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## FARM TYPES IN NEBRASKA, AS DETERMINED BY CLIMATIC, SOIL, AND ECONOMIC FACTORS

R. R. SPAFFORD

# AGRICULTURAL EXPERIMENT STATION OF NEBRASKA

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# Contents

# Farm Types in Nebraska, as Determined by Climatic, Soil, and Economic Factors

by

## R. R. Spafford

### INTRODUCTION

This bulletin treats chiefly of Nebraska agricultural areas as determined by climatic, soil, and economic factors. Most of the subject matter centers about the kind of farm crops grown and their yields. Cultural practices applied to crops are only incidentally considered. Most of the data used are from the Thirteenth Census of the United States and cover the crop year 1909. The small amount of data not derived from this source comes largely from field studies in this State and is used merely to support certain methods of treating census data.

To make the basis of the analysis of Nebraska agricultural areas more stable, it has been necessary to follow thruout the northern hemisphere some of the very general principles in regard to climate, soil, plants, and people. Furthermore, it has been necessary to place the crop groups (based on the classification of annual crops) of Nebraska in line with those of the United States as a whole and to extend the size-of-farm study thruout the Great Plains region.

Crop-group belts are determined largely by the quantity of heat received and in general extend from east to west. The size of farm in the Great Plains is determined largely by rainfall and serves as a good index to the quantity of field crop and pasture growth. The general trend of any given size-of-farm belt in this region is from north to south. The fact that crop-group belts and size-of-farm belts in Nebraska tend to run at right angles to one another makes it a relatively simple matter to block out areas that have a fairly uniform type of farming. In determining the boundaries of type areas, soils are not ignored. Extreme conditions of texture and topography de-

termine certain types and subtypes. The Sand Hill and Level Loess areas in this State serve as illustrations. For each type area the type of farm, as it existed in 1909, has been calculated. The facts concerning the various farm types have been grouped about as follows:

1. Size of farm.
2. Use of land.
    Crop groups.
    Total yields.
    Yields per acre.
    Value of plant
        growth.
    Crop indexes.

3. Live stock.
    Kinds.
    Productive stock.
    Work animals.
    Live-stock returns.
4. Labor.
5. Capital.
6. Classes of operators.

The principal object of this work is to correlate in a measured way a number of important facts concerning farm types. The work, it will be seen, is by no means final. The material prepared during short intervals in the past two years is published here simply as a progress report.

## THE OUTLINE OF AGRICULTURAL REGIONS IN THE NORTHERN HEMISPHERE

North America has two large agricultural regions. One of these regions centers in Washington, Oregon, and California, and the other in the eastern part of the United States and southern Canada. Eurasia also has two such regions similarly located. One is occupied in part by Great Britian, France, Germany, Austria, and east-central Russia, and the other in part by China Proper, Manchuria, and Japan. The climate of each of these regions is to a large extent determined by the westerly winds.* Land located along western coasts receives the westerlies fresh from the ocean while that located along eastern coasts receives these winds only after they have crossed more or less of the interior of the land mass.

Climate within the belt of the westerlies ranges from oceanic to continental. Naturally the truest types of oceanic climate in this belt of winds are found on western coasts.

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*The climate of southeastern North America and Eurasia is to an extent affected by the trade winds.

Eastern coasts have what may be classed as an oceanic climate, but it is not as equable as that of western coasts. The extreme continental climate is common to the interior of North America and Eurasia. In contrast with an oceanic climate, a continental climate is variable. Temperature changes are more sudden and extreme. Rainfall is comparatively lighter and when it comes it is apt to be torrential rather than steady. Also when snow falls the ground is seldom covered with a uniform blanket. In general it can be stated that the climates found on similar sides of North America and Eurasia are more comparable than those found on adjacent sides. This is to a less extent true of points in the interior.

The boundaries of the four great agricultural regions in the northern hemisphere are determined by low temperature, low rainfall, and coast lines. In southern Canada, Norway, Sweden, and Finland, and in northern Russia, Manchuria and Japan, agriculture is limited by low temperature. The principal agricultural boundaries determined by low rainfall in North America are found (1) in the states of the Great Plains and (2) in the states of the Pacific coast region. In Eurasia the principal agricultural boundaries determined by low rainfall are found (1) in southeastern Russia and (2) in western China Proper and Manchuria. Figures 1, 2, and 3 indicate in a diagrammatic way these agricultural boundaries. The small circles mark temperature limits, and the dashes rainfall limits.

The northern parts of the two agricultural regions in both land masses are connected by a strip of marginal agricultural country lying between a cold adverse region to the north and a dry adverse region to the south. This is roughly indicated in the figures by a line made up of both circles and dashes. It is possible that these strips of country are determined by the fact that to the south higher temperature makes droughts very destructive while to the north the lack of heat during the growing season soon comes to act as an absolute limit to ordinary agriculture.

Soil has but little visible effect upon the boundaries of these agricultural regions. Considered on any large geo-

Fig. 1.—The principal boundaries of the agricultural regions of North America. The small circles mark temperature limits and the dashes rainfall limits.

graphical scale, soil effects are often submerged by climate. The reverse, however, is true within any comparatively small area of agricultural land. Here variations in soil often have sufficient range to outweigh the relatively small range of climatic variations.

The location of the favorable agricultural lands with reference to the distribution of native vegetation is striking. The low temperature boundaries are closely marked by the southern limits of the northern coniferous forests while the low rainfall boundaries are marked by a sparse vegetation
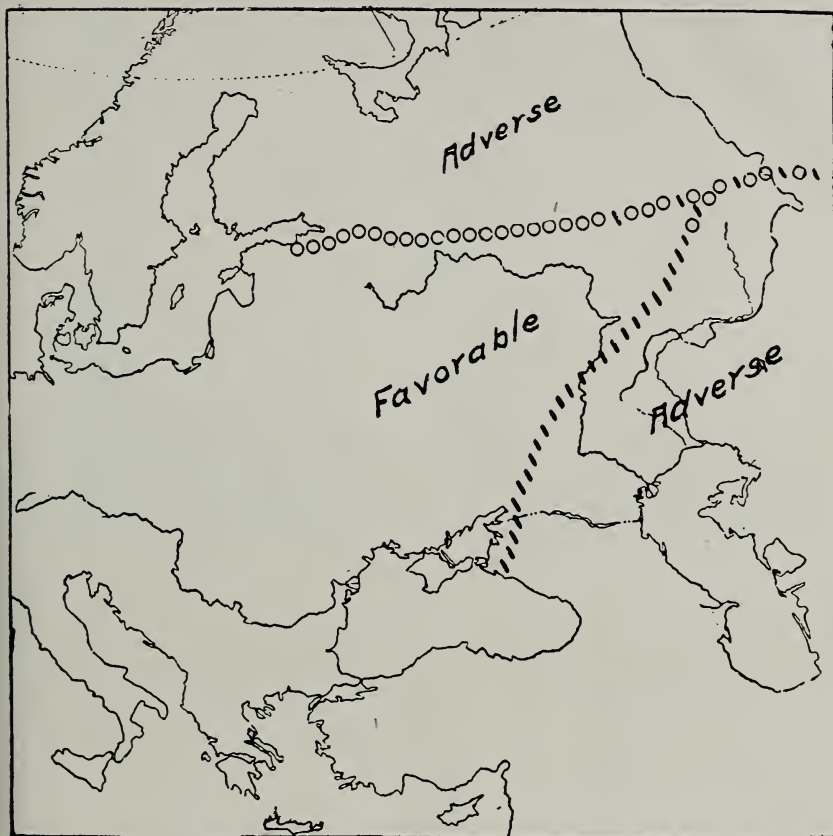
Fig. 2.—The principal boundaries of the agricultural region of Europe. The small circles mark temperature limits and the dashes rainfall limits.

characteristic of semidesert regions. Within the favorable region one finds most of the broad-leaved forests and good growths of temperate grasses.

Figures 4, 5, and 6 illustrate the relative importance of soil, rainfall, and heat in various parts of any great agricultural region. The curved surface of a figure represents the great divisions of substance and the plane surface a few of the greater forces that are important to plants. Man, of course, is actively concerned with only such factors as happen to fall low enough to hinder him in maintaining his
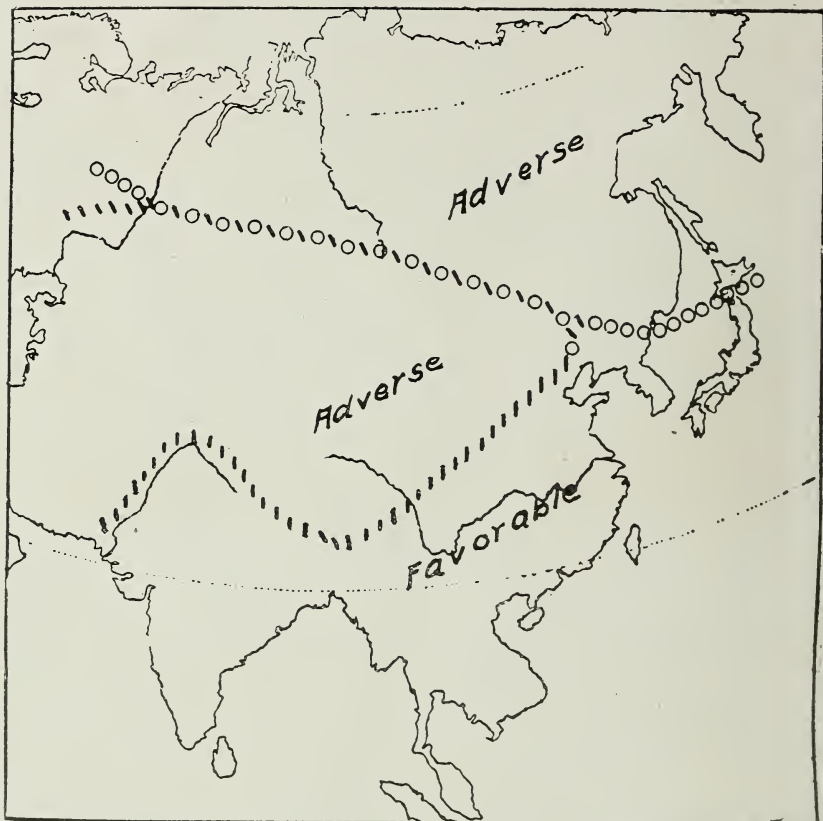
Fig. 3.—The principal boundaries of the agricultural region of Asia. The small circles mark temperature limits and the dashes rainfall limits.

bodily comfort. These figures indicate why it is that farmers living well within favorable regions give a great deal of attention to soil problems, while those in the northern border areas are more interested in cold evasive and cold resistant crops; and again in dry border areas interest turns to problems of irrigation, drought evasion and drought resistance.

Of the people living in North America and Eurasia, 90 to 95 per cent are located within the favorable regions. To the north scarcity of food and the difficulty of maintaining a comfortable bodily temperature act as checks to immigration. Along low rainfall boundaries the principal check is the
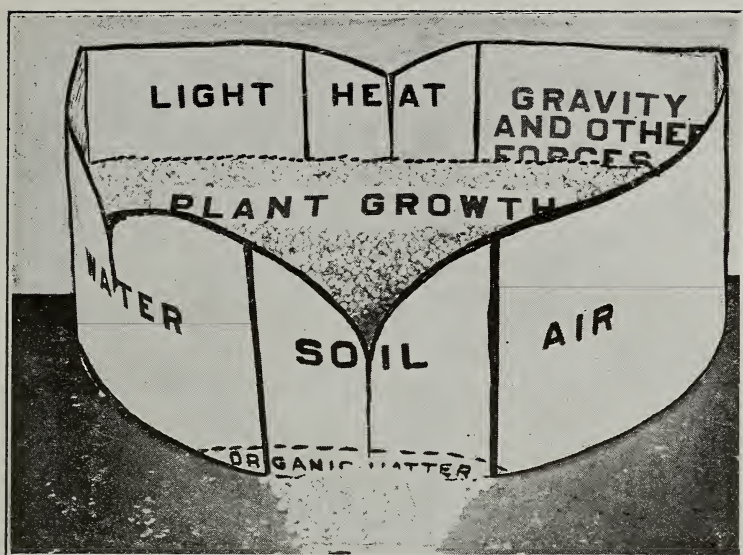
Fig. 4.—Soil the limiting factor within favorable agricultural regions.

the difficulty of obtaining food. It may be added in connection with these statements that our inability to control bodily temperature is one of the chief hindrances to a successful intensive tropical agriculture.

From the foregoing discussion it can easily be seen that Nebraska data will bear heavily upon moisture problems such as are common to areas near the center of the Great Plains. Altitude in the extreme western part of the State adds to what would otherwise be a short scale in heat differences. As concerns soil, there is almost a complete scale in both texture and topography.

## THE EFFECT OF HEAT UPON THE ACREAGE OF CROPS TREATED AS ANNUALS*

### A CLASSIFICATION OF FIELD CROPS

Most field crops can be classified as either annuals, biennials, or perennials. In field practice biennial crops have no

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*For a number of the ideas presented in this division of the bulletin the author is indebted to Professor E. Hopt, formerly in charge of Field Crops instruction in the College of Agriculture, University of Nebraska.
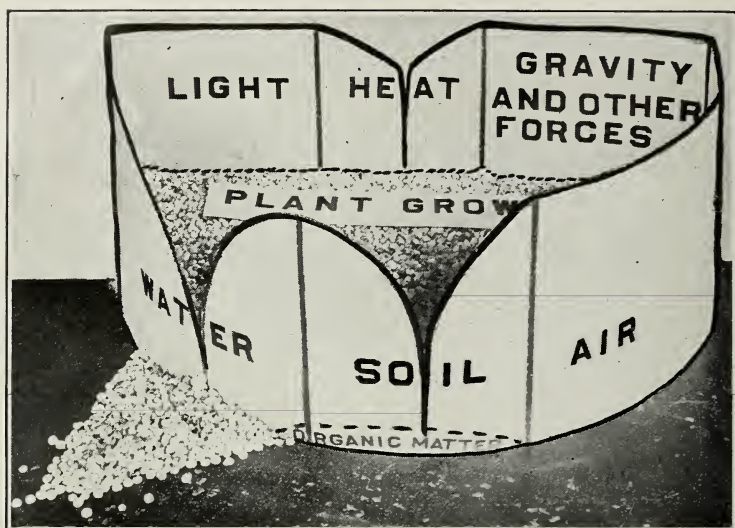
Fig. 5.—Water the limiting factor in border regions determined by rainfall.

well-defined place of their own. In some cases they are treated as annuals and in other cases as perennials. This being the case, one is justified in saying that, in general, there are but two large divisions of field crops, one division treated as annuals and the other as perennials.

Crops treated as annuals divide into three groups commonly spoken of as fall or winter annuals, spring annuals, and summer annuals. Winter annuals are usually seeded in the fall, live thru the winter, bear fruit and die the following summer. Spring annuals are seeded either in the late winter or during the spring and are harvested in the summer or early fall. Summer annuals are planted either in the late spring or early summer and are harvested during the fall and early winter.

This part of the bulletin deals principally with the acreage of the various field crops listed in the census that are treated as cultivated annuals. It appears that the variation in the acreage of the three groups of crops belonging to this division affords one of the best possible measures of the effect
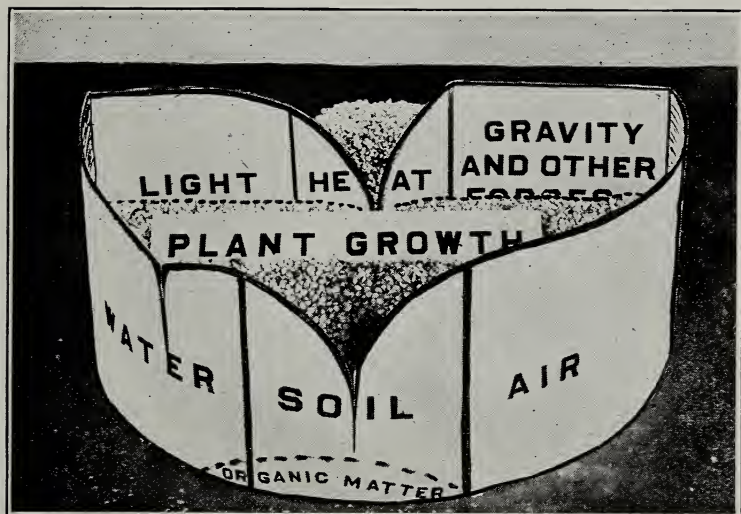
Fig. 6.—Heat the limiting factor in border regions determined by low temperature.

of heat upon farming. The crops treated as annuals are present in nearly every county in the United States and usually occupy the greater part of the cultivated land. These points are very essential where large-scale measurements are to be made.

While it is true that the acreage of cultivated crops treated as perennials is affected by heat it is also true that the effect of heat upon the acreage of perennials is often outweighed by rainfall, soil, and economic conditions. This together with the fact that cultivated perennials are scarcely represented in a large number of counties in the United States makes them almost useless in the measurement of what are more purely heat effects.

The census makes no attempt to keep winter, spring, and summer annuals separated from one another. This grouping of crops in the census made it necessary in some cases to use estimates, and in other cases supplementary data. The following outline will give an idea of how the census material was treated before beginning the study of heat in its relation

to farming. There may be a number of serious and valid objections to the classification of certain crops in the spring and summer annual groups. The outline simply shows the order in which the census material was organized for this particular study.

A.  Cultivated crops treated as annuals.
    1.  Winter annuals. (Cold tolerant but heat sensitive.)
        a.  Winter wheat (supplementary data used).
        b.  Rye. (The acreage of rye given in the census was treated as winter rather than spring. This of course causes error in counties growing spring rye, but this error is seldom sufficient to affect materially any broad classification of farming regions.)
    2.  Spring annuals, together with such summer annuals as are favored by cool weather and have a relatively short growing season. (Cold tolerant but heat sensitive.)
        a.  Spring wheat (supplementary data used).
        b.  Oats. (The acreage of oats given in the census was treated as spring. If the 1909 acreage of winter oats per county had been available, the southern border of the summer-winter type of annual cropping could have been mapped more accurately. See page 18.)
        c.  Barley. (The acreage of barley given in the census was treated as spring.)
        d.  Emmer and speltz.
        e.  Flax.
        f.  Potatoes.
        g.  Grains cut green. (This acreage could not be used, as it contained both winter and spring grains.)
        h.  Peas. (The acreage in the Northern States was classed here . In the Middle States, where the acreage is very small, peas were omitted.)
        i.  Buckwheat.

3. Summer annuals such as are favored by warm or hot summers. (Length of season required had considerable weight in placing a few of the crops in this group.)
   - a. Corn.
   - b. Kafir corn and milo.
   - c. Sugar cane.
   - d. Sorghum cane.
   - e. Broom corn.
   - f. Millet and Hungarian grasses.
   - g. Coarse forage. (The acreage of coarse forage according to the census schedule is made up almost wholly of summer annuals.)
   - h. Cotton.
   - i. Tobacco.
   - j. Rice.
   - k. Beans.
   - l. Peas. (The acreage given in the more southern states was classed as summer.)
   - m. Peanuts.
   - n. Hemp.
   - o. Sweet potatoes and yams.

B. Crops treated as perennials. (This division is not used in studying the effect of heat upon farming.)
   1. Cultivated crops.
      - a. Clover alone.
      - b. Timothy alone.
      - c. Timothy and clover mixed.
      - d. Alfalfa.
      - e. Other tame and cultivated grasses.
      - f. Hop. (This acreage was used only in cases where the cultivated area was desired.)
   2. Crops not cultivated.
      - a. Wild, salt, and prairie grasses.

