

	Without Cold Running Water 1950	1960	With Full Plumbing ¹ 1950	1960
47	33.6	7.8	38.2	78.5
48	28.1	6.7	40.7	82.2
51	59.3	20.2	17.5	58.3
63	37.8	8.2	38.4	81.0
69	44.1	11.6	30.7	75.0
70	39.9	9.6	35.5	77.0
71	66.5	27.2	15.0	54.6
84	70.2	30.4	12.3	49.8
85	45.8	15.1	28.2	68.0
86	45.1	12.5	32.0	75.0
87	63.6	24.6	17.7	60.2
92	51.0	17.9	20.2	62.1
93	48.1	17.0	24.2	66.6

1. Full plumbing includes hot and cold running water, toilet and bath.

erected between 1940 and 1950 in the region were without this facility at the time of the 1950 Census. But houses built in the 1950-60 period were much better equipped in this respect.

There have also been considerable increases in the proportion of houses with full plumbing and private sanitation. Table XXXVIII gives the percentages of farmhouses so equipped in 1950 and 1960 in each subregion. Even so, only about half of the farm dwellings in the three southern subregions had full plumbing at the time of the 1960 Census whereas the situation in the eastern Corn Belt was much better. Such facilities are almost universal in urban Corn Belt housing and this probably suggests why the higher proportion of farmhouses which are so equipped are found in the eastern and more urban part of the region. Here, more farms are connected up with municipal water supplies and have mains sewage. Houses built between 1950 and 1960 were often well equipped with these facilities but up to 50 per cent of those built between 1940-50 still lacked full plumbing at the time of 1950 Census.

Overall it is clear that a full plumbing system had become more common by 1960 than was a cold water system in 1950. This is indicative of the rapid improvement in farmhousing at a time of high incomes which have allowed farm households to make up for some of the neglect resulting from the interwar years of lower incomes.

Both the 1950 and 1960 Housing Censuses reported on the types of heating used in farmhouses but a change in the form of the enumeration does not allow a direct analysis of the trend over the decade. In the 1950 Census heating was enumerated as central or non-central with sub-types according to the fuel used. In 1960 only the types of heating (steam, air, hot water) were listed.

From the 1950 data it is clear that central heating was far from being a universal piece of equipment in Corn Belt farmhouses and was more common, as one would expect, in houses with a full plumbing system. It was mostly found in the areas of higher farm incomes of the eastern and central Corn Belt. In the northern and western areas, where the need for such heating is generally greater, the proportion of houses so equipped was often lower. One finds, as expected, less central heating in the southern areas of lower incomes and warmer winters. Central heating had become far more common by 1960 but it was still a less common piece of farmhouse equipment than those already considered.

Factors Affecting Corn Belt Farmhousing

It has been suggested that variations in farmhouse size are, in

large part, the result of past social and economic factors while such characteristics as house condition and equipment are more related to recent farm income variations. It is immediately clear that income is a major factor accounting for variations in farmhousing.

Each farm is, of course, an individual case where these factors bear upon the farm family when it decides how to improve or replace the home. One farmer may decide to put his surplus capital into his house in some way while another might decide to use a similar amount to do something else on the farm. One farmer might improve his house by installing plumbing or heating while another may decide that the structure is in more urgent need of repair or enlargement. Overall it is necessary to assume that persons who are engaged in the same type of farming routine and are producing the same crops have their lives patterned in similar ways. The physical environment, their sources of income and the type of farmhouses all tend to be more similar within a type of farming region or economic subregion than across the borders of two adjoining subregions.

It is appropriate to consider two sets of factors which seem to be major influences upon farmhousing, namely, the economic factor and that related to urban proximity. These analyses have been based mainly on 1950 data since not all of the similar data was available for 1960, but the examination of some 1960 data suggests that

conclusions based on the older figures are still largely valid.

The Economic Factor

There are three ways of judging farm income in relation to various farmhousing characteristics in Corn Belt subregions. One way is to use farm income classes given in the 1950 and 1960 Housing Censuses where income data is cross-tabulated with various conditions and facilities of farmhouses. A second way is to make use of farm economic classes and, thirdly, farm operator level of living indices.

Using farm income class data, a comparison can be made between the range of income classes and the quality of houses in each subregion. If income is a major determining factor one would expect more good quality houses in areas of higher income farms.

This relationship is shown for each subregion in Fig. 38 which is based on 1950 Census data. In these subregional graphs, farmhouses have been divided into four quality classes as follows:

- 1) non-dilapidated houses with all plumbing facilities.
- 2) non-dilapidated houses with some plumbing.
- 3) non-dilapidated houses without plumbing.
- 4) dilapidated houses.

Each of these house qualities has been graphed with the income classes

to which the occupants belonged in 1950. As one would expect the poorer class of farmhouse, that dilapidated or without plumbing, tended to be the home of the lower income family. Certain other points are suggested by Fig. 38.

a) Poorer quality houses which were more common on the southern fringe of the Corn Belt were mainly inhabited by low income farmers but smaller numbers were also inhabited by farm families with higher incomes in all subregions.

b) Many best quality houses were occupied by higher income farmers but many were the homes of farmers of more moderate incomes of over 2,000 dollars.¹ Since the majority of Corn Belt farmers had this size of income in 1950 it is clear that income alone was not sufficient to achieve and maintain good house quality. Other factors such as the quality of the houses which the present occupants took over and the decisions and needs of the farm families played important roles in relating farm income to house quality. In particular a good income may be needed for many years to allow full house improvement especially as many of the older houses in the Corn Belt lacked these basic "qualities" at the time of construction.

c) These cross-tabulations would suggest that in 1950 house dilapidation was largely the result of low income. On the other hand, Corn Belt farmers with better incomes accepted the need to live in a house with

1. Annual income.

less than the full plumbing facilities but major improvements in farm incomes between 1950 and 1960 have been paralleled by a rise in overall housing conditions.

A second means of relating farm prosperity to house condition is by using data on the economic classes of Corn Belt farms, a classification of farms used by the Census of Agriculture.¹ Each subregion of the

1. The economic class of farm is derived on the basis of three factors: 1) the total value of farm products sold in a year. 2) The amount of work done off the farm by the operator as a means of determining if he could be classed as a full-time farmer. 3) the ratio between the family income derived from the sale of farm products and from nonfarm sources.