### THE SIX PRINCIPAL TYPES OF ANNUAL CROPPING

Three things, mathematically speaking, have but six possible arrangements; so it is with the three groups of field crops

classed under the head of "cultivated crops treated as annuals." In certain regions conditions are such that winter annuals occupy the greatest part of the acreage given to annuals. In other regions the acreage of spring annuals or the acreage of summer annuals may occupy first place. Each of the regions thus determined can again be subdivided. For example, in a region where the acreage of winter annuals stands first, it may be that in some parts summer annuals stand second and in other parts spring annuals occupy that place. Thus from the six possible arrangements we derive the six types of cropping. The subdivision of these six principal types could be carried even further by determining the relative standing of particular crops within their respective groups. In this bulletin, however, very little use is made of the minute divisions that are possible.

TABLE 1.—*The six principal types of annual cropping.*

| Place according to acreage | Spring-summer type | Spring-winter type | Summer-spring type | Summer-winter type | Winter-spring type | Winter-summer type |
|---|---|---|---|---|---|---|
| 1st | Spring | Spring | Summer | Summer | Winter | Winter |
| 2nd | Summer | Winter | Spring | Winter | Spring | Summer |
| 3rd | Winter | Summer | Winter | Spring | Summer | Spring |

Table 1 describes and names the six principal types of annual cropping. It will be observed that the name of a type is determined by the relative standing of its two most important groups of annuals. A sample problem will serve to explain the method of determining and mapping these types. According to the Thirteenth Census of the United States the 1909 acreage of various crops treated as annuals in Fillmore county, Nebraska, was as follows:

| Crops | Acres |
|---|---|
| Corn | 119,007 |
| Oats | 36,443 |
| Wheat | 85,893 |
| Emmer and Speltz | 344 |
| Barley | 88 |
| Buckwheat | 2 |
| Rye | 40 |

| | |
|---|---|
| Kafir corn and milo maize | 12 |
| Dry edible beans | 0 |
| Flax | 10 |
| Millet and Hungarian grasses | 222 |
| Grains cut green | 27 |
| Coarse forage | 309 |
| Potatoes | 957 |
| Sugar beets | 0 |
| Cane, sorghum | 7 |

These acreages were treated and grouped as follow:

| WINTER | | SPRING | | SUMMER | |
|---|---|---|---|---|---|
| Winter wheat | 85,739 | Spring wheat | *154 | Corn | 119,007 |
| Rye | 40 | Oats | 36,443 | Kafir | 12 |
| | | Emmer and speltz | 344 | Millet | 222 |
| | | Barley | 88 | Coarse forage | 309 |
| | | Flax | 10 | Cane | 7 |
| | | Potatoes | 957 | | |
| | | Buckwheat | 2 | | |
| Winter acreage | 85,779 | Spring acreage | 37,998 | Summer acreage | 119,557 |

| | | |
|---|---|---|
| Winter acreage | 85,779 | or 35.2% |
| Spring acreage | 37,998 | or 15.6% |
| Summer acreage | 119,557 | or 49.2% |

243,334 or 100.0%

Since the summer group stands first and the winter group second in order of importance, the annual cropping system of Fillmore county, Nebraska, in 1909 belonged to the summer-winter type.

### CROP BOUNDARIES

The map on page 18 (Fig. 7) shows the approximate boundaries of the six types of annual cropping as they existed in the crop year 1909. The heart of the Corn Belt is made up of the summer-spring and summer-winter types. To the north of the Corn Belt and along the Pacific coast the dominant type is spring-summer. Most of the Rocky Mountain region and some of the cooler parts of the Great Lakes region belong to the spring-winter type. The two remaining types

*The acreage of spring wheat was taken from the Nebraska Agricultural year book (crop year 1909) and subtracted from the total acreage of wheat reported in the census. The remaining acreage was classed as winter wheat.
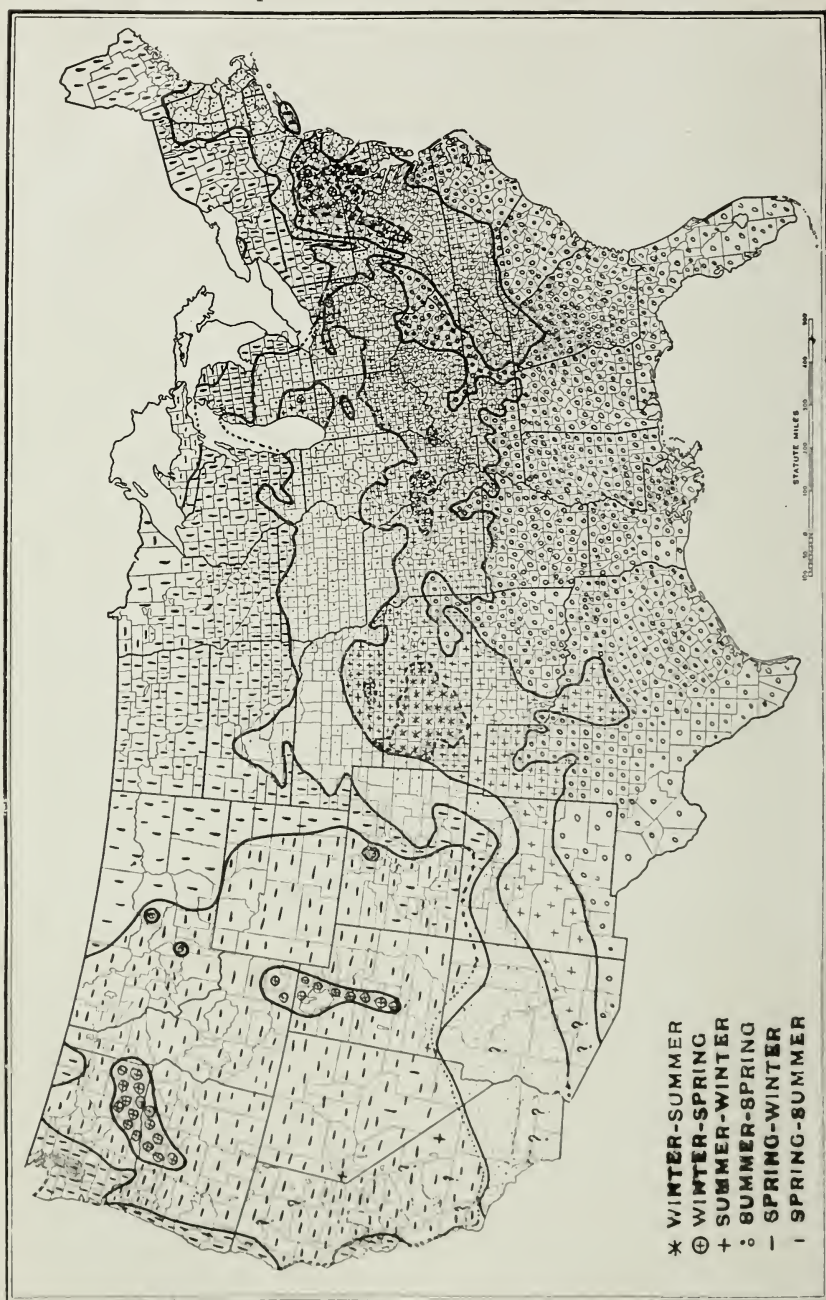
Fig. 7.—The approximate boundaries of the six principal types of annual cropping in the United States. (Crop year, 1909.)

occupy relatively small areas within those already mentioned. The winter-summer type develops at certain points within the summer-winter areas. The largest developments of this type are in western Kansas and southeastern Pennsylvania. The winter-spring type may develop in either the spring-winter or the winter-summer areas. Its most accurately defined area covers a part of southeastern Washington and north-central Oregon. This type is also indicated on the map as occurring in Idaho, Utah, Montana, Colorado, Michigan, Ohio, and Pennsylvania. In as far as was possible to determine, the southern states belong largely in the summer-spring type of cropping. Tho the name of the southern type of annual cropping is the same as that applied to the cropping in the northern part of the Corn Belt, the two regions are very different when one comes to compare the per cent of annuals falling in the summer group. In the southern states the summer group commonly occupies from 85 to 90 per cent of the acreage of land given to crops treated as annuals, while in the northern part of the Corn Belt this group occupies only 50 to 60 per cent of such acreage. If the above measurements are true the cropping in the northern half of the Corn Belt and the cropping in the southern states may be looked upon as examples of two divisions of the summer-spring sype.

CROSS-SECTIONAL VIEWS OF VARIOUS TYPES OF ANNUAL CROPPING

The cross-sectional views (Figs. 8 and 9) drawn from data entering into the map on page 18 make it possible to study the relationship of one type to another. Figure 8 is a cross-sectional view along a line extending from southern Arkansas to the extreme northern part of Michigan. The per cent of the acreage of annuals given to the winter group is extremely low along the line in Arkansas; but by the time one reaches St. Louis County in Missouri, the winter group has come to occupy over 50 per cent of the land in annuals. To the north of this county, winter annuals drop out rapidly. If the acreage of spring rye does not have too great an influence, one can say that there is a tendency for winter an-

nuals to increase slightly while crossing Wisconsin and northern Michigan.

Beginning at the southern end of the line in Arkansas the summer group of annuals stands over 85 per cent as far north as Ripley County in Missouri. North of this point summer annuals drop out rapidly until they finally stand at almost zero in Kewaunee County, Michigan. It will be observed that along this line, from southern Arkansas to northern Michigan, it is the summer rather than the spring annual group that gives way to winter annuals.

The most striking thing to be observed concerning the spring annual group is that its rate of increase to the north is comparatively steady. In all cross-sectional studies thus far made, the rate of change for the spring annual group has been more uniform than that of the other groups.

The vertical crayon-like lines in the graph (Fig. 8) mark the boundaries between types. These occur wherever two heavy solid lines cross one another. Named in order from south to north the types are as follows: summer-spring, summer-winter, winter-summer, summer-winter, summer-spring, spring-summer, and spring-winter.

The cross-sectional view of types in southeastern Washington and north-central Oregon (Fig. 9) gives the relation existing between the spring-summer, spring-winter, and winter-spring types. At the southern end of the line, which is in Baker County, Oregon, winter annuals stand at about 16 per cent. In north-central Oregon, some eighty miles to the northwest along this line, winter annuals come to occupy over 80 per cent of the acreage. Continuing northwest, winter annuals drop out rapidly until they reach almost zero in Snohomish County, Washington. Spring annuals, it will be seen, vary inversely as the winter annuals, for the summer annual group thruout this cross-section stands so low that it has almost no effect. This is particularly true where winter annuals occupy first place.

The broken lines crossing the graphs (Figs. 8 and 9) serve as an index to the quantity of heat above freezing that is nor-
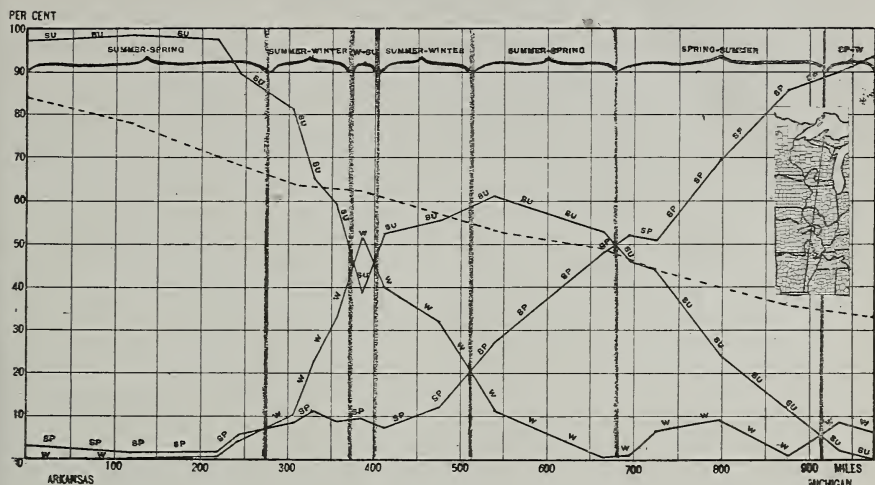
Fig. 8.—A cross-sectional view of annual cropping along a line extending from southern Arkansas to the extreme northern part of Michigan. (See key map placed on the right-hand side of the graph.)

mally received during the year. To reduce the quantity of heat from degrees to per cent, 450 month-degrees above freezing was used as a base. This quantity of heat is found in only the warmest parts of the United States.

### MONTH-DEGREES ABOVE FREEZING

Figure 11 will show where this quantity of heat (450 month-degrees above freezing) is found in southern Texas. To calculate a similar figure for any given Weather Bureau station, it is only necessary to determine the total of the normal mean temperature of the months above freezing and subtract from the sum as many thirty-twos as there are months having a normal mean temperature above freezing.* This gives what is spoken of here as month-degrees above freezing or, in brief, simply month-degrees. Thirty-two degrees is used as the lower limit because it marks a point below

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*Sample problem:—Calculation of the month-degrees at the University Farm, Lincoln, Nebraska.
Normal mean temperature: Jan., 24.9; Feb., 25.3; March, 41.6; April, 52.7; May, 62.3; June, 71.1; July, 76.0; August, 75.0; Sept., 67.4; Oct., 55.0; Nov. 40.6; Dec., 28.1.
(41.6+52.7+62.3+71.1 +76.0+75.0+67.4 +55.0+40.6) — (9x32) = 253.7 month-degrees above freezing.
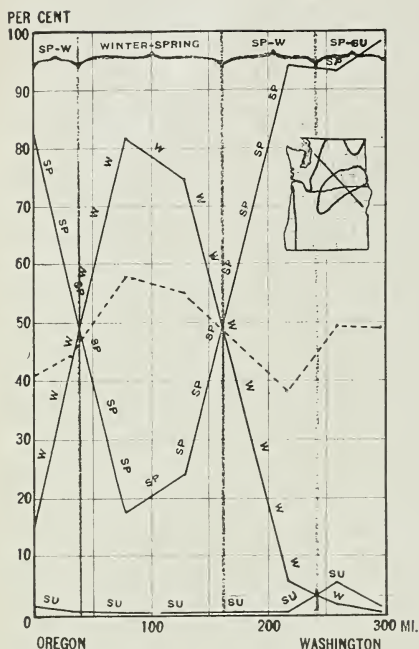
Fig. 9.—A cross-sectional view of annual cropping along a line extending from northeastern Oregon to northwestern Washington. (See key map placed in the upper right-hand corner of the graph.)
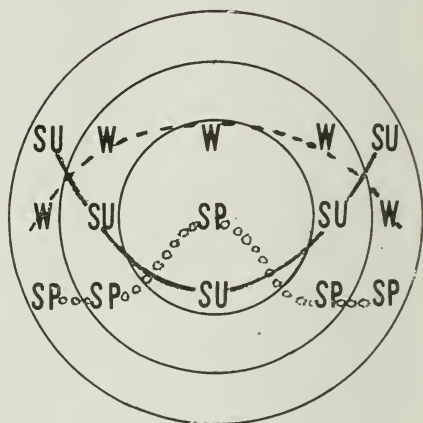
Fig. 10.—A diagram of the occurrence of the winter-spring type of annual cropping within the winter-summer and summer-winter types.

which the growth of agricultural plants almost ceases. Some persons prefer 36° F. or even 40° F. as a lower limit. There can, however, be no good reason for choosing an arbitrary point so long as 32° F. is less questionable and better known.

### BOUNDARY LINES DETERMINED LARGELY BY HEAT

The lines separating one type of annual cropping from another (Fig. 7) are to a large extent determined by heat. The boundary between the spring-summer and summer-spring types east of the Rockies follows in general the line of 200 month-degrees. (See Figs. 7 and 12.) West of the Rockies the boundary between these two types of cropping could not be accurately determined. The boundary line that is shown on the map (Fig. 7) appears to bear no relation to the line of
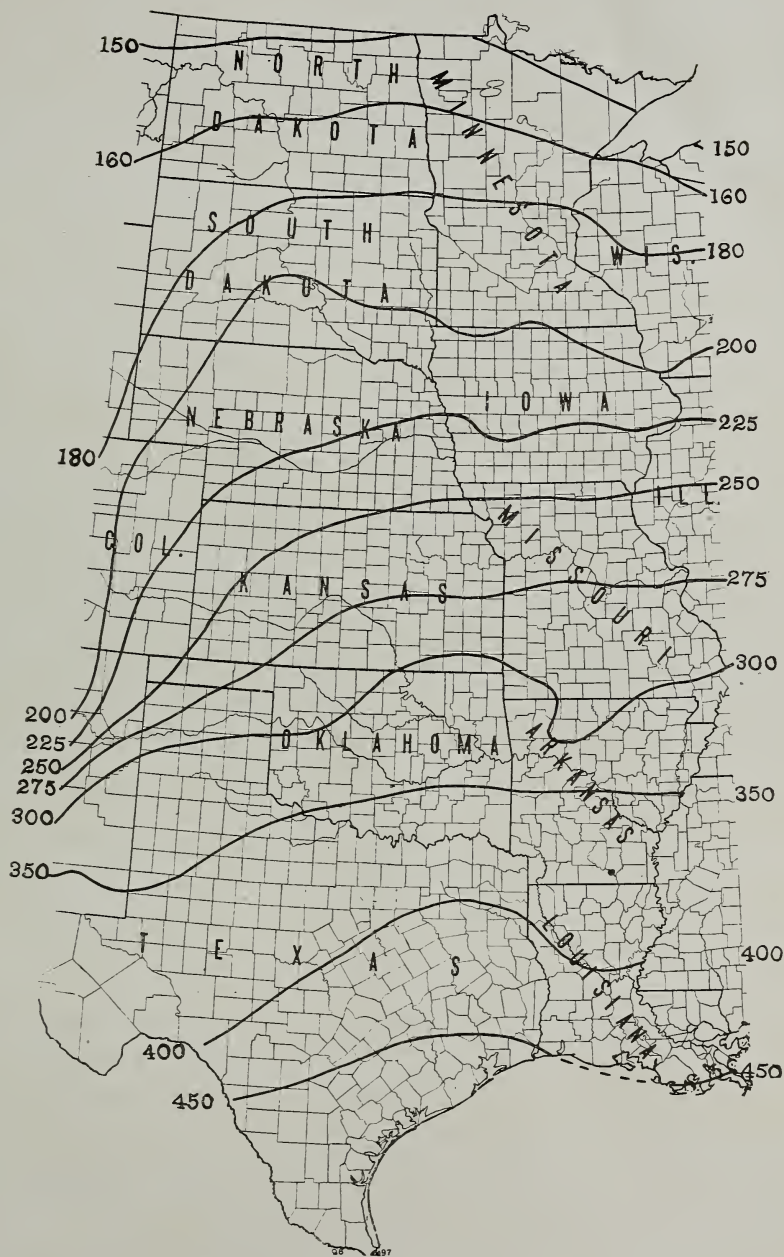
Fig. 11.—Month-degrees above freezing.

Fig. 12.—The line of 200 month-degrees above freezing marks very closely the boundary between the spring-summer and summer-spring types of annual cropping east of the Rockies.

200 month-degrees west of the Rockies.    Question marks appear on the map at points where the classification was most difficult and inaccurate.    To classify this part of the United States one would need in some cases to use township or precinct data in the place of county data.    Furthermore the acreage of winter annuals would need to be more carefully separated from the acreage of spring annuals.

The boundaries of the summer-winter and winter-spring types are in close harmony with certain quantities of winter wheat.    The center of the summer-winter and winter-spring types are usually found close to the line where winter heat measures zero month-degrees. (See Fig. 13.)    Each of the winter-annual areas in 1909 occupied areas where the winter heat measured not less than —25 month-degrees.    While the northern limit was closely marked by —25, the southern limit was almost as closely marked by +25 month-degrees of winter heat.    (It will be observed that crop boundaries and heat lines are again found to be most at variance with one another in the southwestern part of the United States.)

Since in the summer-winter and winter-spring regions winter annuals are more or less active from September 1st to
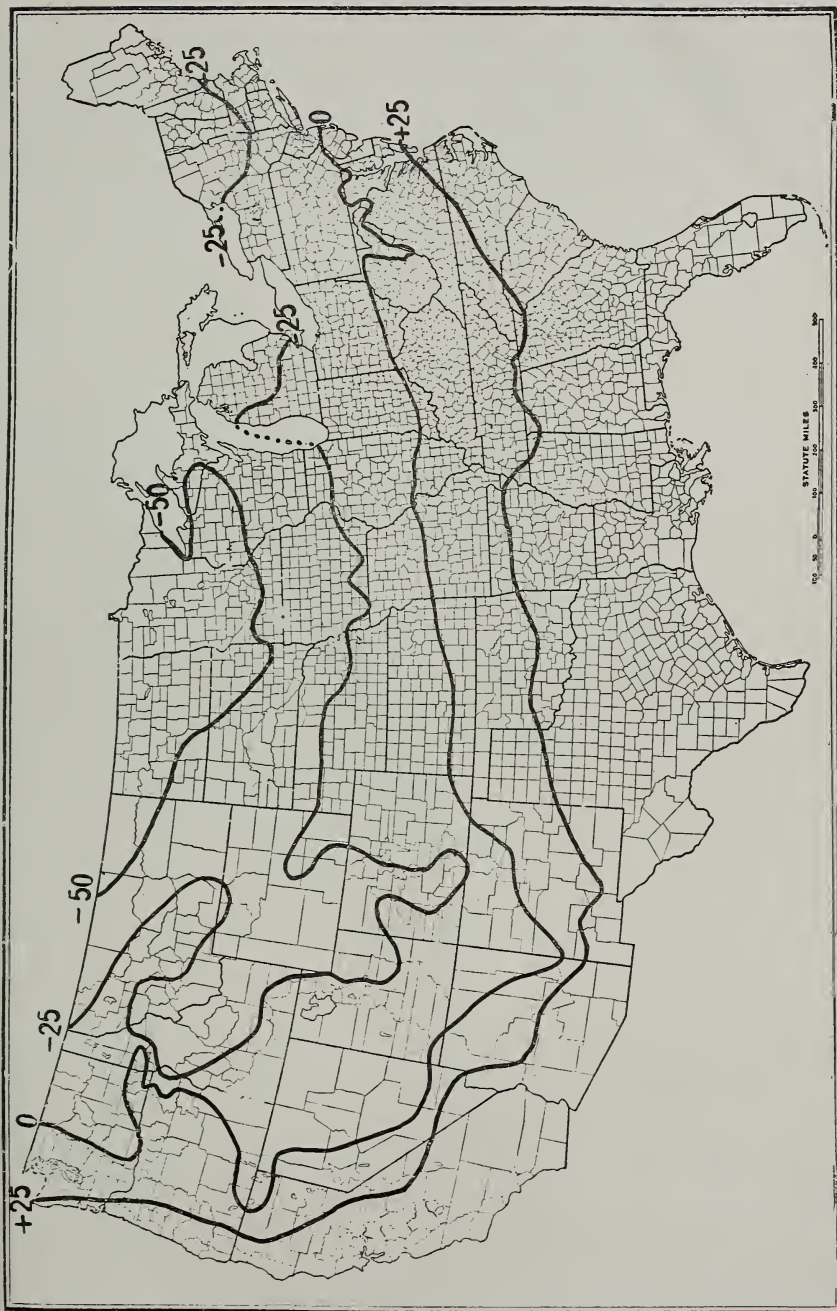
Fig. 13.—Month-degrees above freezing received during December, January, and February.

July 1st the quantity of heat above freezing has also been determined for this period. Figure 14 defines the boundaries of a belt of country in the United States which receives from 150 to 230 month-degrees above freezing between September 1st and July 1st. The small circles placed to the north of this belt mark certain points that receive during the winter annual season not less than 138 month-degrees. Only a few winter annual areas will be found to the north of these points.

### THE EFFECT OF FACTORS OTHER THAN HEAT

Tho heat has the greatest effect upon the boundaries of crop types, rainfall, soil, and economic conditions can have a marked influence. A few examples will suffice to illustrate how heat alone will not fully account for the position of certain crop boundaries. Thus the area of winter-summer cropping in western Kansas is determined to a large extent by July and August droughts that are accompanied by extreme heat. Winter wheat in this area escapes the hot droughty period more often than corn and other summer annuals. If it were not for this fact this area would without much doubt drop back to the summer-winter type. The factors just mentioned also influenced the development of the small island of winter-summer cropping in south-central Nebraska, but here extremely level land was also a factor. This type would, in all probability, not have appeared at this point in 1909 had the land been hilly.

The position of boundary lines in a given year throws some light on the economic question of profits derived from certain crops. As an illustration, the boundary line drawn around the winter-summer type in western Kansas must define an area within which, according to the experience of farmers, an acre of winter annuals had been paying better than an acre of summer annuals. When one stops to consider that in this area winter wheat is about the only winter annual and corn is the leading summer annual, it is not far wrong to assume that here an acre of winter wheat previous to 1909 had been paying
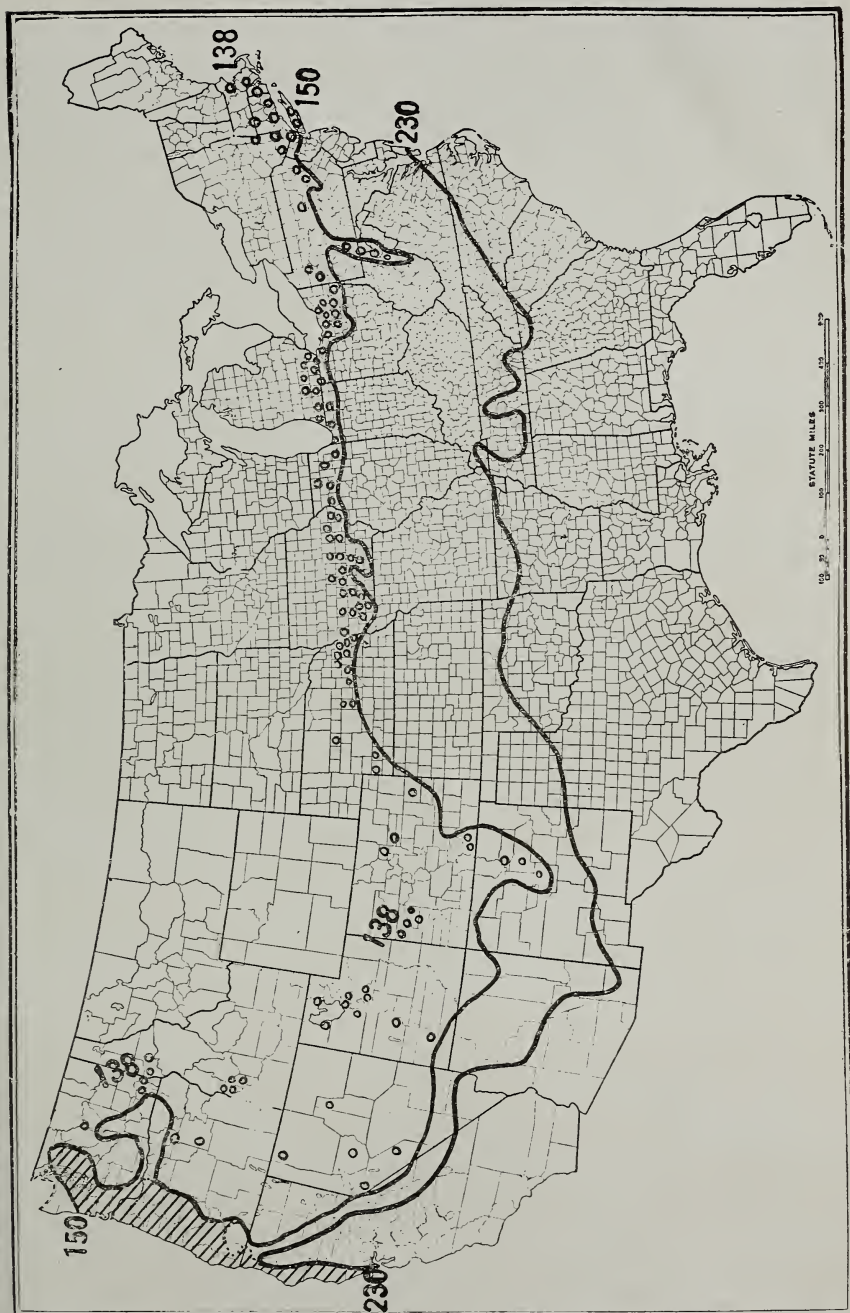
Fig. 14.—Month-degrees above freezing received between September 1st and July 1st. The small circles mark points that receive during this period not less than 138 month-degrees above freezing. The barred part of the belt on the Pacific coast indicates very cool summers, i.e., summers measuring less than 100 month-degrees above freezing.

better than an acre of corn.  If it were not for the fact that an acreage of one group of annuals sometimes of necessity carries with it a certain acreage of another group, this line of reasoning could, without much modification, be applied to all type boundary lines.  For example, it would be only approximately correct to state that in changing from a corn and oat region to a corn and wheat region the boundary line between the two marked the point at which the profits from an acre of winter wheat began to exceed those from an acre of oats.  It would be more nearly correct to say that the boundary line marked the point at which the profits from a given acreage of corn and wheat began to exceed the profits from a given acreage of corn and oats.

## SIZE OF FARM IN RELATION TO RAINFALL AND OTHER FACTORS IN THE GREAT PLAINS

### DEFINITION OF THE TERM FARM

A farm, generally speaking, is the area of land from which a family derives a living thru such operations as cultivating crops, cutting wild hay, pasturing native grasses, and feeding live stock.  Broadly construed, this definition makes it possible for a single farm to include owned land, leased land, and "free range."  If the area of free range were to be excluded, the use of the term farm in this bulletin would be similar to its use in the Thirteenth Census.

Two extracts from the instructions for the general agricultural schedule (1910) will serve to illustrate the census use of the word farm.

> *Farm.*  A "farm," for census purposes—that is, for which a general farm schedule should be obtained—is all the land which is directly farmed by a single person, managing and conducting agricultural operations, either by his own labor alone or with the assistance of members of his household or of hired employees.  The term "agricultural operations" is here used as a general term referring to the work of growing crops, producing other agricultural products, and raising animals, fowls, and bees.  A farm as thus defined may consist of a single tract of land or a number of separate and distinct tracts

situated in the same or in different enumeration districts, and may be held under different tenures, as where one tract is owned by the farmer and another tract leased by him.

For example, if A B operates or cultivates under his personal management one tract of 60 acres in one place and another tract of 30 acres in another place, these two separate tracts constitute one farm of 90 acres. But if A B owns 90 acres of land in one tract but cultivates under his personal management only 60 acres of such tract and leases the other 30 acres to another person, C D, the farm of A B consists of but 60 acres—that is, the number of acres actually farmed or operated by him, the remaining 30 acres constituting the farm, or part of the farm, of C D. Or, again, if A B owns 90 acres of land which he ordinarily considers as "his farm," but leases 30 acres from C D, then the farm of A B consists of 120 acres—that is, the total number of acres actually farmed by him.

*Ranches using public lands.* The farm of ranchmen using the public domain includes only the land which he owns or leases. If he leases public land or any other land, such land is a part of his farm. But his farm does not include any public land for which he pays no rental or upon which live stock are grazed at a fixed charge per head. Across the head of schedules for farms and ranches using public lands for grazing live stock write RANGE in large letters. In cases where cattle are grazed wholly upon the public domain and the owner of the animals does not own or lease any land, fill out a schedule for the owner the same as for any ordinary farm operator, omitting answers, however, to Inquiries 10 to 15 and writing in answer to Inquiry 6 the words "No land owned or leased."

When we include from a farm public land for which a farmer "pays no rental or upon which live stock are grazed at a fixed charge per head" we decrease, to that extent, the area of land from which he derives a living and his farm cannot be directly compared with one having no free range.

METHOD OF CALCULATING THE SIZE OF FARM IN THE GREAT PLAINS REGION

For western Nebraska the Thirteenth Census reports that less than two-thirds of the total area of land was oc-

cupied by farms. Field studies at many points in that part
of the State lead one to believe that the people living there in
1909 would have been seriously handicapped in making a
living had even the poorest one-third of the total land area
been wholly excluded from agricultural use. A farm manage-
ment survey made in Kimball County in 1915 indicated that
the size of farm in the county was nearer two sections of land
than one section as reported in the census. In all probability
the number of farms in Kimball County had increased since
1909, and so it can hardly be true that a farm at that time
consisted of only one section of land. It was also observed
during this survey that the area of pasture land not grazed
over at some time during the year was almost negligible.

Table 2 compares the average size of farms taken at
random in Farm Management surveys with census figures.
In most cases the average size of farm secured thru surveys
(1914-1916) is more in harmony with the result obtained by
dividing the total land area of the county by the number of
farms it contained in 1909, than with the size of farm given
in the census. If the survey figures can be relied upon, it
is safe to state that practically the entire area of land is made
to contribute in one way or another to the living of farmers
located upon it. It is a commonly known fact that nearly every
western area had, at some time previous to the last census,

TABLE 2.—*The size of farm calculated from Nebraska Farm
Management surveys compared with census figures.*

| County in which records were taken | Farm Management surveys | | | Census figures | |
|---|---|---|---|---|---|
| | Number of records | Crop year | Average size of farms taken at random in field surveys | Total area of the county divided by the number (1909) | Size of farm as given in the census (1909) |
| Western counties | | | | | |
| Kimball | 36 | 1916 | 1069 A | 1491 A | 644 A |
| Box Butte | 55 | 1914 | 967 | 1171 | 931 |
| Dawes | 45 | 1915 | 1143 | 1118 | 698 |
| Thomas | 67 | 1915 | 1369 | 1723 | 778 |
| Eastern counties | | | | | |
| Phelps | 66 | 1915 | 241 | 233 | 225 |
| Seward | 63 | 1915 | 216 | 169 | 163 |
| Thurston | 50 | 1915 | 220 | 227 | 169 |
| Madison | 62 | 1915 | 228 | 207 | 197 |

seen ranchers strongly opposed to increasing the number of farms. Even in those times they must have felt that, to make a living under such economic conditions as they were experiencing, it was necessary to use practically all of the land.

The first calculations of the size of farm per county in this State were based upon the assumption that only a very small part of a county was not being used by the people farming there. An attempt was made to eliminate from the total acreage of each county (1) the area occupied by the very small farms reported in the census and (2) the area occupied by town lots and railroads. It was soon found (1) that the very small farms could not consistently be separated from the largest farms and (2) that the area of land occupied by towns and railroads combined did not as a rule amount to one per cent of the area of the county. Further studies brought out the fact that the relation between the number of very small farms and the area of land occupied by towns and railroads was such that one always tended to offset the effect of the other when the total area of the county was divided by the total number of farms. Figures bearing upon the size of farm in the vicinity of Omaha will illustrate this tendency of very small farms to offset even a large area of land in town lots and railroads. According to the order followed in the first method of study, it was estimated that Douglas county, in which Omaha is located, had 29,560 acres of land occupied by towns, railroads, and very small farms. The remaining area of Douglas county was then divided by the number of larger farms. This gave 168 acres per farm. Following the order of the second method the total area of the county was simply divided by the total number of farms. This gave 123 acres per farm. As a check on these figures a field study (1917) was made in Papillion precinct in Sarpy county some seven miles southwest of the South Omaha market. The area covered was 18,880 acres. The average size of farm here proved to be 126 acres. Judging from this study and also from field observations in practically all precincts in Douglas county, the second method of calculating the size of farm gives

a more accurate idea of open farming country than the first. Another very important point in favor of the second method is its freedom from any arbitrary rulings concerning very small farms.

When the total area of the county is used, it gives a stable basis from which to measure any change in the average size of farm brought about thru either an increase or a decrease in the number of farms. Table 3 illustrates the importance of this fact. In the first column of the table are found the names of the type areas in Nebraska and also the

TABLE 3.—*The size of farm as affected by the number of farms within a given area.*

| Nebraska type areas. The figures indicate the total acreage of counties chosen to represent a type area. | Number of all farms in 1900 | Number of all farms in 1910 | Total area divided by total number of farms | | Size of farm given in census | |
|---|---|---|---|---|---|---|
| | | | 1900 | 1910 | 1900 | 1910 |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| 2,314,240 acres used | 14,520 | 13,521 | 159 | 171 | 155 | 164 |
| Cass type area | — | | | + | | |
| Thayer | — | | | + | | + |
| 5.959,680 ................ | 34,657 | 32.323 | 172 | 184 | 169 | 178 |
| Wayne | | + | | — | | — |
| 4,747,987 ................ | 20,254 | 20,743 | 234 | 229 | 232 | 213 |
| Buffalo | | + | | — | | — |
| 2,542,720 ................ | 9,083 | 9,777 | 280 | 260 | 263 | 240 |
| Harlan | — | | | + | | + |
| 5,521,280 ................ | 20,361 | 19,839 | 271 | 278 | 250 | 264 |
| Custer | | + | | — | | — |
| 2,829,440 ................ | 6,939 | 8,194 | 408 | 345 | 321 | 316 |
| Boyd | | + | | — | | + |
| 2,369,920 ................ | 3,764 | 4,007 | 629 | 591 | 329 | 549 |
| Hitchcock | | + | | — | | + |
| 3,091,840 ................ | 3,619 | 4.588 | 855 | 674 | 514 | 531 |
| Chase | | + | | — | | + |
| 4.231,040 ................ | 2,545 | 5,093 | 1,662 | 831 | 473 | 592 |
| E. Sand Hills | | + | | — | | + |
| 2.994,560 ................ | 2,016 | 3,486 | 1,486 | 859 | 439 | 629 |
| High Plains | | + | | — | | + |
| 4.753,280 ................ | 2,654 | 4.203 | 1,789 | 1,129 | 709 | 746 |
| W. Sand Hills | | + | | — | | + |
| 5,818,240 ................ | 1,334 | 3,266 | 4,359 | 1,781 | 661 | 859 |

total area of the counties used in determining the average size of farm. The second column contains the number of all farms in 1900 that were located within the area of land indicated

in the first column of the table. The third shows the number
of all farms within this same area of land in 1910. Columns
4 and 5 of the table give the calculated average size of farm
for 1900 and 1910 respectively, while columns 6 and 7 give the
average size of farm as recorded in the census. It will be ob-
served that where the number of farms in 1910 shows an in-
crease over 1900, the average size of farm recorded in the
census decreases in eastern areas and increases in western
areas. For example, in 1900 some five million acres of land in
the western Sand Hills held 1,334 farms. Ten years later
the number of farms on this area of land had increased to
3,266. The total area of land divided by the number of farms
gives 4,359 acres per farm in 1900 and 1,781 acres in 1910.
From the standpoint of the average area of land required to
make a family living in those years, the figures are not far out
of line with the experience of thrifty ranchers and farmers
living there. Regardless of the fact that the number of farms
in the western Sand Hills more than doubled between 1900 and
1910, the census records a 30 per cent increase in the size of
farm. This increase in size would not appear if all land
grazed had been included in farm.

It is seldom that large areas of grass land in the Great
Plains are so completely withheld from farm use as to reduce
agricultural practices to zero. Where land is partly withheld
farmers and ranchers simply practice more extensive methods
of farming than the other factors in the region would actually
require. What is here said of grass lands will not apply to
the timber lands found in northern Minnesota and Wisconsin.
In this area, part of the land is used by lumber companies and
cannot be classed as land in farms. The fact that much of this
heavy timber must be cleared before the land can have any
farm use makes it relatively easy to hold large tracts of
timber from agricultural use. From these facts it can readily
be inferred that in a timber region the area of a county di-
vided by the number of farms contained cannot give a true
index to the average size of farm. Tho size-of-farm lines, so
determined, have been drawn across northern Minnesota and
Wisconsin, they are of value only when compared with the

acres per person. A study of figures 24, 25, 26, and 27 in comparison with figures 28, 29, 30, and 31 will bring out the fact that the land in northern Minnesota and Wisconsin furnishesa living for more than is indicated by the size-of-farm lines. It will be observed that ordinarily in a grass-covered region the 1280-acre lines are found very close to the lines indicating 200 acres per person (total population). The 1280-acre lines drawn across the timber region would probably cross about as far north as the lines indicating 200 acres per person if it were possible to reduce lumbering to a farm basis.