Farms which sold 1200 dollars (or more) worth of farm products in 1949 were considered commercial (full-time) farms in the 1950 Census. There were 5 classes:

- I over 25,000 dollars of farm sales.
- II 10,000 - 25,000 dollars
- III 5,000 - 9,999 dollars
- IV 2,500 - 4,999 dollars
- V 1,200 - 2,499 dollars

A class VI group of farms were considered commercial if their sales stood between 250 dollars and 1199 dollars and the farmer did not work off the farm for more than 100 days in the year and the family income from non-farm sources did not exceed the farm income.

Three types of non-commercial farms were recognized:

- a) Part-time farms where the 1949 sales of farm products were 250 - 1199 dollars but the farmer worked more than 100 days off the farm or the family income from nonfarm sources exceeded the farm income.
- b) Residential farms where product sales were below 250 dollars.
- c) Farms on institutions. There are very few of these in the Corn Belt and they are here grouped with part-time farms.

Corn Belt farms divided up into the following classes in 1950:

Commercial Farms

Class I and II	17.5 per cent	Non-Commercial	
III	27.6	Farms	
IV	22.1	Part-time	6.7
V	22.0	Residential	6.6.
VI	6.5		

100.0.

Changes between 1950 and 1954 made little alteration. The commercial farms increased by .5 per cent and there was some increase in the higher income farms especially in the eastern Corn Belt.

Corn Belt includes farms in each economic class but one class is generally dominant. Fig. 39 shows the ranges of classes in each State Economic Area and Economic Subregion in 1950.

The main advantage of this type of farm classification is that it separates the full-time (commercial) farmer, who devotes nearly all of his work to farm operations, from the part-time farmer who depends on his smaller farm incomes and nonfarm income sources. The main disadvantage of the classification is that no housing data is directly cross-tabulated with these economic classes. Fig. 39 nevertheless confirms the presence of considerable variations in farm prosperity within and between subregions but that higher class farms are dominant in the core areas of the Corn Belt where housing conditions are also better. It also shows that non-commercial farms are common in both the eastern and southern Corn Belt where housing condition contrast markedly. In the southern areas these part-time farmers have fewer opportunities to supplement their incomes by nonfarm work and therefore tend to form a poor farming fringe, whereas these opportunities are more abundant in the industrial eastern Corn Belt so that non-commercial farming does not here imply low farm incomes.

Further west there were fewer non-commercial farms where there are fewer off-farm job opportunities but farmhousing is generally of a good standard as a consequence of good incomes on commercial farms.

In the far western parts of the Corn Belt good class farms remained dominant in 1950 but other data have already pointed to rather lower housing conditions than existed in the central Corn Belt. This decline would appear to be less the result of incomes but more the result of farm isolation from towns, and from the sources of electricity and other services. The cost of installing these services in many western farmhouses was therefore greatly increased.

A third method of studying regional variations in farm "prosperity" and housing was by means of the farm operator level of living indices. These indices were prepared with 1945, 1950 and 1954 data on the basis of the presence of certain items and equipment in the farmhouse and are a more direct measure of standard of living than income groups.¹ Fig. 40 shows for the counties of the Corn Belt in 1950 the regional variation in the indices. The areas of higher indices relate closely to the subregions characterized by higher farm incomes and economic classes. The main disadvantage of the indices is that they represent a series of county means where it is clear that there are important ranges of economic class within each part of the Corn Belt.

1. Hagood, M.M., Bowles, G.K., and Mount, R.R., Farm-Operator Family Level-of-Living Indexes for Counties of the United States. U.S.D.A. Statistical Bulletin 204, Washington, 1957. Household items used to make the indices included electricity, telephone and car and the value of farm products bought and sold.

These measures of relative farm prosperity and housing conditions would suggest that the main regional housing variations between the central core of the Corn Belt and its southern borders are the result of the larger numbers of low income farmers in the south. The other main, but less marked, regional variation in farmhousing between the Corn Belt and its western borders appears to be less the result of income conditions than of the relative isolation and lack of urban influences to the west.

Farmhousing on the Non-Commercial and Low Income Commercial Farms

Part-time and residential farms made up 13 per cent of all Corn Belt farms in 1950 while a further 19.5 per cent of the commercial farms had incomes of less than 1200 dollars in 1949.¹ These farms together made up one third of all Corn Belt farms in 1950 and 1960 and largely represent the low income sector of the rural Corn Belt.

One must, however, make exceptions to this generalization. Non-commercial farms are a diverse group. Some part-time and residential farms are so classed because the nonfarm income is higher than the farm income and is probably sufficient to allow a good living to be made without the sale of many farm products. Other farms in this group belong to retired farmers living on their capital. Persons who have urban employment but prefer to live in the country can also

1. Annual income.

be included in this category. All of these generally have incomes and housing conditions well above those of other non-commercial farmers who must rely to a large extent on their farm income to supplement a low nonfarm income. In such cases the total family income would generally be less than that of the better class of full-time farmer.

Just as this group includes a wide range of income types so the houses are also very varied. Many of them were recently built on smallholdings and hill farms and on the fringes of urban areas. The holding is often too small or poor to provide a good income and other sources of income and employment must be relied on so that such farms are commonly found on the edges of urban areas, where land is awaiting development, and where alternative nonfarm employment can be found nearby. These cheaply constructed houses often lacked the basic facilities found in older houses built on higher income farms. They also tended to be smaller houses and thus more subject to overcrowding apart from their other deficiencies. But other farmhouses included in this group are of high standard and represent the homes of urban persons who prefer to live in a country house and have provided themselves with many of the amenities that they would enjoy in a good urban dwelling. Census data is not helpful in separating the low standard non-commercial farms from those of higher standard. But the

points already considered and field observation would suggest the lower standard non-commercial farms are most common in the southern Corn Belt.

Overall the one third of Corn Belt farms which are run on a low income or non-commercial basis include more of the poorer type of dwelling and so have a detrimental effect on the total farmhousing inventory. If this group were extracted one would find that the other two-thirds measure up far more closely to the quality of urban housing once allowance is made for the factor of isolation which makes the supply of many domestic services more expensive. In many ways then, the low income and non-commercial group of farms have housing which may be considered the equivalent of the urban slum.

The Factor of Urban Proximity

The location of farmhouses on the land which is actually farmed by the operator, rather than in a nearby village, has obvious advantages for farm operation. These benefits have already been outlined in Chapter 5. At the same time the relative isolation of each farmstead from its neighbour and from the rural centres and towns creates problems of supplying services to these houses at a reasonable cost. One might suggest that these costs would increase outwards from the major urban centres. These aspects of relative isolation mean that

in the central and western Corn Belt, where farm incomes are often as high as in the eastern areas, the use of such urban-based services is lowered by the higher cost of supplying them.