A summary of the above discussion will bring out more clearly the chief considerations that led to basing size-of-farm studies in the Great Plains on simply the area of a county divided by the number of farms contained. (1) When a farm is defined as the area of land from which a family derives a living thru such operations as cultivating crops, cutting wild hay, pasturing native grasses, and feeding live stock, nearly all of the land in the Great Plains can be looked upon as farm land. (2) The area occupied by town lots and railroads tends to be offset by the number of very small farms. (3) The total area of the county gives a stable basis from which to measure any changes in the average size of farm due to a change in the number of farms.

### METHOD OF MAPPING THE DATA

From county data contained in the census the size of farm has been determined for each county (counties in Oklahoma excepted*) in the Great Plains region and certain bordering areas to the east. The data includes census reports as far back as 1880. Maps drawn after the plan of those commonly used by the Weather Bureau are here used to summarize the size-of-farm data. This method of mapping makes it a simple matter to compare the trend of any given size-of-farm line with the trend of precipitation lines.

*Since Oklahoma did not develop in harmony with the other states in this region, it is here omitted.

## THE WESTERN EDGE OF 160-ACRE FARMING

In 1880 the 160-acre farm was common as far west as northwestern Missouri, central Iowa, and southwestern Wisconsin. A study of figure 19 will show that the 160-acre lines remained almost stationary in Kansas, Nebraska, and Iowa for a period of thirty years. The great expansion during the period between 1880 and 1910 took place to the west, north, and south of this strip of country. Barring soil effects, the western edge of quarter-section farming follows very closely a normal annual precipitation of from 31 to 32 inches. (See Fig. 18.) In eastern Kansas the 160-acre lines are usually found in counties having from 35 to 40 inches of rainfall. It is here that the "flint hill section" holds the 160-acre lines to the east. In Texas the 160-acre farm advanced much farther south than west. The westward advance against a decreasing rainfall was scarcely greater than that taking place in the states to the north.

## TWO-SECTION FARMING

The principal factors affecting the size of farm in the drier parts of the Great Plains can best be introduced thru a study of the 1,280-acre lines. (See Fig. 23 and also Figs. 24, 25, 26, and 27.) Between 1880 and 1910, two-section farming in South Dakota moved from a country having 24 inches of rainfall to one having but 16 inches. In central Texas during the same period this size of farm occupied the strip of country lying between the 21 and the 26 inch rainfall lines. While 1,280-acre farming in South Dakota advanced thru approximately an 8-inch decrease in rainfall, it advanced thru only about 5 inches in central Texas. The slower advance against rainfall in the south can be attributed largely to two factors, namely, greater evaporation and somewhat slower development of country. Of the factors mentioned, evaporation appears to have the greater influence.

In North Dakota and Texas the 1,280-acre lines make a fairly regular advance during each ten-year interval following 1880. In contrast with these regular movements,

the lines at many points in South Dakota, Nebraska, and Kansas show a number of reactions. This is particularly true of the lines marking the western edge of two-section farming in 1890 and 1900. One of the outstanding features of the 1,280-acre line in 1890 is its marked westward bend into northeastern Colorado. Within this bend homesteading reached one of its highest points. In the late eighties and early nineties, people here occupied a country developed more out of harmony with rainfall and heat than could be found at any point either to the north or to the south. The line drawn for the year 1900 gives at least a partial view of the reaction that followed.* It was most severe in southwestern Nebraska and northwestern Kansas. To the north and south of these areas the reactionary movement gradually disappears.

### SIZE OF FARM IN RELATION TO RAINFALL AND HEAT

The size of farm in 1880 and 1910 was probably more uniformly adjusted to rainfall and heat than it was in either 1890 or 1900. (See Figs. 24, 25, 26, and 27.) Nevertheless, each map in the series just referred to shows a tendency for its lines to converge to the south more rapidly than rainfall. (See Fig. 18.) This convergence is more readily seen when the lines in the eastern quarter of Texas are covered. Figure 15 is a diagram on which the 1910 size-of-farm lines are plotted according to inches of rainfall used as degrees of longitude and month-degrees used as degrees of latitude. The 320-acre line and the lines to the east of it follow approximately the same quantity of rainfall regardless of an increase or decrease in the quantity of heat. To the west of the 320-acre line the section and two-section size of farm veer rapidly into higher rainfall to the east as the quantity of heat increases to the south. As was mentioned in the introductory discussion of the 1,280-acre lines, a small part of this variation may be due to a slower development of western farming in the south.

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*It must be borne in mind that some actions and reactions were so sharp that measurements made at ten year intervals could not fully record them.

### SIZE OF FARM IN RELATION TO SOIL

From the preceding discussion one might be led to infer that the position of size-of-farm lines in the Great Plains is seldom affected by soil. The series of maps last referred to (Figs. 24, 25, 26, and 27) can also be used to illustrate certain soil effects. The "Flint Hill" section in Kansas was mentioned during a discussion of 160-acre lines. In 1880 this section stood out as an island of half-section farming in eastern Kansas. In 1890, 1900, and 1910 the size of farm is seen to be somewhat reduced but it still stands out as an area occupied by relatively large farms. The Sand Hill region in north-central Nebraska has even a more marked effect upon the size of farm. On the map of 1880 (Fig. 24) the two-section and one-section lines in northeastern Nebraska bend sharply to the east in order to avoid the Sand Hills and bordering areas of more or less sandy land. In 1890 these lines enter the eastern Sand Hills. In 1900 they recede to the eastern edge, where they almost meet the half-section line which has moved a little to the west and is just beginning to bend eastward in order to avoid sandy land. By 1910 the two-section line has passed beyond the Sand Hills, leaving behind it an island of very large farms to occupy the western part. While section farming has again entered the eastern Sand Hills, half-section farming in 1910 still skirts the edge.

### SIZE OF FARM IN RELATION TO RAINFALL AND ECONOMIC CONDITIONS

A cross-sectional measurement of size of farm in the Great Plains region will bring out certain facts concerning rainfall and economic conditions more clearly than can be pointed out from maps. Figure 16 is a cross-sectional measurement following approximately the line of 240 month-degrees from Iowa across southeastern Nebraska and northwestern Kansas into Colorado. The purpose of following a given quantity of heat is to eliminate in as far as possible the effect of heat upon the size of farm. The choice of this particular quantity of heat was influenced by the fact that it crosses the Great Plains at a point where soil variations are

slight. It is even possible that the western soils, being a little more open and more level than the eastern soils, give a slight advantage to the western farms. With effective variation in both heat and soil largely eliminated, the study along this line can be more positively centered upon the size of farm in relation to rainfall and economic conditions. In the graph (Fig. 16), rainfall tends to give similarity to the shape of the curves while economic conditions are largely responsible for their position relative to one another. Each of these curves shows that as soon as rainfall is decreased below a certain point the size of farm increases rapidly. This point in rainfall is sometimes designated as critical rainfall. Along the line of the graph, critical rainfall varies with economic conditions. Thus in 1880, 1890, 1900, and 1910, critical rainfall stood at approximately 25.0, 19.5, 22, and 21 inches respectively. It is a rather striking fact that between 1880 and 1910 the critical point in rainfall along this line had been lowered only about 4 inches. When cross-sectional studies of this kind are made across the northern part of the Great Plains, the curves reach into lower rainfall and are less sharp. On the other hand, cross-sectional studies to the south of the 240-month-degrees line give very sharp curves that do not reach into extremely low rainfall.

### SIZE OF FARM IN RELATION TO PLANT GROWTH

The connecting link between size of farm and moisture conditions in the Great Plains is plant growth. It stands to reason that where rainfall is normally low and as a result crop yields are low and pasture growth is short, a farm must of necessity occupy enough land to bring the total annual growth of usable plants to a level that will insure the average farm family a living. Figure 17 gives a view of the size of farm in relation to the total annual growth of crops and pasture. As shown by the key map accompanying the figure, the heat and soil conditions in the areas chosen are much the same as those described in the preceding cross-sectional study. In the accompanying diagram the blocks placed adjoining one

another illustrate how a farm in the Great Plains adjusts its area to overcome the effects of low crop yields and short pasture growth. The base-length of a block represents the total farm area. (Note here Table 3, columns 1 and 5.) The division of the farm area between crop and pasture land is brought out by shading. The height of one block relative to another (the height above the shading) is in harmony with the crop index of one farm type relative to another. The crop index of each of these farm types was calculated from the census and applies only to the crop year 1909. When the crop and pasture growth in the Thayer area was assumed to be 100 per cent, the Harlan and Hitchcock types measured 60.2 and 32.0 per cent respectively. Tho these measurements are based on only the crop year 1909, they serve very well as an index to normal conditions. According to the results obtained, 100 acres of the Harlan type of farm were equivalent, in 1909, to 60.2 acres of the Thayer type of farm. Comparing the Hitchcock type of farm with the Thayer type in this year, 100 acres of the former were about equivalent to 32 acres of the latter.

This principle of adjusting the size of farm to the quantity and value of plant growth is as old as dry land farming. It is practiced in all of the dry border regions of the world. Field studies in Nebraska lead one to conclude that until this principle is complied with the would-be dry farmer is barred from success.
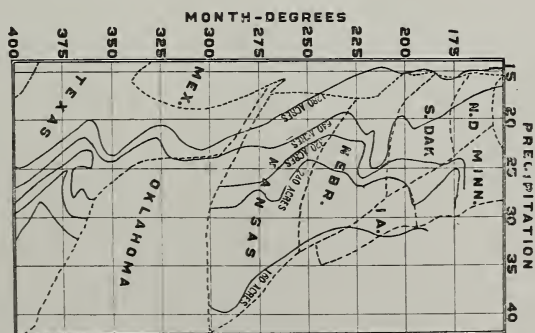


Fig. 15.—The size-of-farm lines for 1910 plotted on a diagram which uses rainfall as degrees of longitude and month-degrees as degrees of latitude.
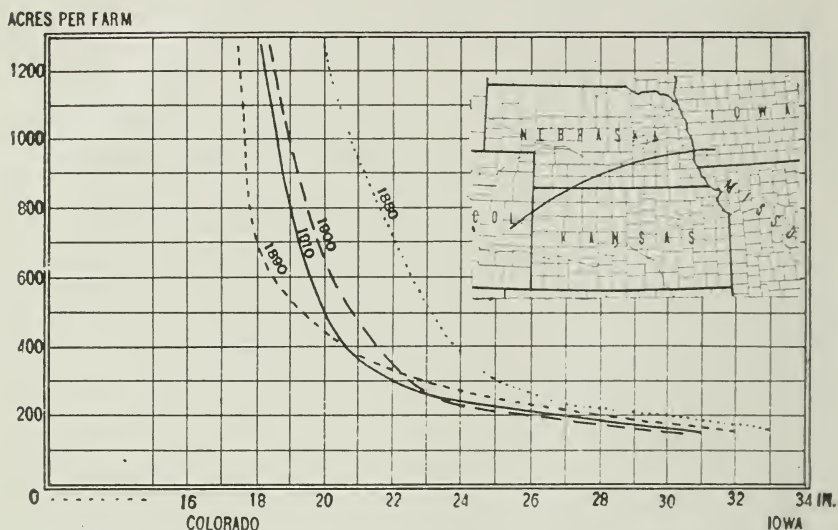
Fig. 16.—A cross-section measurement of size-of-farm following approximately the line of 240 month-degrees from Iowa into Colorado.
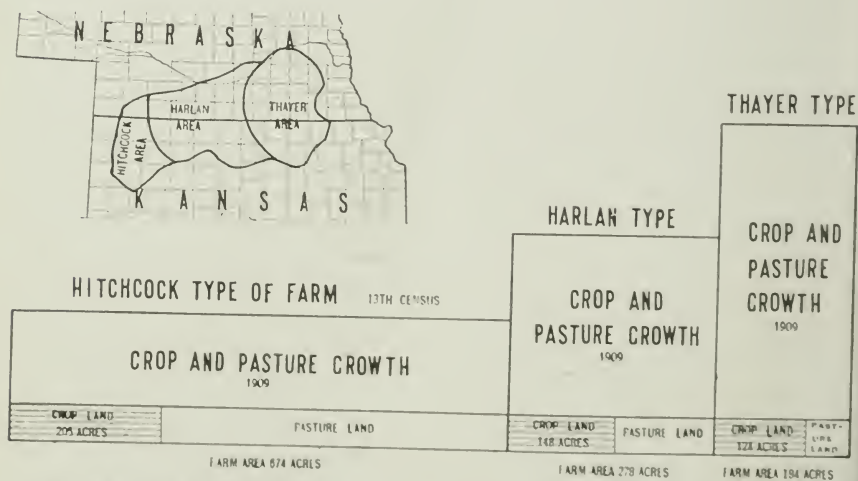


Fig. 17.—The relation of the size of farm to the total annual growth of crops and pasture.

Fig. 18.—Average annual precipitation in inches.

160
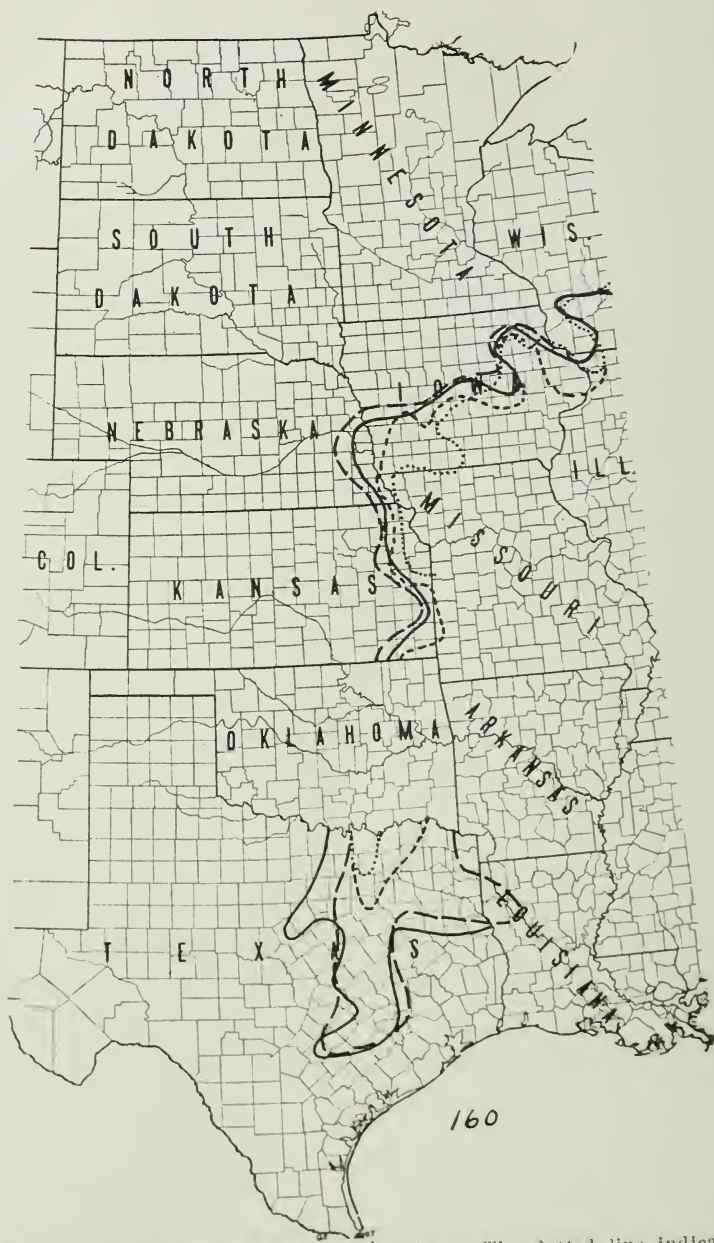
Fig. 19.—The movement of the 160-acre lines. The dotted line indicates the western margin of 160-acre farming in 1880, and the solid line the western margin in 1910
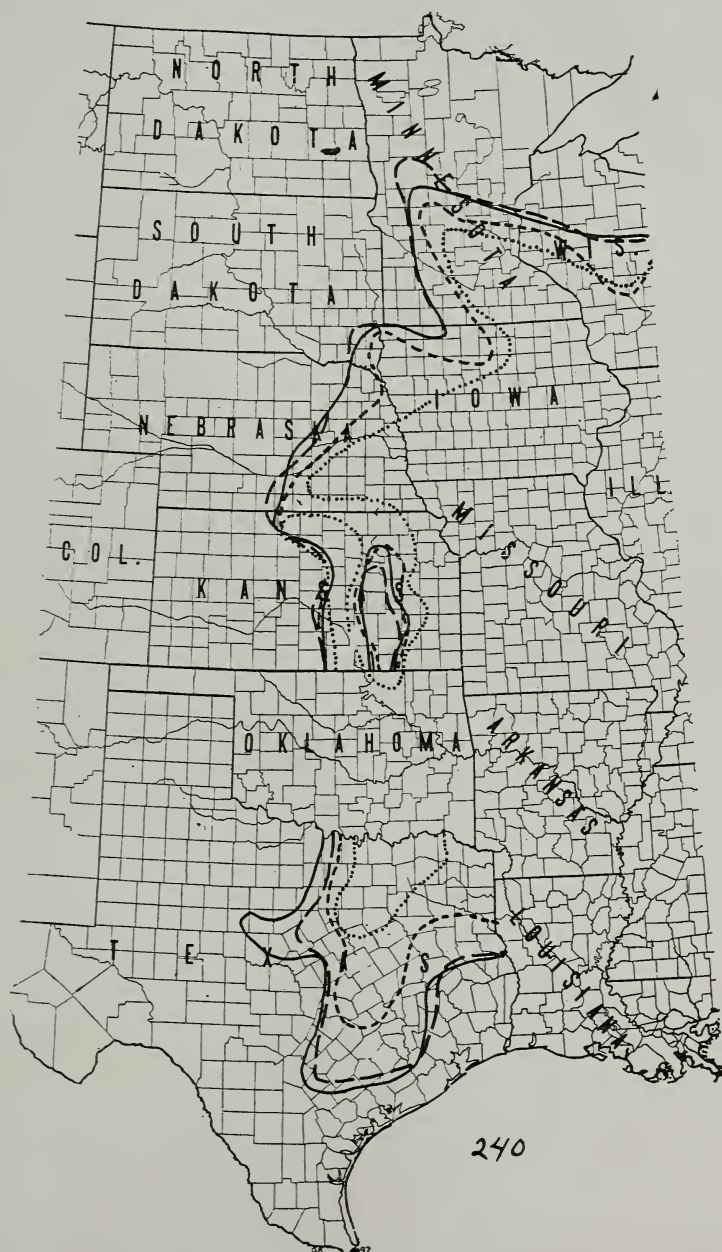
Fig. 20.—The movement of 240-acre lines. The dotted line stands for 1880 and the solid line for 1910.
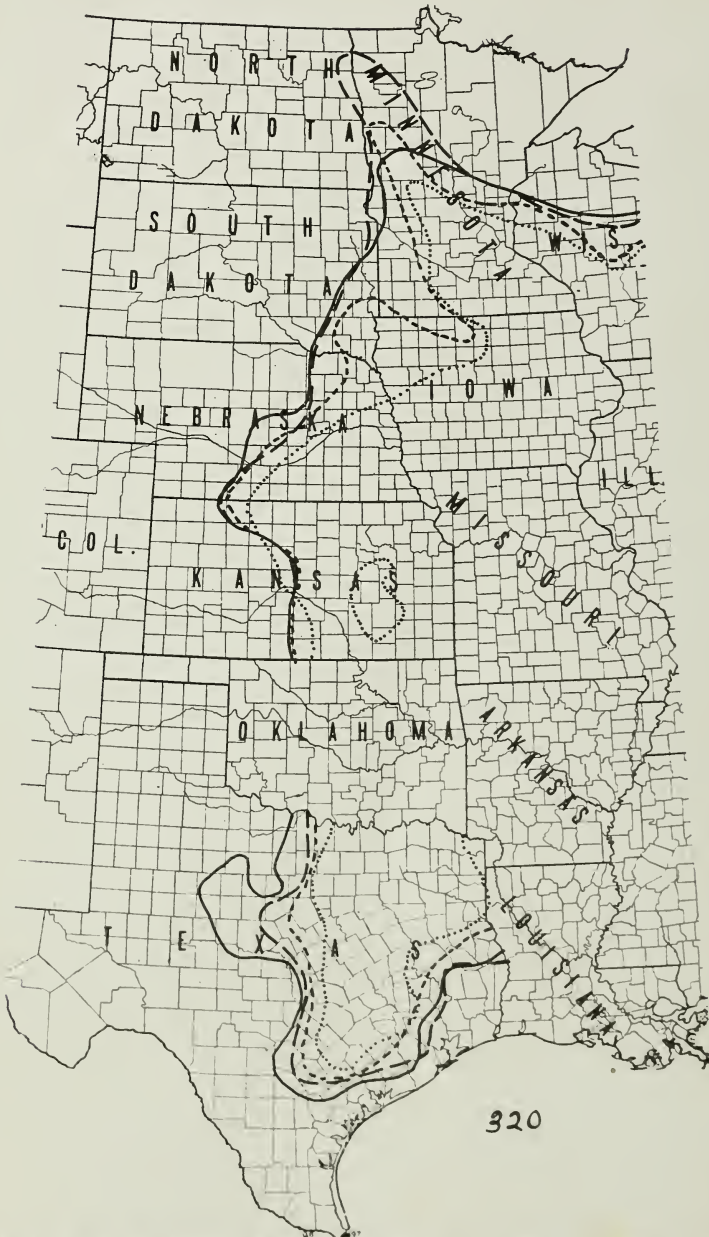
Fig. 21.—The movement of 320-acre lines. The dotted line stands for 1880 and the solid line for 1910.

640
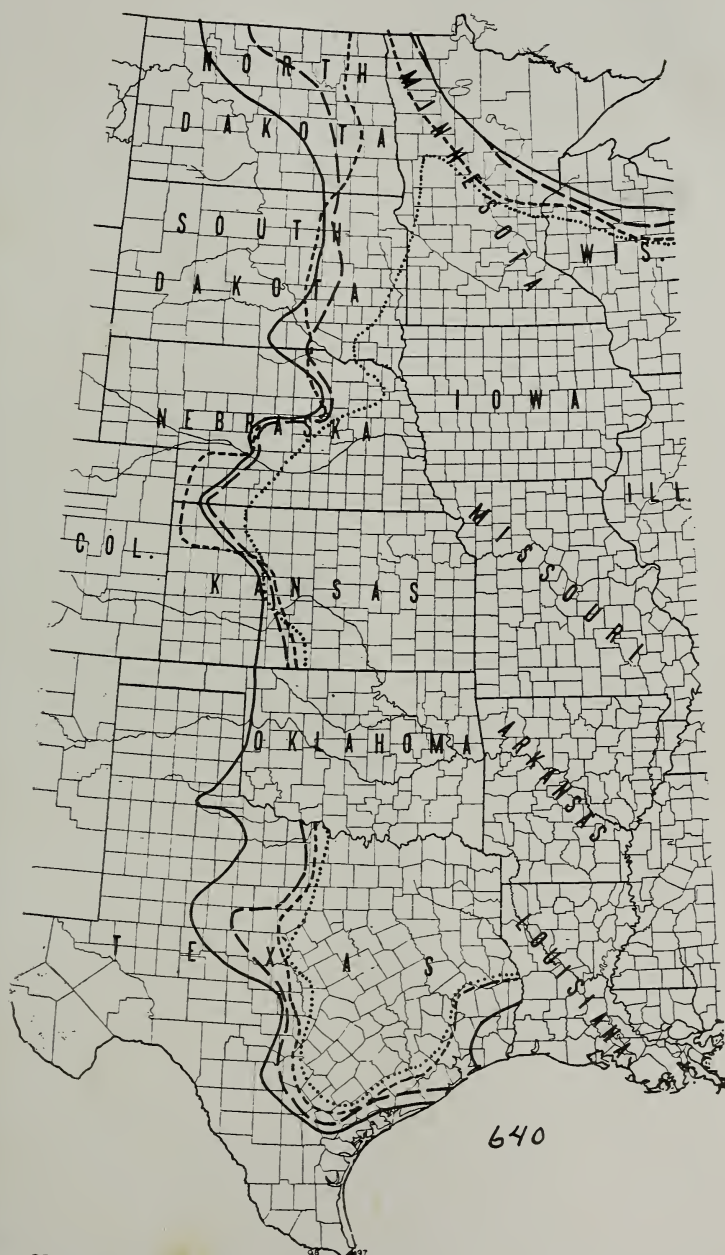
Fig. 22.—The movement of 640-acre lines. The dotted line stands for 1880 and the solid line for 1910.
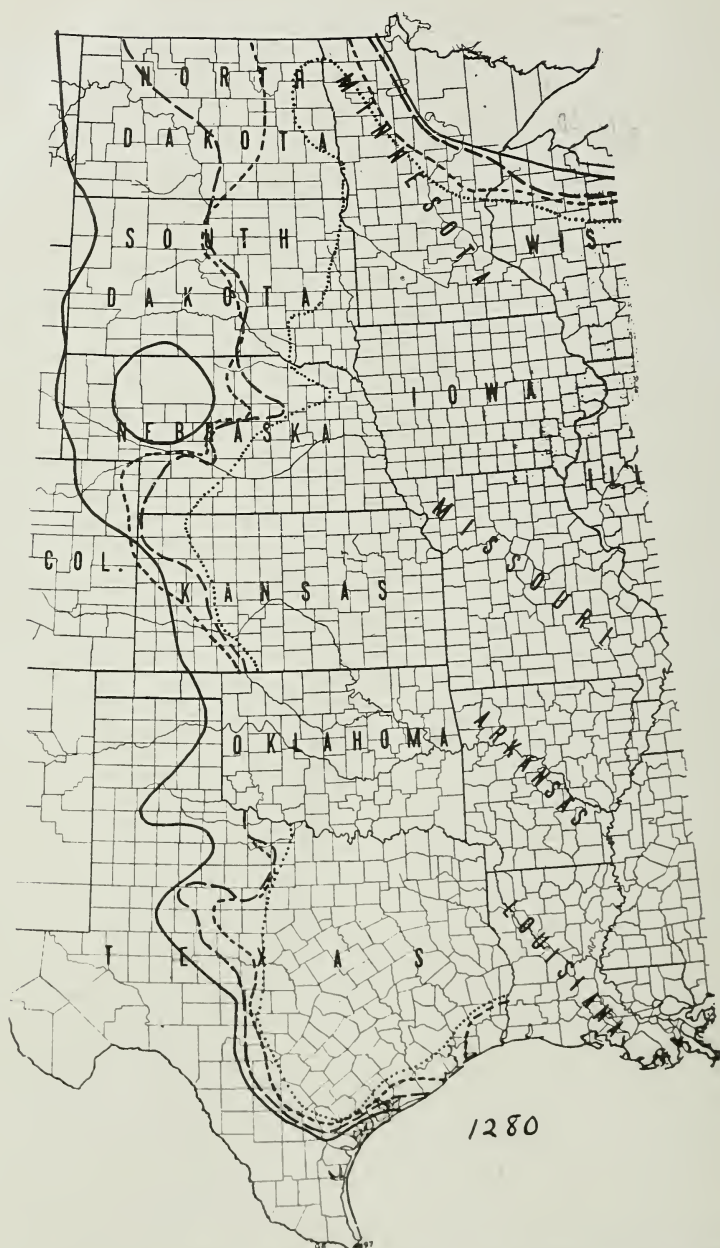
Fig. 23.—The movement of 1280-acre lines. The dotted line stands for 1880 and the solid line for 1910.
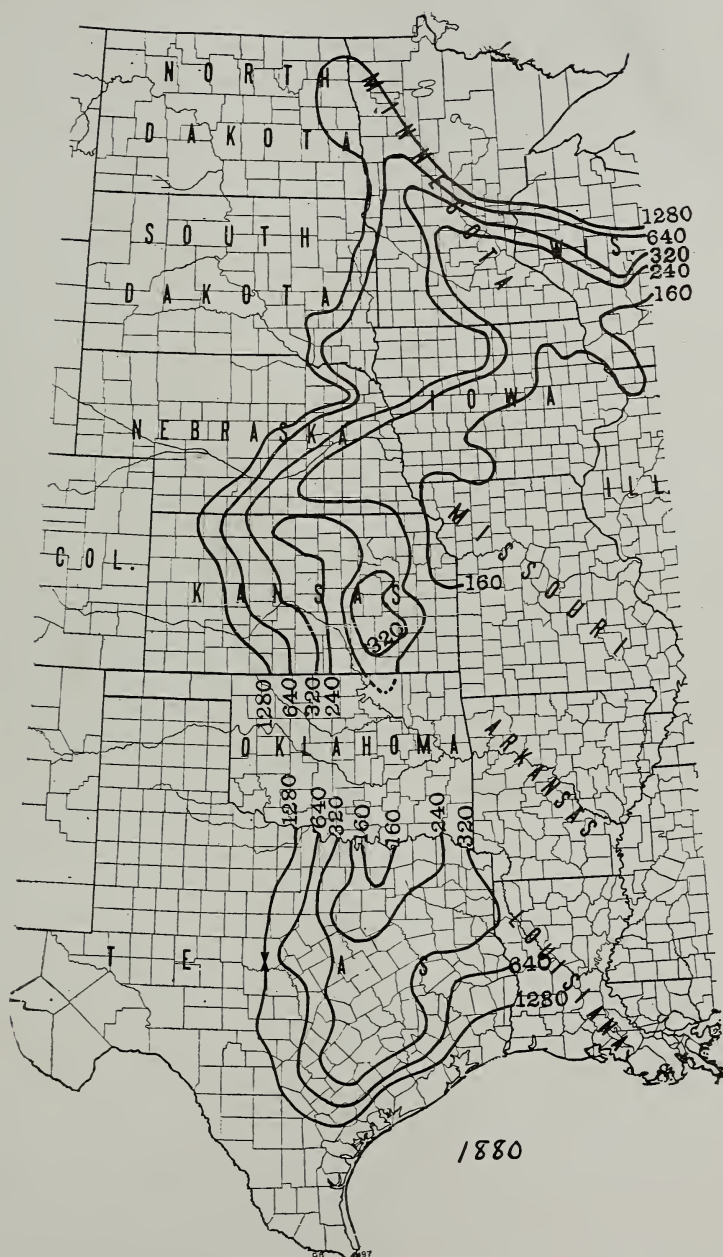
Fig. 24.—The position of various size-of-farm lines in 1880.
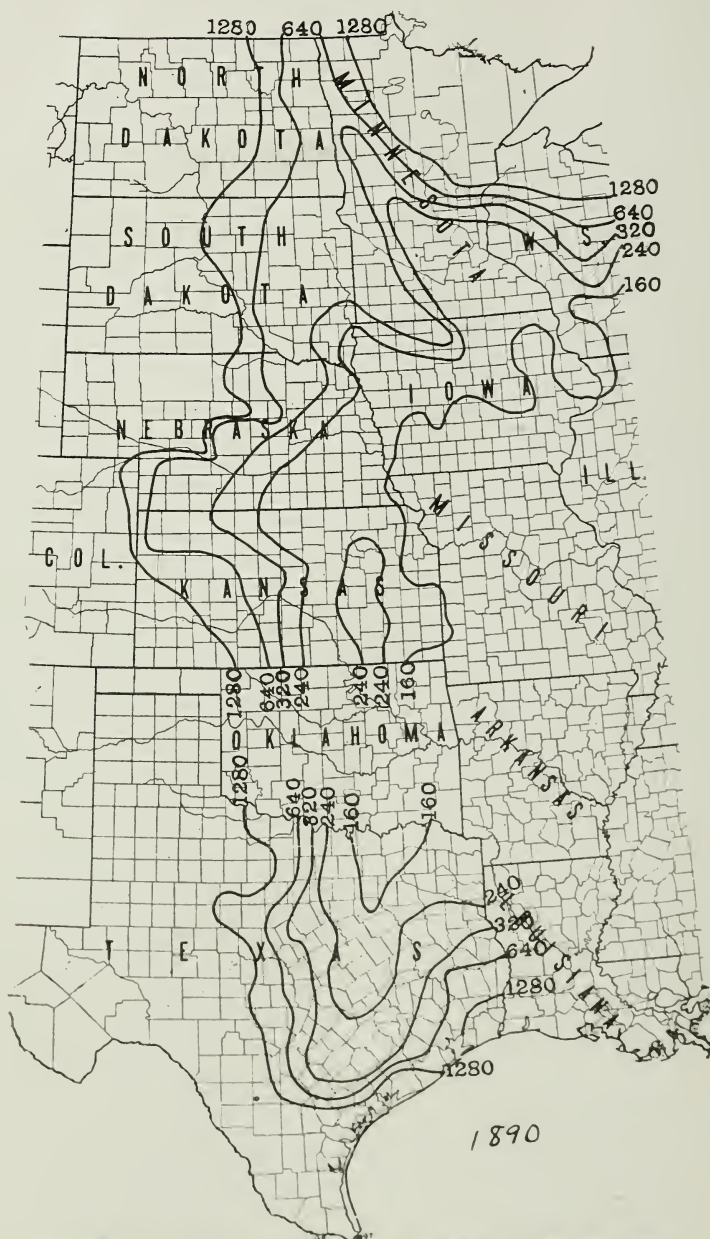
Fig. 25.—The position of various size-of-farm lines in 1890.
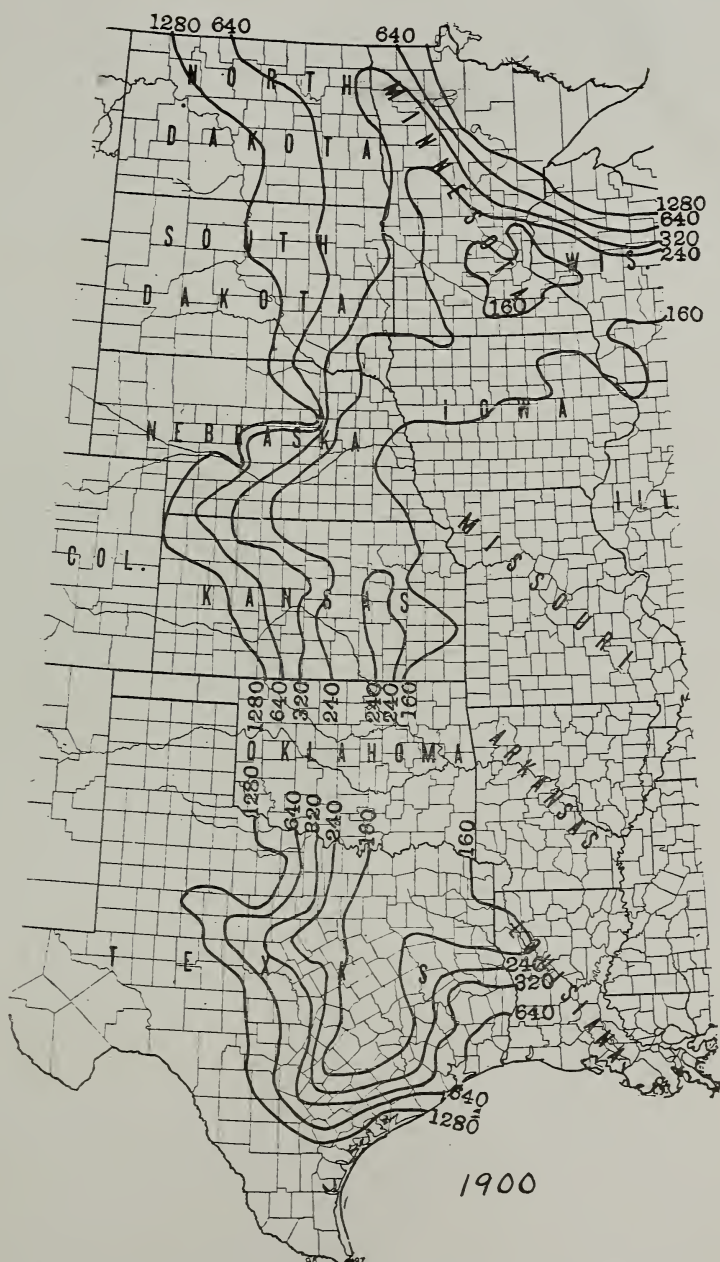
Fig. 26.—The position of various size-of-farm lines in 1900.
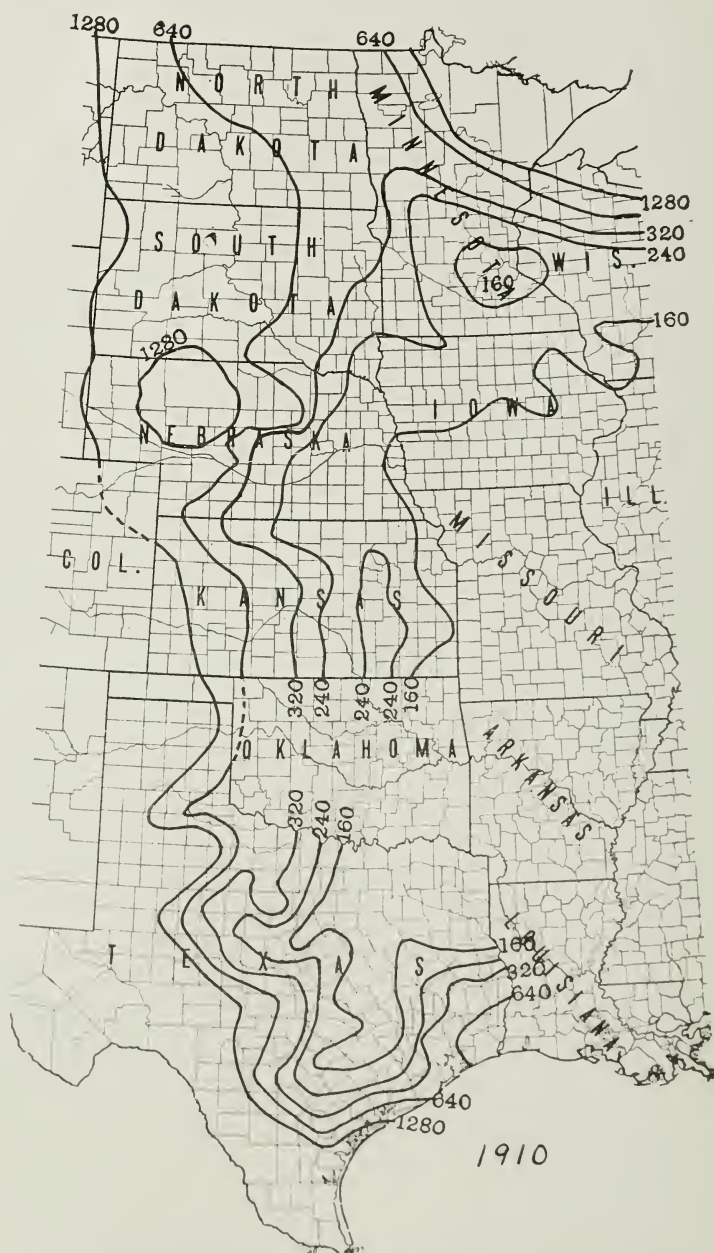
Fig. 27.—The position of various size-of-farm lines in 1910.
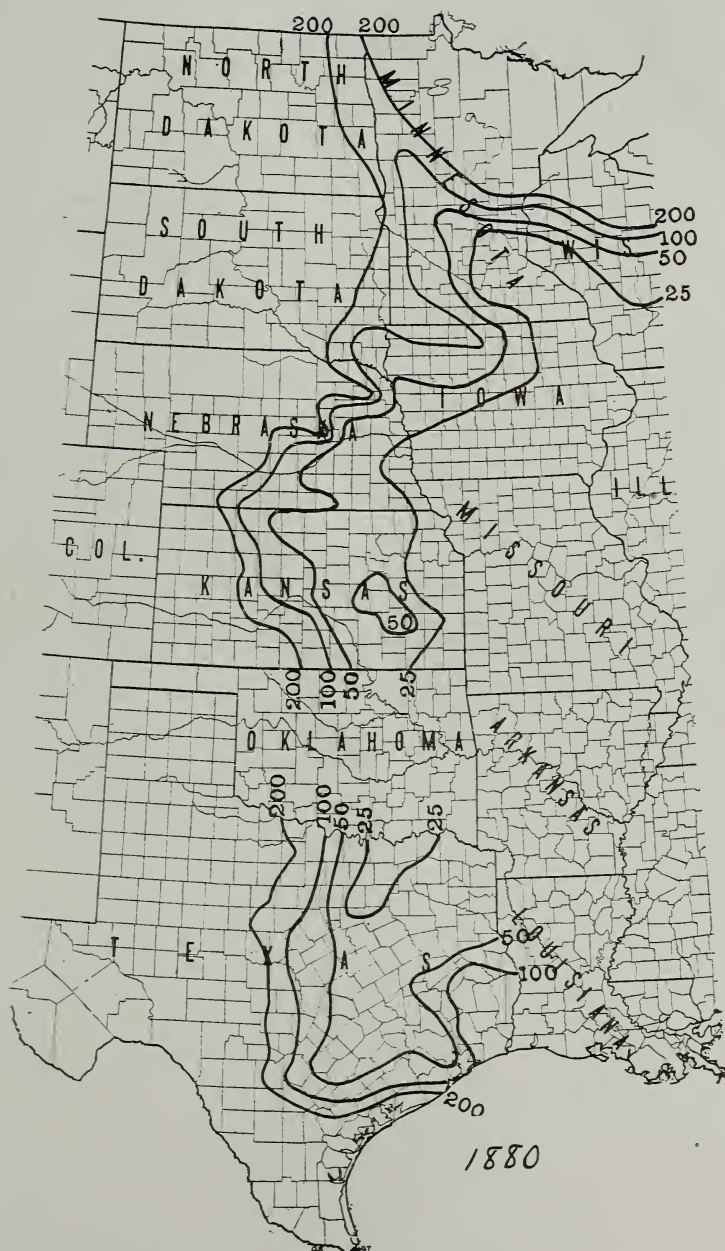
Fig. 28.—Acres per person (total population) in 1880.