The influence of the proximity of an urban centre on local farmhousing is most readily apparent where the urban centre is large, since the effect of the centre then radiates out to affect farmhousing not only in the county in which the centre is situated but in the adjoining rural counties also. The same effects are probably found around smaller centres but the radius of the area influenced is shorter and does not necessarily affect the housing of adjoining counties. In order to see the effects of urban proximity on farmhousing it is necessary to be able to compare Census data for adjoining counties.¹

In the following examination, housing data has been taken for counties which have been grouped into fringe areas around selected Standard Metropolitan Areas (S.M.A.'s). Each S.M.A. had a population of over 50,000 in 1950 and occupied a considerable part of the county in which it was situated. It is thus possible, in each case, to compare the farmhousing characteristics in the county containing the metropolitan area with the rural counties adjoining it. The selected

1. Township housing data would be more useful in this respect but this is not published.

S.M.A.'s are shown on Fig. 41 with the groups of counties which form the fringe around each.¹

Table XXXIX presents selected housing data for 1950 for the S.M.A. counties and the fringe counties. In each case, with the occasional exception of the rate of dilapidation, the urban county had better farmhousing conditions than the fringe counties. Although not shown in the table these fringe counties in turn tended to have slightly better farmhousing than counties beyond them. But the tendency for some of those counties to occur on the edges of other metropolitan areas made the analysis of such data impossible. Nor is the county data used here sufficiently detailed to see if there is any relationship between the co-variant housing characteristics and the size of the metropolitan population.

The effect of urban proximity upon the surrounding farmhousing is reflected in several ways of which only a few can be measured from available census data. Clearly the presence of such a centre makes such services as electricity, water and sewage more readily available

1. The fringes were made as near circular as possible. Where only a corner of a fringe county touched the central county and most of the fringe county lay outside of the fringing zone, the county was omitted. Similar methods of employing Census data to measure housing variations have been used by Beyer and Rose, op. cit., pp. 88 - 98.

TABLE XXXIX Farmhouses by Selected Characteristics in
Metropolitan and Fringe Counties, 1950
(percentages)

No. counties in metrop. area and fringe	Non Dilap. All plumbing	With Electricity supply	with Central Heating	Built post 1940	dilap.	Without water
Columbus (1)	48	96	53	12	8	24
fringe (6)	33	93	34	6	7	35
Springfield (Ohio)						
(3)	42	94	46	17	4	28
fringe (8)	33	96	34	6	6	37
Lima (1)	44	96	35	10	6	29
fringe (5)	39	95	39	4	4	36
Indianapolis (1)	56	98	58	16	6	18
fringe (7)	36	94	28	9	7	33
Muncie (1)	50	97	41	11	8	16
fringe (6)	38	96	29	7	5	29
Ft. Wayne (1)	42	91	49	10	5	27
fringe (9)	35	93	40	4	6	33
Kalamazoo (1)	51	97	54	13	8	13
fringe (7)	38	95	45	10	10	22
Terre Haute (1)	27	89	45	12	9	45
fringe (6)	19	80	22	6	10	49
Evansville (1)	41	100	50	22	3	28
fringe (4)	19	86	20	13	11	27
Decatur (1)	37	96	45	8	5	35
fringe (6)	29	87	30	6	7	43
Springfield (Ill.)						
(1)	34	93	41	7	6	41
fringe (5)	28	88	34	5	8	45
Peoria (2)	43	96	63	9	5	30
fringe (8)	36	93	48	6	6	35
Rockford (1)	45	90	65	12	4	28
fringe (6)	39	96	59	6	4	34
Davenport (2)	40	93	66	8	5	28
fringe (7)	39	92	57	6	5	33

TABLE XXXIX Continued.

No. counties in metrop. area and fringe	Non Dilap. All Plumbing	With Electricity supply	with Central Heating	Built post 1940	dilap.	Without water
Cedar Rapids (1) fringe (7)	26 34	93 91	46 46	10 6	7 4	36 39
Waterloo (1) fringe (7)	42 31	99 94	54 42	9 6	4 4	26 42
Des Moines (1) fringe (6)	38 29	94 89	47 37	12 6	7 6	35 43
Sioux Falls (1) fringe (8)	23 19	86 74	33 35	7 5	4 4	52 56
Sioux City (1) fringe (8)	29 28	91 91	30 31	7 6	7 5	32 34
Omaha (3) fringe (9)	37 30	91 85	37 31	5 4	5 5	29 35
Lincoln (1) fringe (8)	28 24	83 81	28 26	6 4	7 8	42 44
St. Joseph (1) fringe (7)	22 18	83 76	23 18	8 6	11 11	47 53
Kansas City (4) fringe (10)	18 18	87 77	33 17	15 7	7 10	35 54

to surrounding farms at an economic price. This can be seen in the greater percentage of farmhouses in the urban counties with an electricity supply and central heating, the lower percentage without running water and the higher proportion with all facilities.¹

Dilapidation, however, does not appear to be clearly related to the urban factor probably because some low-income farms develop as small-holdings on the fringes of cities. A higher percentage of newer houses are also found in the metropolitan counties.²

Urban proximity also exerts social and economic effects in other ways. The proximity of a farm to an urban centre allows the farm operator and members of his family to obtain extra nonfarm employment to increase their total income, with resulting benefits to their living standards and housing needs, but little data is available on these supplementary incomes. It is in these counties especially that the loss of farm persons to permanent nonfarm employment, without changing the place of residence, is high. It is this transfer of occupation

1. The farmhouses in the urban counties also had more refrigerators, washing machines and other equipment.

2. Although considerable house improvements occurred between the 1950 and 1960 censuses the farmhousing in metropolitan areas appeared to retain its advantages over that further from the metropolitan centres. Thus for the county containing Indianapolis and the seven adjoining counties, a higher percentage of non-dilapidated, fully plumbed houses were found in the central county than in the fringe. The percentages had risen from 56 and 36 to 83 and 79 respectively in 1960.

which accounts for a considerable part of the apparent out-migration of farmers which has been characteristic of the Corn Belt for several decades. In counties twenty miles or more from an urban centre fewer farm persons are likely to travel to work in the town and the farmer is also less likely to engage in part-time urban work. If he decides to give up farming for an urban job he would generally consider moving to the town. This actual change of residence would account for the other part of the farm migration process.