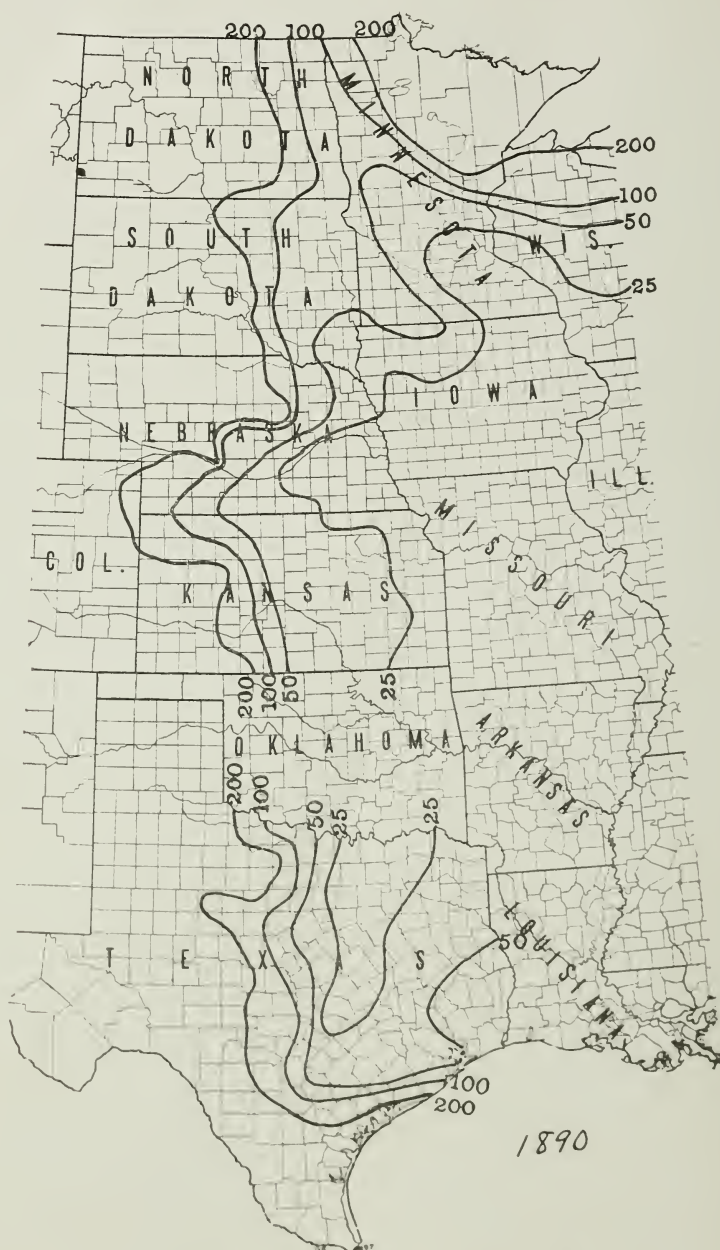
Fig 29.—Acres per person (total population) in 1890.
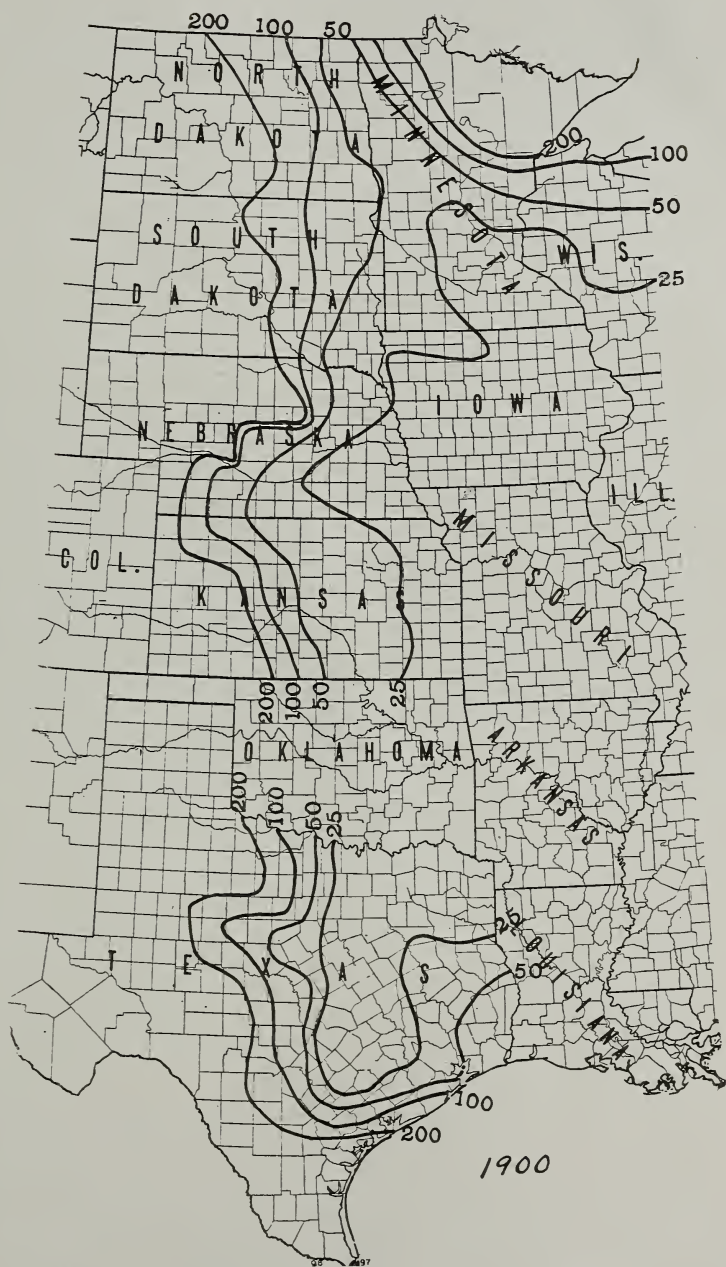
Fig. 30.—Acres per person (total population) in 1900.
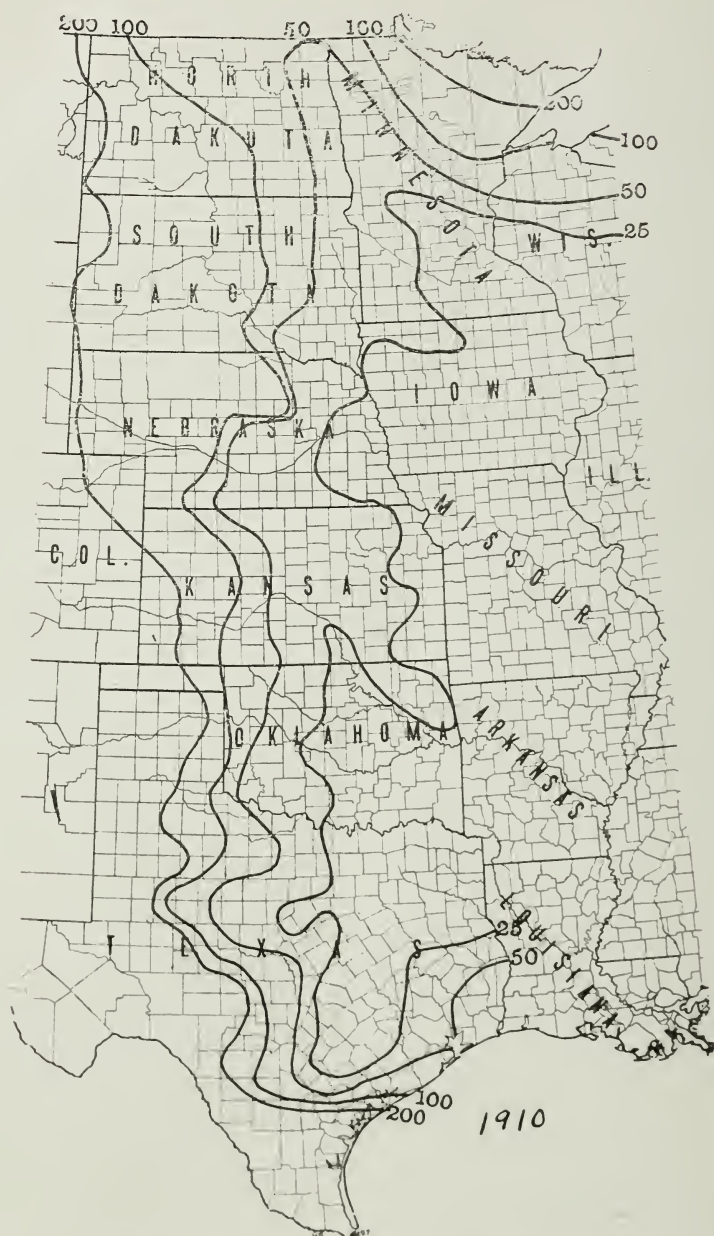
Fig. 31.—Acres per person (total population) in 1910.
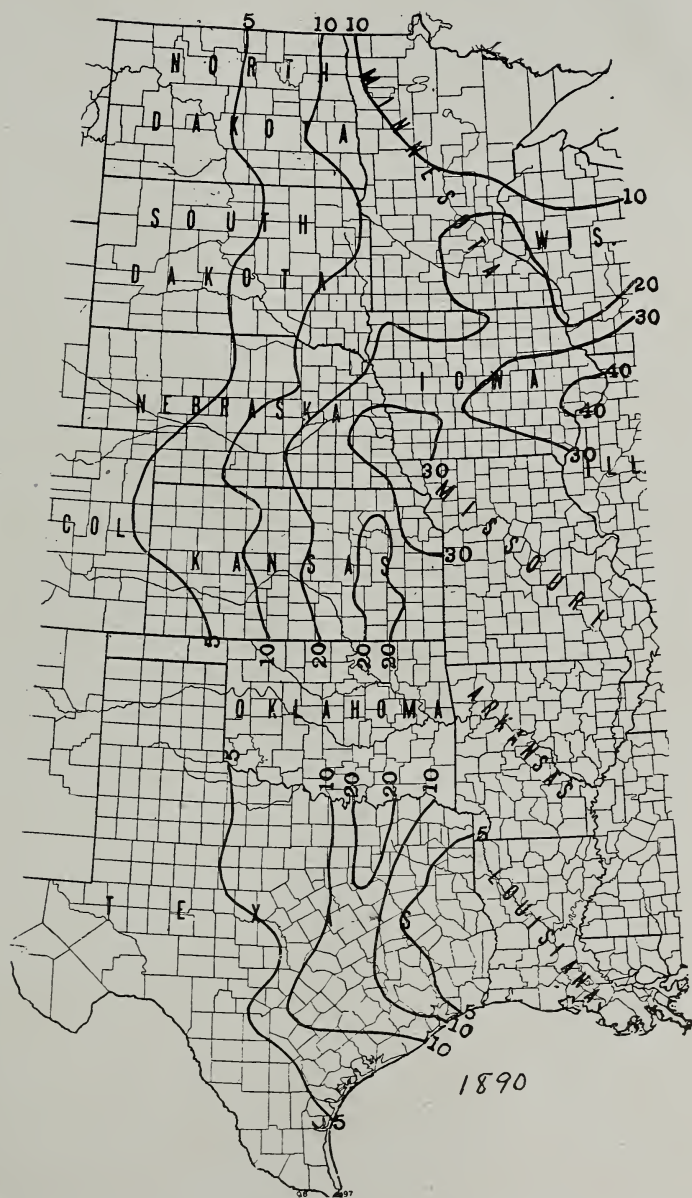
Fig. 32.—The value per acre of such land as was reported to be in farms in 1890.
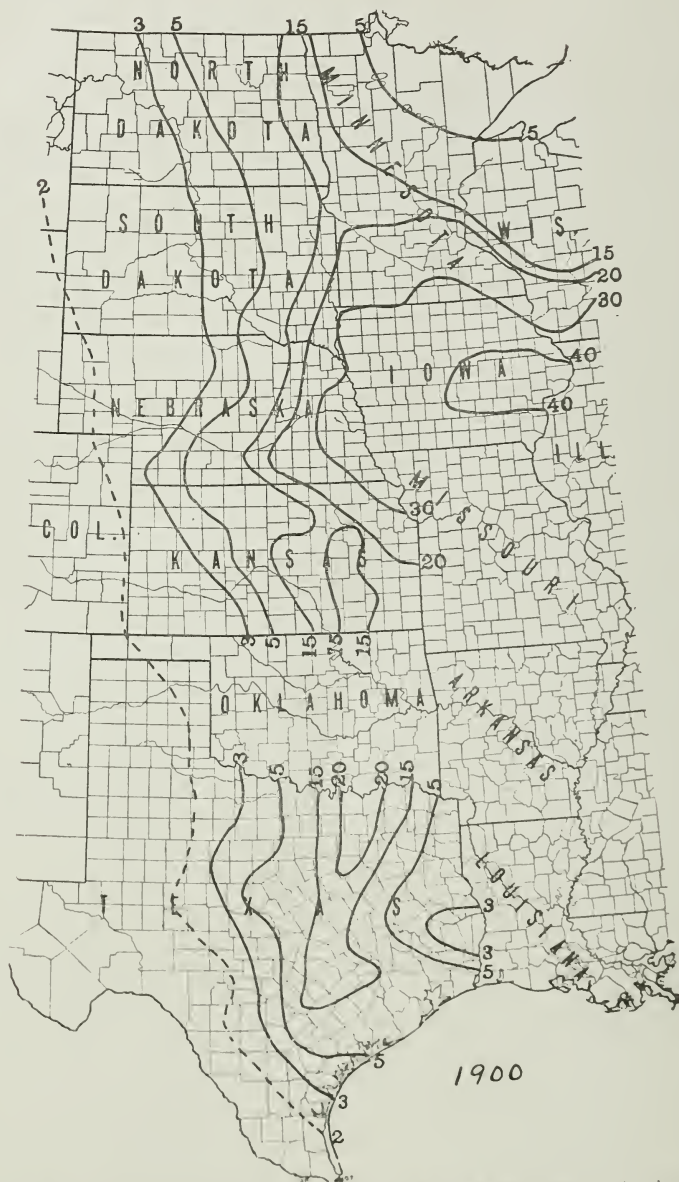
Fig. 33.—The value per acre of such land as was reported to be in farms in 1900.
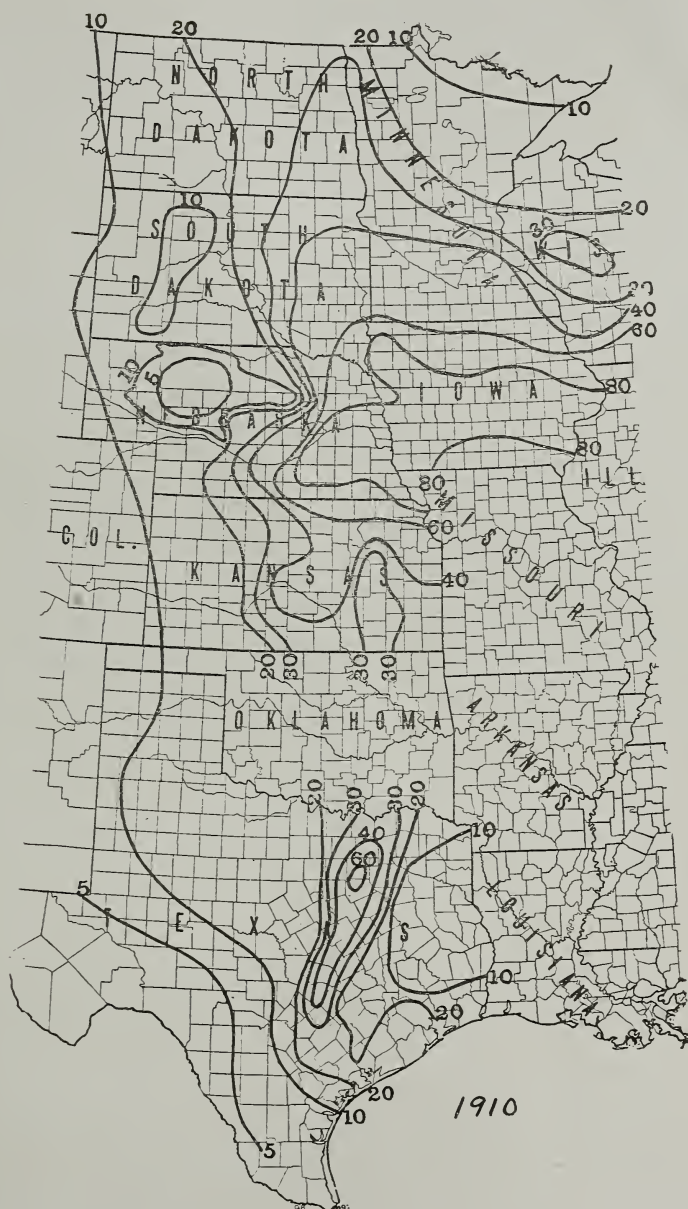
Fig. 34.—The value per acre of such land as was reported to be in farms in 1910.
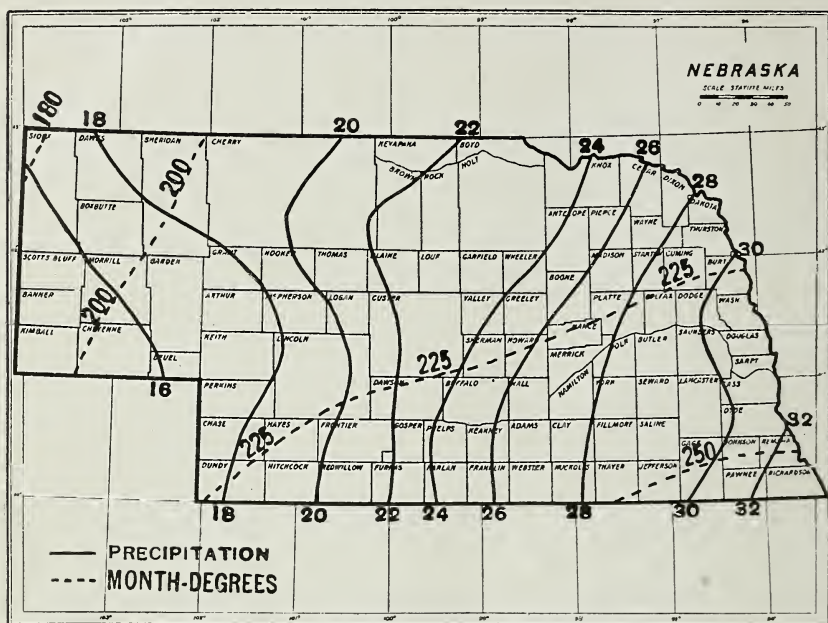
Fig. 35.—The average annual precipitation and month-degree in Nebraska.

## FARM TYPES IN NEBRASKA

### BOUNDARIES OF TYPE AREAS

The boundaries of type areas in Nebraska are to a large extent determined by heat, rainfall, and soil. To map the principal areas of the State having a fairly uniform type of farming, crop lines are used to register heat effects as slightly modified by rainfall and other factors, while size-of-farm lines are used to register rainfall effects as slightly modified by heat and other factors. In one case, that of the Sand Hills, soil is used independently to determine the outer boundaries of two types.

A key to all boundary lines is shown in figure 36. It will be observed that in general the northern and southern boundaries of type areas are determined by the type of annual cropping, and the eastern and western boundaries by the size of farm. The data used in determining these lines were se cured from the Thirteenth Census. The Fourteenth Census

Fig. 36.—The key to the boundaries of type areas in Nebraska as determined for the year 1909.

no doubt will show the need of redrawing nearly all lines aside from those determined by the Sand Hills. For example, it would not be surprising to find that the small island of winter-summer cropping in south-central Nebraska had grown larger, that the summer-winter type was covering more of the south-eastern counties, and that certain size-of-farm lines had moved a little farther west.

For the crop year 1909 Nebraska has been divided into twelve type areas. The three northwestern areas are named according to the regions they occupy. All other areas bear county names. (See Fig. 37.) To one who is familiar with the State, county names serve to characterize and locate an area almost as well as regional names. If it had been possible, however, regional names would have been given to all areas.

### THE DETERMINATION OF FARM TYPES

The average type of farm for each type area was calculated from the county agricultural data of the census. Since

the organization of the census data would not permit the use of the entire area of land within a given set of boundary lines, it was necessary to choose a representative group of counties to serve as a basis for farm types.*   To determine farm types, each item of county agricultural data was tabulated according to the representative groups of counties and then totaled and reduced to an average farm basis.   While the total area of land was reduced to an average farm basis by using the number of all farms as a divisor, the total number of live stock and similar items were reduced by using the number of farms reporting domestic animals.   This avoided at least a part of the error that would result from distributing field crops, live stock, and other items to very small farms not belonging to the general type.   Table 4 brings out the fact that in most cases the difference between the number of all farms and the number of farms reporting domestic animals is relatively small.

The relative standing of winter, spring, and summer annuals indicated by the crop boundaries of type areas is very accurately shown by the average figures derived from the representative groups of counties.   (See Figs. 36 and 37.)   Both the boundary lines and the figures indicate that the High Plains area belongs to the spring-summer type of annual cropping, that the Western Sand Hills, Eastern Sand Hills,

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*Boyd Area—Boyd, Holt, and Kayapaha Counties.
Buffalo Area—Buffalo, Dawson, Howard, Merrick, Nance, and Sherman Counties.
Cass Area—Cass, Dodge, Johnson, Otoe, Pawnee, Saunders, and Washington Counties.
Chase Area—Chase, Dundy, and Hayes Counties, in Nebraska; Phillips and Yuma Counties in Colorado; Cheyenne County in Kansas.
Custer Area—Boone, Custer, Greeley, and Valley Counties.
Eastern Sand Hill Area—Blaine, Brown, Garfield, Loup, Rock, and Wheeler Counties.
Harlan Area—Harlan, Franklin, Frontier, Furnas, Gosper, Kearney, and Phelps Counties in Nebraska; Graham, Mitchell, Norton, Phillips and Smith Counties in Kansas.
High Plains Area—Banner, Box Butte, Cheyenne, Dawes, Kimball and Sioux Counties.
Hitchcock Area—Hitchcock County in Nebraska; Logan, Rawlins, Sheridan and Thomas Counties in Kansas.
Thayer Area—Clay, Butler, Fillmore, Hamilton, Jefferson, Nuckolls, Polk, Saline, Seward, Thayer, and York Counties in Nebraska; Clay, Marshall, Republic, and Washington Counties in Kansas.
Wayne Area—Cedar, Dakota, Dixon, Cuming, Knox, Madison, Pierce, Stanton, and Wayne Counties in Nebraska; Plymouth County in Iowa; Clay, Union and Yankton Counties in South Dakota.
Western Sand Hill Area—Cherry, Hooker, McPherson, and Thomas Counties

TABLE 4.—*The number of all farms compared with the number reporting domestic animals.*

| Type area | Approximate acreage of the counties chosen to represent an area | Number of all farms (1910) in the counties chosen | Number of farms (1910) reporting domestic animals |
|---|---|---|---|
| Boyd | 2,369,920 | 4,007 | 3,955 |
| Buffalo | 2,542,720 | 9,777 | 9,588 |
| Cass | 2,314,240 | 13,521 | 13,297 |
| Chase | 4,231,040 | 5,093 | 4,915 |
| Custer | 2,829,440 | 8,194 | 8,097 |
| E. Sand Hills | 2,994,560 | 3,486 | 3,382 |
| Harlan | 5,521,280 | 19,839 | 19,331 |
| High Plains | 4,753,280 | 4,203 | 3,988 |
| Hitchcock | 3,091,840 | 4,588 | 4,410 |
| Thayer | 5,959,680 | 32,323 | 31,833 |
| Wayne | 4,747,987 | 20,743 | 20,435 |
| W. Sand Hills | 5,818,240 | 3,266 | 2,993 |

Boyd, Chase, Custer, Wayne, and Cass areas belong to the summer-spring type; that the Buffalo, Harlan, and Thayer areas belong to the summer-winter type; and the Hitchcock area to the winter-summer type. The key to boundary lines (Fig. 36) shows that the Wayne area is separated from the Custer area by a line following 5 per cent winter annuals. The figures determined from county groups indicate 2 per cent winter annuals in the Wayne area and 10 per cent winter annuals in the Custer area.

The relation that exists between the size-of-farm boundaries and the average size of farm determined for county groups can be seen on comparing figure 36 with figure 38. The average size of farm determined for a group of counties in no case exactly agrees with the average indicated by the size-of-farm lines. This is in part due to the fact that the size of farm does not change at a uniform rate from one line to another.

Each type area outlined holds a wide range of farm conditions. This is particularly true of western areas. For example, there is not a great deal of difference between lowland and upland farms in the eastern part of the State, but in western areas lowland farms that are either naturally or artificially irrigated resemble in many ways eastern farms
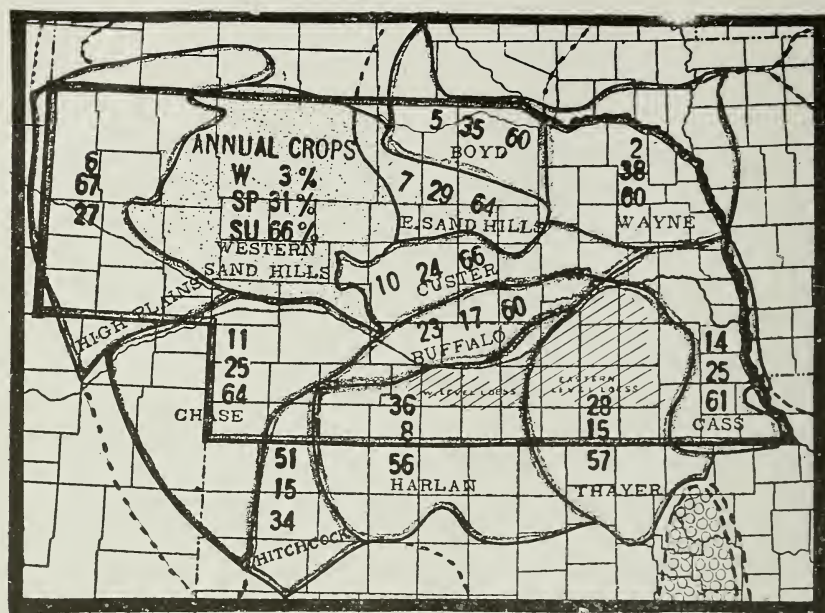
Fig. 37.—The relative importance of winter, spring, and summer annuals in the various type areas of Nebraska. (1909)

more closely than they do dry upland western farms. These and similar irregularities make it impossible to describe a type of farm that will fit all conditions within a given area. The numerical descriptions of farm types which follow apply more to farming on nonirrigated upland than they do to farming on bottom land and irrigated upland.

### FARM TYPES GROUPED FOR THE PURPOSE OF STUDY

The effects of heat upon the twelve farm types can be most accurately studied when the High Plains, Western Sand Hills, Eastern Sand Hills, and Boyd types are looked upon as northern, the Chase, Buffalo, Custer, and Wayne types as central, and the Hitchcock, Harlan, Thayer, and Cass types as southern. Rainfall effects can be most accurately studied by comparing the Boyd, Wayne, and Cass types with the High Plains, Chase, and Hitchcock types respectively.
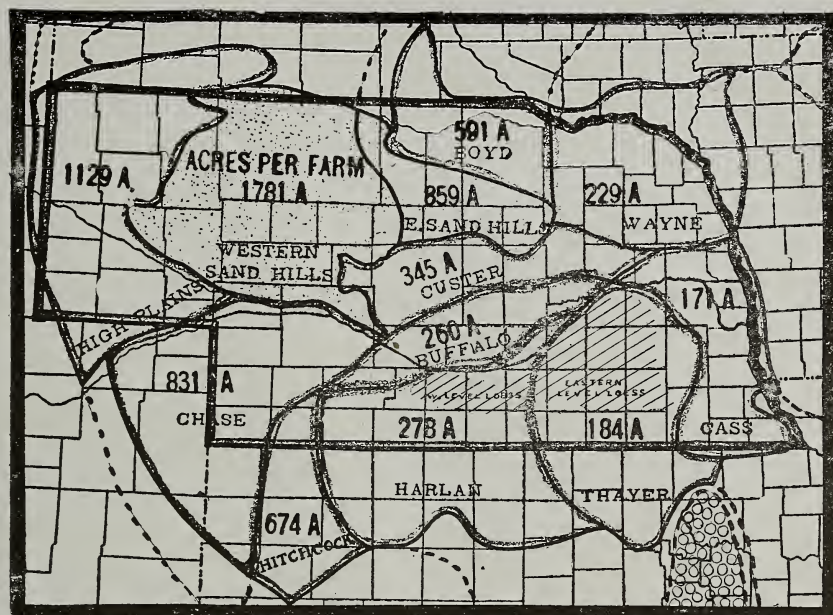
Fig. 38.—The average size of farm in the various type areas of Nebraska.
(1909)

### THE PRINCIPAL USES OF FARM LAND

Nearly all of the land in a farm can be classed as either cultivated land, wild hay land, or pasture and waste. In this study the cultivated land together with the wild hay land will be spoken of as the crop area. The difference between the total farm area and the crop area is assumed to be the area occupied by the farmstead, pasture, roads, and waste. Since the land occupied by lots, roads, and waste is often used more as pasture than as crop land it will not be far wrong to treat all of the farm area aside from crop land as simply pasture.

### THE ACREAGE AND YIELD OF CROPS

The acreage of the various crops grown on a given type of farm varies less from year to year than either the yield per acre or the total yield per farm. While yields per acre in any given area vary greatly from season to season, there is a tendency for the yields in all areas to vary in harmony with one

another. This is in part explained by the fact that effective changes in weather during the crop season often affect areas as large or even larger than the State.

The last column in the following group of tables usually expresses the yield per acre in terms of percentage. Wherever this is done, the yield per acre on the Cass type of farm is used as a base, or 100 per cent. These percentage figures picture the normal standing of one area relative to another only in so far as yields in 1909 had the same percentage variation from normal.

TABLE 5.—*Corn per farm in 1909.*

| Type area | Acres per farm | Bushels per acre | Bushels per farm | Index to yields, Cass = 100% |
|---|---|---|---|---|
| Northwest to North Central | | | | |
| High Plains | 11.3 | 15.9 | 180 | 58 |
| Western Sand Hills | 23.4 | 15.6 | 364 | 57 |
| Eastern Sand Hills | 35.9 | 22.8 | 818 | 83 |
| Boyd | 50.6 | 24.0 | 1,215 | 87 |
| Southwest to Northeast | | | | |
| Chase | 64.5 | 12.7 | 819 | 46 |
| Buffalo | 61.0 | 22.6 | 1,378 | 82 |
| Custer | 68.8 | 25.4 | 1,748 | 92 |
| Wayne | 68.0 | 36.8 | 2,500 | 133 |
| Southwest to Southeast | | | | |
| Hitchcock | 48.7 | 9.6 | 468 | 35 |
| Harlan | 66.4 | 12.3 | 816 | 45 |
| Thayer | 59.3 | 18.2 | 1,079 | 66 |
| Cass | 59.8 | 27.6 | 1,652 | 100 |

TABLE 6.—*Coarse forage (largely corn and "cane") in 1909.*

| Type area | Acres per farm | Tons per acre | Tons per farm | Index to yields, Cass = 100% |
|---|---|---|---|---|
| Northwest to North Central | | | | |
| High Plains | .90 | 1.64 | 1.48 | 61 |
| Western Sand Hills | .51 | 1.76 | .90 | 66 |
| Eastern Sand Hills | .35 | 2.51 | .88 | 94 |
| Boyd | .53 | 2.58 | 1.37 | 97 |
| Southwest to Northeast | | | | |
| Chase | 7.89 | 1.60 | 12.62 | 60 |
| Buffalo | 1.13 | 1.99 | 2.25 | 75 |
| Custer | .52 | 2.48 | 1.29 | 93 |
| Wayne | .22 | 3.00 | .66 | 112 |
| Southwest to Southeast | | | | |
| Hitchcock | 12.82 | 1.52 | 19.52 | 57 |
| Harlan | 3.68 | 1.77 | 6.51 | 66 |
| Thayer | .45 | 2.51 | 1.13 | 94 |
| Cass | .18 | 2.67 | .48 | 100 |

TABLE 7.—*Wheat per farm in 1909.*

Notice that on "hard land" the production of wheat per farm is greatest where the yields are lowest.

| Type area | Acres of winter wheat per farm | Acres of spring wheat per farm | Bushels of all wheat per acre | Bushels of all wheat per farm | Index to yields, Cass = 100% |
|---|---|---|---|---|---|
| Northwest to North Central | | | | | |
| High Plains | 1.2 | 14.5 | 10.9 | 172 | 58 |
| W. Sand Hills | .3 | 1.7 | 8.0 | 16 | 43 |
| E. Sand Hills | 1.6 | 1.3 | 13.4 | 39 | 71 |
| Boyd | 1.7 | 4.2 | 10.5 | 62 | 56 |
| Southwest to Northeast | | | | | |
| Chase | 12.7 | 15.5 | 11.4 | 320 | 61 |
| Buffalo | 24.4 | .8 | 18.3 | 462 | 97 |
| Custer | 10.6 | 1.0 | 19.3 | 224 | 103 |
| Wayne | 1.9 | 5.7 | 14.2 | 108 | 76 |
| Southwest to Southeast | | | | | |
| Hitchcock | 99.2 | 4.9 | 6.4 | 667 | 34 |
| Harlan | 45.6 | .4 | 10.9 | 501 | 58 |
| Thayer | 30.2 | .3 | 15.7 | 480 | 84 |
| Case | 13.2 | 3.4 | 18.8 | 312 | 100 |

TABLE 8.—*Oats per farm in 1909.*

| Type area | Acres per farm | Bushels per acre | Bushels per farm | Index to yields, Cass = 100% |
|---|---|---|---|---|
| Northwest to North Central | | | | |
| High Plains | 12.6 | 20.2 | 255 | 83 |
| Western Sand Hills | 5.9 | 15.4 | 91 | 63 |
| Eastern Sand Hills | 10.4 | 20.4 | 212 | 84 |
| Boyd | 21.3 | 20.0 | 427 | 82 |
| Southwest to Northeast | | | | |
| Chase | 3.7 | 20.5 | 76 | 84 |
| Buffalo | 16.1 | 17.0 | 274 | 70 |
| Custer | 21.5 | 16.3 | 351 | 67 |
| Wayne | 35.1 | 25.1 | 880 | 103 |
| Southwest to Southeast | | | | |
| Hitchcock | 4.2 | 18.6 | 78 | 76 |
| Harlan | 8.0 | 20.8 | 166 | 85 |
| Thayer | 15.3 | 24.0 | 368 | 98 |
| Cass | 20.7 | 24.4 | 506 | 100 |

TABLE 9.—*Rye per farm in 1909.*

| Type area | Acres per farm | Bushels per acre | Bushels per farm | Index to yields, Cass = 100% |
|---|---|---|---|---|
| Northwest to North Central | | | | |
| High Plains | 1.97 | 11.7 | 23 | 82 |
| Western Sand Hills | .82 | 9.8 | 8 | 69 |
| Eastern Sand Hills | 2.45 | 9.8 | 24 | 69 |
| Boyd | 2.31 | 9.5 | 22 | 67 |
| Southwest to Northeast | | | | |
| Chase | .85 | 9.4 | 8 | 66 |
| Buffalo | .36 | 11.1 | 4 | 78 |
| Custer | .47 | 10.6 | 5 | 75 |
| Wayne | .22 | 10.9 | 2 | 77 |
| Southwest to Southeast | | | | |
| Hitchcock | .48 | 7.5 | 4 | 53 |
| Harlan | .22 | 9.1 | 2 | 64 |
| Thayer | .04 | 11.0 | 4 | 77 |
| Cass | .07 | 14.2 | 1 | 100 |

TABLE 10.—*Barley per farm in 1909.*

| Type area | Acres per farm | Bushels per acre | Bushels per farm | Index to yields, Cass = 100% |
|---|---|---|---|---|
| Northwest to North Central | | | | |
| High Plains | 1.25 | 17.6 | 22 | 83 |
| Western Sand Hills | .17 | 15.2 | 3 | 72 |
| Eastern Sand Hills | .24 | 14.9 | 4 | 70 |
| Boyd | .47 | 18.4 | 9 | 87 |
| Southwest to Northeast | | | | |
| Chase | 8.07 | 17.6 | 142 | 83 |
| Buffalo | .22 | 15.6 | 3 | 74 |
| Custer | .85 | 14.1 | 12 | 66 |
| Wayne | 2.07 | 18.8 | 39 | 89 |
| Southwest to Southeast | | | | |
| Hitchcock | 19.00 | 13.7 | 260 | 65 |
| Harlan | .30 | 13.1 | 4 | 62 |
| Thayer | .10 | 20.4 | 2 | 96 |
| Cass | .17 | 21.2 | 4 | 100 |