Closeness to an urban centre also probably leads the farm family into more contact with urban and nonfarm families and promotes the farm family to desire the higher urban housing standards. Comparing similar income groups the urban family has, on average, better housing than its rural farm counterpart, with the rural nonfarm households somewhere between the two.

Overall, then, proximity to an urban area appears to raise farm-housing conditions more than the presence of a few poor farms on the urban fringe can depress them. The amount of improvement may well depend on the size of the urban centre but this cannot be tested with the crude data available. Table XXXIX also suggests that the amount of farm-house improvement close to metropolitan areas varies regionally since the housing in the fringe counties in the eastern Corn Belt is often better than it is close to the urban centres of the western Corn Belt.

Other Factors

Other factors which might affect farmhousing characteristics include 1) regional variations in climate, 2) tenancy rates, 3) value of farms and investment and 4) the type of household. These factors were less easily subject to examination and less attention was directed towards them.

1) One would expect climatic effects, especially regional variations in winter temperature, to affect house-building and house improvement decisions.¹ Winter temperatures drop far lower in the northern Corn Belt and, on the basis of degree units,^{day} as much as $2\frac{1}{2}$ times as much heating is required in the northern Corn Belt as in the south.² But it has already been pointed out that higher incomes lead central Corn Belt farms to have on average more heating than northern farms. In summer there is less regional variation in temperature or humidity so that the relief of heat is a regional housing problem. Air-conditioning in farmhouses are still too rare to indicate any distribution.

2) The condition and equipment of Corn Belt farmhouses varies with the form of tenure, rented houses generally being poorer than owner-

1. Cowles, M.L. and Irwin, M.H., Factors Affecting Farm Housing in the North Central Region. University of Wisconsin Agric. Experiment Station Bulletin 499, Madison, 1953.

2. Garland, op. cit., p. 21.

occupied houses in the same income group. But the differences are least marked in the higher income cash grain prairie areas where tenanted farms are most common. This is not surprising since the good farming conditions allow both farm tenant and owner to derive a good income and enjoy good housing. Overcrowding is largely a problem of tenant-occupied houses of the smaller types which are common in the southern Corn Belt, but tenancy is less common in these parts.

3) Average farm values do not appear to reflect closely variations in housing. These values are shown in Fig. 42 based on 1950 data. High value farms are found especially in the central Corn Belt cash-grain areas and decline to the south, and east where farms are smaller and often yield less income. Nonfarm sources of income lead to housing differences in these areas. Medium value western farms result from their large size rather than the high value of land per acre but farmhousing conditions are not equally as good.

4) 90 per cent of farm households in each Corn Belt subregion are of the normal parent and children type, with others including other relatives or non-relatives. These households are better housed than others consisting of only one or two persons or other family groups. These less usual households are evenly distributed across the Corn Belt and do not appear to have any significant effect on regional variations in farmhousing.

Summary

Certain conclusions can be drawn from this examination of census farmhousing data.

1) Farm income clearly influences the condition and equipment of Corn Belt farmhouses. The nature of the relationship is not always clear because of the difficulty of handling the data and because other factors also influence these housing characteristics. This is seen by the fact that some high income farmers have poor housing. Nevertheless farmhouse quality is higher in the more prosperous central and eastern Corn Belt.

2) The age and size of Corn Belt farmhouses, most of which are old and large, are related less to income than past economic and social conditions. The older, often well-built large farmhouses are more common in the areas of higher farm income and undoubtedly help to differentiate the housing of areas of greater and lesser prosperity.

3) The quality of farmhousing appears to benefit from urban proximity which makes the provision of services easier and allows members of farm families to supplement farm income in nonfarm work.

4) Between 1950 - 1960 the large reduction in the number of farm persons and farmhouses has been paralleled by a rapid rise in the

standard of housing at a time of higher farm incomes. This improvement has resulted from the loss of poorer housing, their partial replacement by new and better houses and, above all, by the improvement of the many older houses. These improvements tend to follow a sequence with the basic services like electricity and water coming before improved plumbing and heating. Regional variations in these improvements relate to farm income and isolation and the effects of past neglect in periods of less prosperous farming.

5) The factor of tradition amongst farm people is often strong so that higher incomes and improved means of communication do not necessarily lead to farmhouse improvements as rapidly as in urban areas. The discrepancy between urban and farm housing standards is, therefore, not only one of income and isolation. As the farmhouse is a part of a total farm investment many farmers may well neglect the house in order to improve a more productive part of the plant. In this way the farmer and the nonfarm person could look on their houses in different ways. These sociological factors are not easily examined.

CHAPTER VII RURAL SETTLEMENT IN THE CORN BELT - A PRELIMINARY ASSESSMENT

This dissertation has attempted to describe and analyse some of the characteristics of dispersed rural settlement in the Corn Belt. The approach adopted necessitated reviews of Federal policy towards landholdings and of the attitudes and techniques of settlers as a background against which the patterns and features of settlement evolved. More recent influences like farm enlargement, the growth of a dispersed nonfarm population and changes in the farmhouse inventory have also been considered.

A regionalization in terms of rural cultural landscapes could be considered as the next stage in the geographical analysis of the region. This would have to take into account the settlement characteristics considered here. Although all of this is beyond the scope of the present study it can be tentatively suggested that four basic subdivisions should separate out¹⁾ the central core of the Corn Belt,²⁾ an urbanized eastern area,³⁾ a far western fringe bordering the Plains and⁴⁾ a southern Corn Belt border. In this last chapter the settlement features of these four subdivisions are briefly indicated and illustrated by means of a sample county in each.

The main settlement characteristics which appear to differentiate

the core from its three fringe areas are the density of farm settlement, the date of initial pioneering as it affected the settlement layout, the type of land, the amount of land suitable for farms and general trends in population growth and decline. The application of statistical methods of analysis to this and other multivariate data could be the basis of a much fuller regionalization than is attempted here.

The eastern Corn Belt of Ohio and central and northern Indiana is distinguished especially by small farms composed of small or medium-size field units. With a high proportion of the land in farms the densities of farm settlement are some of the highest for the entire Corn Belt. At the same time it should be recalled that these counties were settled relatively early by a rather haphazard process of woodland clearance within the general framework of the township and range survey. This created less regular settlement patterns than are found in many prairie counties. Over a longer period of settlement there has been considerable farm splitting and consolidation so that varied forms and shapes of operating unit are now common. Farmstead dispersal is less "linear" than in the central and western Corn Belt. Road networks are dense but less regular in form than in other parts of the region.

A second set of characteristics relate to the rapid growth of an urban, manufacturing economy which has, in turn, affected the rural settlement in the eastern area. In particular, as farm population has

declined the nonfarm population in service centres has shown renewed growth while a newer dispersed form of nonfarm settlement has developed in the open country in some counties. Farm enlargement and losses of people from the farm sector have been slowed with an increase in non-commercial farming. The fact that many counties have not yet reached their population peak is indicative of these trends.

House and farmstead characteristics in these eastern counties tend to be varied. Many house types exist and ages of houses vary considerably. Nonfarm houses outside of the rural centres include both bungalow clusters and converted farmhouses. High farm and nonfarm incomes are reflected in the good quality of much of this housing.

Henry County, Indiana - An Example of Eastern Corn Belt Settlement

Henry County, in the central Indiana grain and hog farming area, occupies undulating till and loess land where settlement was largely unhindered by physical conditions. Like the rest of this part of Indiana, the county was forested before settlement. The gray-brown podzolic soils are generally well-drained while some of the humic gley soils have been improved by tile drainage.

The county received its first white settlers from the east, the south and southern Indiana in the early years of the 19th Century and had a well established scatter of farms by 1820. Much of the land

was suited to subsistence crops so that clearings were made in many parts of the county, no one part being especially favoured. The population had grown to over 20,000 by 1850 and has increased every decade since initial frontier settlement although the rural farm sector has been in decline at least since 1930. The growth of Newcastle as the county seat and a manufacturing town has induced most of this population growth and a peak has clearly not yet been reached. Between 1930 and 1960 the county population rose from 35,238 to 48,899 but, at the same time, the farm population fell from 10,740 to 6,429 and now represents only 13 per cent of the county population. Table XLIII outlines some of these population trends.

The pattern of farm settlement in this and other urbanized Corn Belt counties, typical of the eastern part, reflects also the relatively early date of settlement and the small average size of farm units. The combination of the two factors appears to encourage farm units which vary considerably in size and shape with many composed of separated pieces of land. Average farm size in 1959 was 127.6 acres but 34.0 per cent of the units were less than 50 acres and 12.7 per cent were over 250 acres. Fields are also small and often less regular in shape than in the central Corn Belt counties.

The county roads which developed to serve the farm settlement seldom form a regular grid. Many seem to pass between property units

rather than merely following section lines. Most are, however, oriented to the main compass points as can be seen in Fig. 43. Further, on top of this local grid has been imposed a set of major paved roads radiating out of Newcastle and together the two systems create a dense network of routes so that no rural house is more than a few hundred yards from a gravel road or about 3 miles from a highway.

Another major characteristic of the rural settlement of the county is the recent growth of the dispersed nonfarm sector as the farm population has declined. It has already been suggested that this type of settlement is a significant feature differentiating much of the densely settled and urbanized eastern Corn Belt from areas further west. The dispersed nonfarm population in Henry County in 1960 exceeded both the farm population and the nonfarm population in the 15 rural centres.

The rapid growth of the rural nonfarm population in Henry County has come about both by a movement of persons out of Newcastle into the surrounding country and also by the retirement of some farmers who have taken nonfarm occupations without leaving their rural dwellings. This has also enabled the remaining farm units to become larger.

The transference of farm persons to nonfarm work and of urban persons to rural houses has been further complicated by the growth of

small part-time or residential farms, the partial withdrawal of some farm operators from commercial farming and the setting up of small-holdings by a few townspeople. From the census viewpoint these persons are included in the farm category but they serve to widen the range of farm size and type and they have also slowed down the increase in average farm size over the last 30 years. With diverse income sources, these persons, who made up 31 per cent of all farmers in 1960, also tend to have different housing standards from full-time farmers so that they, together with the nonfarm persons, create a much more varied housing situation than in a more purely commercial farming county.

Reference to the settlement of Prairie Township in the northern part of the county will further illustrate some of these points. In a 1961 survey it was seen that marked increases in the dispersed settlement of the township had occurred since an earlier survey in 1948.¹ The pattern of settlement in 1961 is shown in Fig. 44. This growth was entirely the result of nonfarm population increases in the open country which paralleled growth in the two service centres. Data on these changes are given in Table XL.

1. Jehlik, P.J. and Losey, J.E., Rural Social Organization in Henry County, Indiana. Purdue University Agricultural Experiment Station Bulletin, 568, Lafayette, 1951, p. 46.

TABLE XL Population Changes in Prairie Township, 1930 - 1960

	Total	Mt. Summit	Springport	Dispersed
1930	2208	274	183	1751
1940	2451	265	189	1997
1950	2660	295	217	2148
1960	2934	424	253	2257

As the dispersed rural population includes the inmates of the epileptic centre in the south of the township, only about 1200 could really be considered as open country dwellers in 1960. In the 1961 survey 337 dwellings were counted and 144 were judged to be nonfarm. In the 1948 survey 283 dwellings were counted in the same area of which 70 were nonfarm. These changes are laid out in Table XLI.

TABLE XLI Housing Totals in Prairie Township

	1948	1961	Change
Farmhouses	213	193	- 20
Nonfarm houses	70	144	+ 74
Total	283	337	+ 54

Even allowing for some discrepancy in the assignment of houses to nonfarm and farm categories in the two surveys, it is clear that the

loss of farmhouses and gain of nonfarm houses reflects changes seen throughout the county.

The distribution of farm and nonfarm houses in the township is shown in Fig. 45. Most of the increase in nonfarm dispersed settlement has been in the southern parts of the township on the fringes of Newcastle where some farmland has been given up to residential development in the form of small clusters of bungalows. Other development has been along the main north highway and around the institution. This development is less marked in the north. Mt. Summit in the south has grown more rapidly than Springport further north of Newcastle. Farmhouse losses appear mainly to have been by a change of occupancy to nonfarm rather than by actual destruction. As a result of these factors housing type and condition are varied within the township and further changes are still occurring.

The western Corn Belt fringe in South Dakota, Nebraska and Kansas shows some marked contrasts to the eastern fringe. Most of the land is in farms which are large, so that the density of farmsteads is far less than to the east. Settlement occurred late in the last century on the flat or undulating western prairie by the taking up of quarter- and half-section claims. Farm enlargement has been marked as the farm

population has fallen and as agriculture has become more mechanized, but this has not greatly upset the layout of farm boundaries or the road net. There have been few additions or improvements to the road systems which developed when settlement was consolidated, rather some roads have gone out of use.

Nor has there been much urban population growth except in restricted areas and most small towns and rural centres have also lost population. There has, as a result, been little rural nonfarm settlement in the open country to diversify the rural patterns and most counties experienced a population peak several decades ago. Rural houses are mainly of the prairie types but even though they are generally well maintained like the farmsteads, they often lack basic facilities.

Thayer County, Nebraska - An Example of Western Corn Belt Settlement

Thayer County lies 700 miles west of Henry County in the Nebraska cash grain and livestock area where the drier climate also favours winter wheat with corn. The land is mainly flat or undulating, with well drained chernozems formed on loess materials. The subhumid conditions and the danger of soil erosion on some steep slopes are the main physical obstacles to land-use but 98 per cent of the county is in farms. The natural vegetation was tall grass prairie.

Settlement was mainly carried out by persons from eastern states and other parts of the Mid-West who came into the county in the final three decades of the last century. The county was organized in 1872 and had reached its peak population soon after 1900. In 1898, when the county was last mapped by the Geological Survey, most farms were gathered close to Hebron, the main town, or to other centres and the railways. Settlement then spread out into the other parts of the county. The decline in population since about 1900 has affected both the farm and nonfarm sectors because the service centres have been almost entirely dependent on the growth and prosperity of the farm areas. The county population fell from 14,775 in 1910 to 9,118 in 1960 of which 42.1 per cent (3860) were classed as farm persons.

The decline in the farm population and the consequent increase in farm size have clearly altered the pattern and density of settlement. The county is dotted with neglected farmsteads where the surrounding land has been taken in by other farms. Farm size averaged 186 acres in 1920 but had grown to 306 acres by 1959. The layout of farms is regular with large square fields common, few of them under pasture. Farm consolidation is, however, very uneven and in 1959 15 per cent of the units were less than 100 acres while there were 17 units of over 1,000 acres. The number of these had doubled since 1955.

The original development of the farm settlement on the basis of

quarter-section farms had created a very regular road grid. But the farmstead losses without a compensating nonfarm growth have led to the closure of some roads while others are little used. At the same time the improvement of the more heavily used routes between centres in and beyond the county has been achieved without providing new roads. Instead, existing roads have been paved but the ratio of improved to unimproved roads is wider than in Henry County and the density of roads is also less. Relevant settlement data is given in Table XLIII.

Another contrast with Henry County is in the lower density, more even spread and greater uniformity of rural houses in Thayer County. With big farms common and a lack of a dispersed nonfarm settlement spilling out of the rural centres, this situation is not surprising. Further, as settlement only occurred between 60 and 80 years ago many of the farmhouses are the original structures erected by the first farm families. Many of these are of the standard Prairie Tee type made possible by the cheap import of timber by railway. As the farm population is declining there has been no need to add newer houses except occasionally where replacement has occurred.

An examination of the dispersed settlement in the eastern half of Chester Precinct shows in more detail the trends which appear to be affecting the whole county. The area concerned is shown in Fig. 46. The dispersed population of the precinct in 1900 was 355 but it had

declined to 195 by 1960 only 55 per cent of the peak figure. Most of the losses resulted from migrations right out of the precinct in that Chester, the only service centre in the area, has also lost population at a slightly slower rate. By 1960 its 480 inhabitants made up 71 per cent of the precinct's population compared with 64 per cent in 1930.

The settlement shown in Fig. 46 brings out several points differentiating it from Prairie Township in Henry County. The 30 farmsteads are well scattered each with adjoining land measuring not less than a quarter-section with the exception of three units bordering the service centre. Average farm size was 284 acres in 1961 but several of the land units were unused by their occupants because of retirement so that the actual operating units were generally much larger. The working of small non-adjacent pieces of land is uncommon.

As the area was previously mapped in 1898 and 1938 it is possible to show what farmstead losses have occurred in the area given in Fig. 46. Five units were lost between 1898 and 1938 and another 9 in the following period. It is noticeable that none of these losses occurred along the paved highway (U.S. 81) and that only 5 nonfarm houses were counted of which 4 were located on the edge of the service centre and really formed part of it.

Settlement characteristics in the broad central core of the Corn Belt of Illinois, Iowa and the northern areas can be briefly considered at this point as they appear to fall between those of the eastern and western areas. Average farm size, density of farm settlement, rectangularity of settlement and roads and population trends in central counties have, in the main, values intermediate between those found in the east and the west. Average farm size and rectangularity of settlement under prairie conditions likens the core to the western fringe but the recent growth of manufacturing in many central Corn Belt towns has induced some renewed growth of the nonfarm population sector and even some dispersed nonfarm settlement. In this way the core is like the eastern area. Most of these counties had a population peak earlier in the century but are now experiencing regrowth in spite of farm losses.

In other ways the core of the Corn Belt has distinctive settlement characteristics. Land values are very high in most counties as a result of a good combination of topographic, soil, climatic and settlement conditions for very successful agricultural production. Good farm income for owners and tenants alike, and high levels of living, are reflected in the well maintained and white painted farmhouses set within the typically neat farmsteads and a well ordered rural landscape of large square fields.

Moultrie County, Illinois - An Example of Central Corn Belt Settlement

Moultrie County lies in the southern Grand Prairie of the Illinois cash grain area. Fertile dark-coloured brunizem soils developed under the original prairie vegetation on the gently undulating tills, but about a quarter of the county was wooded mainly along the streams. Lighter gray - brown podzolic soils developed in these areas.

The first settlers, from Ohio, Kentucky and Europe, came in the late 1820's and took the streamsideland so that considerable areas, notably the prairie parts, were unsettled before mid-century. The county population was 3,234 in 1850 but rose to 14,481 by 1890. Population growth since then has been slow mainly by the expansion of Sullivan, the county town which now has some manufacturing enterprises. At the same time the farm population had declined from 7165 in 1930 to about half that figure (3584) in 1960. By 1960 the farm population only represented 26.3 per cent of the county population. The dispersed nonfarm population is still small.

The reduced density of farm settlement has allowed average farm size to rise from 138 acres in 1920 to 206 acres in 1959. The rectangular survey was closely followed at the time of frontier settlement and a fairly regular grid of roads was built up. Further processes of land subdivision and consolidation have, to some extent, upset the

original neat arrangement of settlement but with about 3 farms to the section and a high proportion of land under cultivation, the pattern of settlement is denser than in Thayer County and typical of large parts of the central Corn Belt.

The process of settlement change in Dora Township illustrates what is happening in the rural parts of the county. The settlement pattern in the township in 1961 is shown in Fig. 47. The north-western part of the County was mainly a prairie area and this township was not first settled until 1852.¹ By 1880 it had a population of 1345 in the open country and in the two service centres of Dalton and Lake City. The township population had fallen to 904 by 1960 of which less than 400 were in the farm sector compared with 688 in 1930. The two centres have also declined, Dalton on the main highway more slowly than Lake, but Dalton's population is now increasing again.

The 110 farmsteads observed in the 1961 survey were well scattered with very little land unfarmed, most fields large, rectangular and unfenced and serviced by a regular road grid. Farms ranged in size from about 160 acres to over 600 acres with the average at 200 acres. As farm size has tended to increase more units operating non-adjacent pieces of land have come into being after early farm subdivisions had

1. No author, Histories of Shelby and Moultrie Counties, Illinois. Brink, McDonough, Philadelphia, 1881, p. 233.

split some holdings up. The landholding situation is shown in Fig. 48. Most farmsteads were well maintained and had houses and other features of a fairly uniform type with the Prairie Tee house type dominant.

Most of the nonfarm population of the township is still confined to the service centres but 13 houses in the open country were judged to be nonfarm, mainly old farmhouses now occupied by nonfarm persons (see Fig. 47). In this and other ways, the township and county appear to stand intermediate in their settlement characteristics between Henry and Thayer counties.

Settlement characteristics in the southern Corn Belt are the least easy to generalize although these counties consistently separate themselves off from more northerly counties in terms of date of settlement, origin of settlers and general level of agricultural prosperity. But within this narrow belt of counties stretching from Indiana to Missouri there is considerable variation in the settlement features and the physical environment on which they were implanted. Generally, however, these counties have poorer soils derived from non-glacial materials, much sloping land and a lower proportion of land in farms than in most of the Corn Belt. These factors, combined with relatively early settlement mainly by southern pioneers, have helped to

create a less regular pattern of farm settlement and small farm units which, in spite of the process of enlargement, remain smaller than in many Corn Belt counties. The urban populations of this fringe is proportionately low and there is relatively little dispersed nonfarm settlement. A lack of manufacturing industry also prevents farmers' incomes benefitting greatly by off-farm employment. Lower farm incomes and land values are reflected in smaller, less well maintained farmsteads and houses. Not surprisingly the majority of the counties had a population peak earlier in the century.

Sullivan County, Indiana - An Example of Settlement on the Southern Corn Belt Fringe

Sullivan County displays the effects of varied, hilly topography, gray-brown podzolic and other soils of limited fertility and the long periods of settlement which characterize much of this fringe of the Corn Belt. Other characteristics are of local importance.

Small grants of land were made by the Indians to French traders in the area as early as 1742.¹ These land grants were land out in the Wabash plain part of the county with their boundaries at 45° to the main compass points. Some of these early lines of settlement can still be traced in road and property lines.

1. Wolfe, T.J., A History of Sullivan County, Indiana. Lewis, New York, 1909, p. 7.

Other land in the county passed into American hands in 1803 as one of the areas of early settlement north-west of the Ohio River. Scattered woodland clearings were soon linked up into a continuous spread of farms, some situated on sloping lands that were soon exhausted. The county population exceeded 10,000 by 1850 and farm and nonfarm growth continued until the early years of the present century. Farms have always been small as a result of early woodland settlement with little regard to the rectangular survey and also because supplementary income was available to many farmers in the county's coal industry. Small mines had been opened in the 1830's and these continued to employ many local farmers throughout the next one hundred years. The industry reached its peak output in 1906 when the 28 mines in the county employed about 4,000 men many of whom operated smallholdings. With the closure of many mines in the 1930's and with general changes in farming, average farm size rose rapidly from 89 acres in 1920 to 156 acres in 1959. This is still small compared with the average farm size in all but the industrialized eastern counties and land qualities are not good enough to ensure reasonable farm incomes at this density of settlement. This is seen in the generally poor level of farmstead maintenance and the low quality of much farmhousing. Further farm population losses seem likely by a process of farm enlargement and as some land is returned to nonfarm, mainly forestry, uses. The farm population losses in this county have been paralleled by dispersed

TABLE XLIII Selected Population and Settlement Data for
Four Counties

	Henry	Thayer	Moultrie	Sullivan
Topography	----- undulating -----			hilly
Main Soils	g.b. podzolic	chernozem	brunizem	g.b. podzolic
Original Vegetation	wooded	prairie		wooded
Drainage	good	fairly good		good
Approximate Date of				
First Settlement	1815	1870	1830	1750
Date of Population Peak	1960	1900	1920	1910
Present Population Trend	increase	-----	decrease	-----
1960 Farm Population as percentage 1930 farm population	59.8	51.2	50.0	48.3
% 1930 Population which was				
Urban	39.7	-	-	18.9
Farm	30.7	55.0	54.1	39.9
Rural Nonfarm	29.6	45.0	45.9	41.2
% 1960 Population which was				
Urban	41.6	-	28.9	22.9
Farm	13.1	42.3	26.3	25.1
Rural Nonfarm	45.2	57.7	44.8	52.0
% 1960 Nonfarm Population dispersed	57.0	-	30.1	40.8
% Land in Farms (1959)	88.3	98.1	92.9	76.5
Average Size of Farm (1920)	94	186	138	89
(1959)	128	306	206	156
Average Value Land and Buildings per acre (dollars)	331	122	463	94
per farm (000's dollars)	42	39	101	30

TABLE XLIII (Contd.....)

	Henry	Thayer	Moultrie	Sullivan
% Commercial Farms	68.6	87.3	81.0	63.6
% Low Income (Class V + VI) Farms	22.6	24.1	na	22.4
Average Farm Level of Living Index (1954)	183	162	168	153
Main Farm Type	Cash Grain	Cash Grain	Stock	General
Farms per road mile	3.1	1.3	2.1	2.7
Density of farmsteads per sq. m.	4.4	2.1	2.8	3.1
Shape of Road Net	fairly irregular	regular	fairly irregular	irregular
Type of farmstead dispersal	irregular	linear	linear	irregular
Types of farmstead and farm- houses	varied	prairie	prairie	varied
Condition of farmhouses	v. good	good	v. good	poor
Type of dispersed nonfarm settlement	clusters	none	scattered	clusters
Type of nonfarm houses	bungalow	-	mixed	mixed
Condition of nonfarm houses	good	-	good	varied

na = not available

nonfarm losses with the streamlining of the remaining coal workings. The diversification of economic activities in the nucleated settlement may encourage the renewed growth of rural nonfarm settlement.

Data on these four counties are given in Table XLIII. Inadequate in themselves, these results for the four counties are supported by others obtained in nine other counties not reported here and by the general conclusions presented in other chapters. The selection of the same kind of data from the census materials and from highway maps could well provide the basis for a regionalization of the Corn Belt in terms of its settlement and the rural landscape. Such subdivisions could help to identify areas which have undergone, or are undergoing certain processes of settlement change. The predictive value of this type of settlement study in terms of estimating housing needs, road developments and farmland losses to nonfarm uses could be of value.

In conclusion, and within the limits of the present study, it would seem that there is a basic uniformity in the settlement characteristics of the Corn Belt. This uniformity owes its origin to several factors working in conjunction. The movement of settlers across the whole region in less than one hundred years implied that the settlers had fairly similar cultural backgrounds and their techniques of settlement were of limited variety. The family was the basic pioneering unit which settled in the west to take cheap land for

subsistence or commercial crop production. The uniformity of the settlement process also owes something to the physical environment, in terms of the soil, climate and topography which everywhere allowed cereals to become important in the farm systems and so encouraged the development of a corn belt. Thirdly, the spread of settlement was aided by the policy of the Federal authority which controlled land disposal to individuals. Prior survey ensured that the land was neatly parcelled out while the methods of disposal favoured the setting up of owner-operated farm units. Farmstead nucleation did not occur under these conditions, rather road networks grew up to link each farm with its neighbours and with outside markets. Frontier subsistence farming was replaced by commercial agriculture as settlement was consolidated and communications developed. With this, timber farm buildings and houses of imported and local design were spread over wide areas.

There were some local factors, however, which produced variety within the framework of uniformity. The later settlement of the prairies, the western areas and some poorly-drained eastern land, occurred against a background of increasing commercialism and the need for bigger farms. Larger farms and a lower density of rural settlement were also encouraged by progressive modification of the land laws. At the same time the increasing parts played by land speculators and other bodies introduced other elements which locally affected settlement.

Some variety is also due to local environmental conditions and the different origins and the changing attitudes and skills of the settlers. This is especially well seen in the problems presented by the settlement of the prairies, now the more prosperous farm areas. Southern hill lands, with their poorer soils, never provided as high a proportion of tillable land as other parts and were never fully suited to the rectangular system of land division. The early replacement of southern settlers by easterners and Europeans as the dominant groups meant that varied skills and attitudes were brought in.

A second set of factors lent variety to the settlement within a superficially similar framework. Once the settlement of the region had been consolidated the pattern consisted of an almost uninterrupted fabric of dispersed farmsteads. Scattered points of denser, nucleated nonfarm settlement at the rural service centres formed a second "stratum" of settlement with a third stratum of urban nucleations at wider intervals on the landscape. The mean spacing between the individual farmsteads and the nucleated centres varied across the region. But during the last forty years or more the farm density has been declining unevenly with a process of farm enlargement. The remaining farms have taken into operation non-contiguous pieces of land. The unequal rates at which farm losses have occurred in different areas create more variety. These losses were most rapid in

western counties where the Federal land policy was never modified sufficiently to encourage economically stable farm settlement. Southern areas have also shown marked farm losses while in the east the growth of urban and nonfarm populations close to rural areas has allowed some farmers to operate small farms on a part-time basis and supplement their incomes by nonfarm work.

The growth of dispersed nonfarm settlement around urban areas has also caused differences within the Corn Belt by creating new patterns of settlement. These semi-clustered types of nonfarm settlement, with their own house types, may later become increasingly important in central and western parts of the region but there they would be implanted upon a more regularly arranged farm landscape than exists in the eastern Corn Belt.

A third aspect of variety has resulted from the different standards of farmhousing within the Corn Belt. While higher farm incomes everywhere raised conditions closer to those enjoyed by urban families, the central core of the region and the more urbanized east have benefitted most, while levels have lagged in the more isolated west and the poorer farming areas of the south.

APPENDIX I A Method of Estimating the Dispersed Nonfarm Population

The Census of Population gives figures for the township in each county and subdivides off the populations of urban places and incorporated rural places. Most of the population in these incorporated rural centres is nonfarm but the total rural nonfarm population in a county will normally exceed that found in the incorporated places because 1) some of the nonfarm population lives in smaller unincorporated nucleations not listed separately in the Census and 2) some of the nonfarm population lives dispersed with the farm population in the open country.

Using the census data, together with data on the smaller places obtainable in sources like the Rand McNally Geographical Handbook (Chicago, 1962) and various oil company road maps, it has been possible to estimate the total rural population of all nucleations in Iowa and Indiana. This also allows an estimate of the dispersed population to be made. These results are given in Chapter 4, Table XIX.

It was also found that the larger, incorporated rural centres (1,000 - 2499 inhabitants each) in both Iowa and Indiana grew more consistently between 1930 and 1960 than smaller places. Data on the 155 smaller centres in Iowa and the 441 in Indiana, which were not listed in the Census, was only available for 1960.

A further refinement of the estimate took into account the fact that a small part of the nucleated population is made up of farm persons. This, in turn, affects the estimate of nonfarm dispersed population. It is possible only to obtain an actual figure for the percentage of farm persons in larger rural centres. In Iowa, in 1960, farm persons made up 1.7 per cent of the population of larger rural centres. The proportion in smaller places could well be higher and an estimate of 5 per cent of the population of smaller centres has been used in Table XIX.

The following figures, for Iowa in 1960, indicate the method of calculation:

Population in centres listed in Census:			
with 1,000 - 2499 inhabitants			214,375
with 250 - 999	"		239,019
with less than 250	"		43,520
Population in 155 unlisted centres			33,980
Farm population in 1,000 - 2,499 centres			3,567
"	"	" all other	" (estimate) 15,820
Total nonfarm population in all centres			
		(estimate)	511,000
"	"	"	" dispersed settle-
			ment (estimate) 122,000

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GR	Geographical Review
PIAS	Proceedings of the Indiana Academy of Science
EG	Economic Geography
RS	Rural Sociology
AHR	American Historical Review
AES Bull.	Agricultural Experiment Station Bulletin
-U.P.	-University Press

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BASE MATERIALS FOR FIGURES

Corn Belt county and regional maps based on U.S. Bureau of Census County Map, 1960 (Albers Equal Area Projection).

Fig.

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