TABLE 11.—*Potatoes per farm in 1909.*

| Type area | Acres per farm | Bushels per acre | Bushels per farm | Index to yields, Cass = 100% |
|---|---|---|---|---|
| Northwest to North Central | | | | |
| High Plains | 3.5 | 54 | 188 | 61 |
| Western Sand Hills | 1.4 | 50 | 70 | 57 |
| Eastern Sand Hills | 1.3 | 74 | 96 | 84 |
| Boyd | .7 | 69 | 47 | 78 |
| Southwest to Northeast | | | | |
| Chase | .6 | 50 | 30 | 57 |
| Buffalo | .6 | 62 | 37 | 70 |
| Custer | .6 | 72 | 43 | 82 |
| Wayne | .7 | 79 | 55 | 90 |
| Southwest to Southeast | | | | |
| Hitchcock | .5 | 50 | 25 | 57 |
| Harlan | .6 | 50 | 30 | 57 |
| Thayer | .5 | 78 | 39 | 89 |
| Cass | .6 | 88 | 53 | 100 |

TABLE 12.—*Millet per farm in 1909.*

| Type area | Acres per farm | Tons per acre | Tons per farm | Index to yields, Cass = 100% |
|---|---|---|---|---|
| Northwest to North Central | | | | |
| High Plains | 1.90 | 1.16 | 2.20 | 59 |
| Western Sand Hills | .49 | 1.22 | .60 | 62 |
| Eastern Sand Hills | .62 | 1.61 | 1.00 | 82 |
| Boyd | .77 | 1.64 | 1.26 | 84 |
| Southwest to Northeast | | | | |
| Chase | 3.70 | 1.18 | 4.36 | 60 |
| Buffalo | .72 | 1.63 | 1.17 | 83 |
| Custer | .94 | 1.65 | 1.55 | 84 |
| Wayne | .55 | 2.18 | 1.20 | 111 |
| Southwest to Southeast | | | | |
| Hitchcock | 2.56 | 1.29 | 3.31 | 66 |
| Harlan | 1.97 | 1.50 | 2.96 | 77 |
| Thayer | .65 | 1.85 | 1.20 | 94 |
| Cass | .25 | 1.96 | .49 | 100 |

TABLE 13.—*Alfalfa per farm in 1909.*

| Type area | Acres per farm | Tons per acre | Tons per farm | Index to yields, Cass = 100% |
|---|---|---|---|---|
| Northwest to North Central | | | | |
| High Plains | 4.30 | 2.07 | 8.90 | 73 |
| Western Sand Hills | 1.15 | 2.06 | 2.37 | 73 |
| Eastern Sand Hills | 2.05 | 1.91 | 3.91 | 67 |
| Boyd | 3.50 | 1.47 | 5.16 | 52 |
| Southwest to Northeast | | | | |
| Chase | 1.75 | 2.05 | 3.58 | 72 |
| Buffalo | 11.64 | 2.19 | 25.50 | 77 |
| Custer | 12.30 | 1.87 | 23.00 | 66 |
| Wayne | 2.00 | 2.65 | 5.30 | 93 |
| Southwest to Southeast | | | | |
| Hitchcock | 5.05 | 2.02 | 10.18 | 71 |
| Harlan | 10.15 | 1.69 | 17.06 | 60 |
| Thayer | 6.18 | 2.36 | 14.61 | 83 |
| Cass | 1.59 | 2.84 | 4.52 | 100 |

TABLE 14.—*Timothy and clover per farm in 1909.*

| Type area | Acres per farm | Tons per acre | Tons per farm | Index to yields, Cass = 100% |
|---|---|---|---|---|
| Northwest to North Central | | | | |
| High Plains | .03 | 2.00 | .06 | 130 |
| Western Sand Hills | .35 | 1.69 | .59 | 110 |
| Eastern Sand Hills | .98 | 1.30 | 1.27 | 84 |
| Boyd | 2.27 | 1.33 | 3.03 | 86 |
| Southwest to Northeast | | | | |
| Chase | ........ | ........ | ........ | ........ |
| Buffalo | .49 | 1.31 | .64 | 85 |
| Custer | .54 | 1.31 | .71 | 85 |
| Wayne | 6.03 | 1.65 | 9.98 | 107 |
| Southwest to Southeast | | | | |
| Hitchcock | ........ | ........ | ........ | ........ |
| Harlan | .02 | 1.00 | .02 | 65 |
| Thayer | 2.49 | 1.33 | 3.30 | 86 |
| Cass | 5.27 | 1.54 | 8.12 | 100 |

TABLE 15.—*Wild hay per farm in 1909.*

| Type area | Acres per farm | Tons per acre | Tons per farm | Index to yields, Cass = 100% |
|---|---|---|---|---|
| Northwest to North Central | | | | |
| High Plains | 40.7 | .65 | 26.4 | 42 |
| Western Sand Hills | 145.0 | .82 | 119.0 | 54 |
| Eastern Sand Hills | 88.4 | .88 | 77.5 | 58 |
| Boyd | 86.1 | 1.03 | 88.5 | 67 |
| Southwest to Northeast | | | | |
| Chase | 10.9 | .82 | 8.9 | 54 |
| Buffalo | 19.4 | 1.15 | 22.3 | 75 |
| Custer | 24.5 | .92 | 22.5 | 60 |
| Wayne | 16.2 | 1.48 | 23.9 | 97 |
| Southwest to Southeast | | | | |
| Hitchcock | 4.7 | .98 | 4.6 | 64 |
| Harlan | 9.9 | .88 | 8.7 | 58 |
| Thayer | 7.2 | 1.17 | 8.4 | 76 |
| Cass | 8.8 | 1.53 | 13.5 | 100 |

TABLE 16.—*Apple trees per farm and also the approximate per cent of all land covered with woods (1909).*

| Type area | Apple trees per farm | Bushels of apples per tree | Bushels of apples per farm | Approximate per cent of all land covered with woods |
|---|---|---|---|---|
| Northwest to North Central | | | | |
| High Plains | 42 | .40 | .17 | 1.90 |
| Western Sand Hills | 1.08 | .03 | .03 | .40 |
| Eastern Sand Hills | 5.64 | .51 | 2.88 | 1.07 |
| Boyd | 9.76 | .94 | 9.16 | 2.92 |
| Southwest to Northeast | | | | |
| Chase | 1.27 | .21 | .27 | .31 |
| Buffalo | 9.55 | .96 | 9.20 | 1.68 |
| Custer | 11.40 | .59 | 6.70 | .99 |
| Wayne | 14.70 | 1.53 | 22.50 | 2.35 |
| Southwest to Southeast | | | | |
| Hitchcock | 1.90 | .20 | .38 | .49 |
| Harlan | 9.60 | .45 | 4.33 | 1.34 |
| Thayer | 35.40 | .77 | 27.40 | 2.68 |
| Cass | 55.30 | 1.40 | 77.40 | 4.20 |

### THE HARVEST VALUE OF CROPS

The census reports the value of crops grown on crop land, but does not report the value of pasture growth. If the value of plant growth on one type of farm is to be compared with the value of plant growth on another type of farm, pasture must be included. Furthermore, the value assigned to pasture growth must be comparable with the value assigned to crop growth. Since the census gives to crops what might be termed a harvest value (Table 17), it will be necessary to compute a similar value for pasture (Table 18). In computing the so-called harvest value of pasture it was assumed that the acreage of pasture per farm multiplied by the average value of all land would give a fair index to the total value of pasture land, and that 5 per cent of the total would not be far from the actual harvest value of pasture per farm. If it had been possible, however, the average value of pasture land would have been used in the place of the average value of all land and $7\frac{1}{2}$ per cent (three times what is approximately the actual rent) would have been used in the place of 5 per cent.

TABLE 17.—*The harvest value per farm of all crops grown on crop land in 1909.*

| Type area | Value of all crops grown on crop land, 1909 | Per cent from grains, vegetables, fruits, etc. | Per cent from hay and other rough feeds | Value of crops per acre of crop land | Percentage index to the value of crops per acre |
|---|---|---|---|---|---|
| Northwest to North Central | | | | | |
| High Plains | $744 | 61 | 39 | $7.45 | 54 |
| W. Sand Hills | 732 | 44 | 56 | 3.95 | 29 |
| E. Sand Hills | 911 | 68 | 32 | 6.00 | 43 |
| Boyd | 1,185 | 71 | 29 | 6.50 | 47 |
| Southwest to Northeast | | | | | |
| Chase | 1,004 | 86 | 14 | 7.50 | 54 |
| Buffalo | 1,582 | 81 | 19 | 11.45 | 83 |
| Custer | 1,544 | 82 | 18 | 10.65 | 77 |
| Wayne | 1,939 | 87 | 13 | 13.70 | 99 |
| Southwest to Southeast | | | | | |
| Hitchcock | 1,261 | 86 | 14 | 6.15 | 45 |
| Harlan | 1,199 | 83 | 17 | 8.05 | 58 |
| Thayer | 1,718 | 88 | 12 | 13.80 | 100 |
| Cass | 1,612 | 88 | 12 | 13.80 | 100 |

TABLE 18.—*The estimated harvest value of pasture per farm in 1909.*

| Type area | Approximate value per acre of all land | Acres of pasture per farm | Index to total pasture value Col. 1xCol. 2. | Estimated harvest value of pasture (5% of the values in Col. 3) |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| Northwest to North Central | | | | |
| High Plains | $9.89 | 1029 | $10,180 | $509 |
| W. Sand Hills | 4.66 | 1596 | 7,437 | 372 |
| E. Sand Hills | 10.10 | 707 | 7,141 | 357 |
| Boyd | 22.73 | 409 | 9,297 | 465 |
| Southwest to Northwest | | | | |
| Chase | 11.06 | 698 | 7,720 | 386 |
| Buffalo | 49.10 | 122 | 5,990 | 300 |
| Custer | 34.83 | 200 | 6,966 | 348 |
| Wayne | 69.50 | 87 | 6,046 | 302 |
| Southwest to Southeast | | | | |
| Hitchcock | 15.67 | 469 | 7,349 | 368 |
| Harlan | 35.40 | 130 | 4,602 | 230 |
| Thayer | 74.60 | 60 | 4,476 | 224 |
| Cass | 85.90 | 54 | 4,639 | 232 |

TABLE 19.—*Value of crop and pasture growth per farm in 1909.*

| Type area | Estimated harvest value of pasture | Harvest value of pasture per acre of pasture land | Value of crops plus the estimated value of pasture | Value of crops and pasture per acre of the farm area | Per cent of the value of land |
|---|---|---|---|---|---|
| **Northwest to North Central** | | | | | |
| High Plains | $509 | $ .49 | $1253 | $1.11 | 11 |
| W. Sand Hills | 372 | .23 | 1104 | .62 | 13 |
| E. Sand Hills | 357 | .50 | 1268 | 1.48 | 15 |
| Boyd | 465 | 1.14 | 1650 | 2.79 | 12 |
| **Southwest to Northeast** | | | | | |
| Chase | 386 | .55 | 1390 | 1.67 | 15 |
| Buffalo | 300 | 2.46 | 1882 | 7.24 | 15 |
| Custer | 348 | 1.74 | 1892 | 5.48 | 16 |
| Wayne | 302 | 3.51 | 2241 | 9.79 | 14 |
| **Southwest to Southeast** | | | | | |
| Hitchcock | 368 | .78 | 1629 | 2.42 | 15 |
| Harlan | 230 | 1.77 | 1429 | 5.13 | 14 |
| Thayer | 224 | 3.73 | 1942 | 10.55 | 14 |
| Cass | 232 | 4.30 | 1844 | 10.78 | 13 |

## CROP INDEXES

In 1909 the Hitchcock type of farm produced on 48.70 acres as many bushels of corn as the Cass type of farm produced on 16.94 acres.* According to this ratio 100 acres of corn in the Hitchcock area would have produced as much as 34.77 acres in the Cass area. In Farm Management this statement would commonly read—the crop index of corn land in the Hitchcock area is 34.77 per cent of that in the Cass area.

Table 20 illustrates the method of determining the crop index of the cultivated land, the crop land, and the farm as a whole. It will be observed that according to this calculation

*Representative counties in the Cass area—Cass, Dodge, Johnson, Otoe, Pawnee, Saunders, and Washington Counties produced 21,977,553 bushels of corn on 795,719 acres. Acres per farm reporting domestic animals, 59.82. Bushels per farm, 1,652. Yield per acre, 27.62 bushels. (1909)

Representative counties in Hitchcock area—Hitchcock county in Nebraska and Logan, Rawlins, Sheridan, and Thomas Counties in Kansas produced 2,062,805 bushels of corn on 214,529 acres. Acres per farm reporting domestic animals, 48.70. Bushels per farm, 468. Yield per acre, 9.61 bushels. (1909)

200.12 acres of cultivated land in the Hitchcock area were about equivalent in 1909 to 83.19 acres of cultivated land in the Cass area. It is readily seen that this is a ratio of 100 acres to 41.6 acres, and that the crop index of the Hitchcock cultivated land must therefore be 41.6 per cent.

Wild hay occupies such a small acreage on the Hitchcock type of farm that there is little difference between the area of cultivated land and the area of crop land. This being true, it is not surprising to find that the crop index of crop land measures very nearly the same as the crop index of the cultivated land.

The value of land is here assumed to be in harmony with the normal yield of native pasture grasses. (Field studies in many parts of the State indicate that this is in general true.) If the inventory of live stock and the use of pasture in one area could have been directly compared with the inventory of live stock and the use of pasture in another area, the carrying capacity of the land rather than its value would have been used as an index to pasture yields. When pasture land is added to crop land the index to yields is decidedly lowered. This is especially true of western areas where the greatest difference exists between the quantity of plant growth on the land selected for crops and the quantity of plant growth on the land left for pasture.

TABLE 20.—*The calculation of Hitchcock crop indexes using the Cass type of farm as a basis.*

| (1) Kinds of crops | (2) Acreage of various crops grown on the Hitchcock type of farm. | (3) Total yield from the acreage of various crops grown on the Hitchcock type of farm. | (4) Yield per acre of various crops grown on the Cass type of farm. | (5) Acreage of the Cass type of farm equivalent in 1909 to a given acreage of the Hitchcock type of farm. (Figures in Col. 3 divided by corresponding figures in Col. 4.) | (6) Hitchcock crop indexes (figures in Col. 5 divided by corresponding figures in Col. 2) Cass=100% |
|---|---|---|---|---|---|
| Rye ......................... | $0.48 A | 4 bu. | 14.22 bu. | 0.28 A | |
| Winter wheat............ | 99.20 A | (All wheat) | (All wheat) | (All wheat) | |
| Spring wheat .......... | 4.88 A | 667 bu. | 18.81 bu. | 35.45 A | |
| Oats ....................... | 4.16 A | 78 bu. | 24.43 bu. | 3.19 A | |
| Barley .................... | 19.00 A | 260 bu. | 21.23 bu. | 12.25 A | |
| Emmer ..................... | 1.09 A | 21 bu. | 16.83 bu. | 1.25 A | |
| Grains cut green.... | 0.19 A | 0.18 T | 1.37 T | .13 A | |
| Potatoes ................ | 0.50 A | 25 bu. | 88.00 bu. | .28 A | |
| Corn ..................... | 48.70 A | 468 bu | 27.62 bu. | 16.94 A | |
| Millet ................... | 2.56 A | 3.31 T | 1.96 T | 1.69 A | |
| Kafir .................... | 0.97 A | 8.80 bu. | 16.17 bu. | .54 A | |
| Cane ..................... | 0.21 A | 0.28 T | 3.45 T | .08 T | |
| Coarse Forage......... | 12.82 A | 19.25 T | 2.67 T | 7.32 A | |
| Timothy .................. | ........ | ........ | 1.52 T | ........ | |
| Timothy and clover | ........ | | 1.54 T | ........ | |
| Clocer ................... | 0.20 A | 0.20 T | 1.49 T | .13 A | |
| Alfalfa .................. | 5.05 A | 10.18 T | 2.84 T | 3.58 A | |
| Other tame grasses | 0.11 A | 0.11 T | 1.47 T | .08 A | |
| Small fruit ............. | ........ | ........ | ........ | ........ | |
| Total ................. | 200.12 A | | | 83.19 A | cultivated land Index 41.6% |
| Wild hay ............. | 4.66 A | 4.6 T | 1.53 T | 2.99 A | |
| Total ............. | 204.78 A | | | 86.18 A | Crop land index 42.1% |
| Pasture .............. | 469.00 A | | | 85.50 A* | |
| Total .............. | 673.78 A | | | 171.68 A | Crop and pasture land Index 25.5 % |

*The acreage of pasture in the Hitchcock type of farm (469.00A) is to be equivalent acreage of pasture in the Cass type of farm (85.50A) as the price of land in the Cass area ($85.90) is to the price of land in the Hitchcock area ($15.67.)

TABLE 21.—*What were approximately equivalent acreages in 1909.*

| Type area | Cultivated land | | Crop land | | Crops and pasture | |
|---|---|---|---|---|---|---|
| | Actual acreage | Equivalent acreage of Cass land in 1909* | Actual acreage | Equivalent acreage of Cass land in 1909* | Actual acreage | Equivalent acreage of Cass land in 1909* |
| High Plains | 59 | 40.4 | 100 | 57.7 | 1129 | 169.5 |
| W. Sand Hills | 40 | 23.8 | 185 | 101.5 | 1781 | 188.2 |
| E. Sand Hills | 63 | 51.0 | 152 | 102.0 | 859 | 184.4 |
| Boyd | 96 | 78.9 | 182 | 136.5 | 591 | 244.5 |
| Southwest to Northeast | | | | | | |
| Chase | 122 | 67.9 | 133 | 73.8 | 831 | 163 5 |
| Buffalo | 119 | 98.8 | 138 | 113.1 | 260 | 183.0 |
| Custer | 121 | 102.9 | 145 | 117.1 | 345 | 198 0 |
| Wayne | 126 | 148.0 | 142 | 163.5 | 229 | 233.5 |
| Southwest to Southeast | | | | | | |
| Hitchcock | 200 | 83.2 | 205 | 86.2 | 674 | 171.7 |
| Harlan | 138 | 74.1 | 148 | 79.9 | 278 | 133.9 |
| Thayer | 117 | 89.8 | 124 | 95.1 | 184 | 147.0 |
| Cass (the base) | 108 | 108.0 | 117 | 117.0 | 171 | 171.0 |

*The value of land cannot be judged from such equivalent acreages as appear in this table. In some cases the so-called equivalent acreage of Cass land is made up largely of pasture and wild hay and in other cases it contains a large share of cultivated land. For example, the 1781-acre farm in the Western Sand Hills appears to be equivalent to 188 acres of **average** land in the Cass area. This is 17 acres greater than the average Cass farm. When one stops to consider, however, that the equivalent acreage of Cass land (188 acres) is made up of 23 acres of good cultivated land in the Cass area, 78 acres of Cass wild hay land, and 87 acres of Cass pasture land, it is readily seen that it is not equivalent to an equal acreage of average land in the Cass area. Furthermore, in studying the equivalent acreages given above it must be borne in mind that it is more expensive to harvest a given quantity of a crop where yields are low than where yields are high and also that where farms are large the distance to market is greatly increased.

TABLE 22.—*Crop indexes in 1909.**

| Type area | Crop index of cultivated land. Cass = 100% | Crop index of crop land. Cass = 100% | Crop index of the farm area. Cass = 100% |
|---|---|---|---|
| Northwest to North Central | | | |
| High Plains | 68.5% | 57.7% | 15.0% |
| Western Sand Hills | 59.5 | 54.8 | 10.6 |
| Eastern Sand Hills | 80.9 | 67.1 | 21.5 |
| Boyd | 82.2 | 75.0 | 41.4 |
| Southwest to Northeast | | | |
| Chase | 55.6 | 55.4 | 19.7 |
| Buffalo | 83.0 | 82.0 | 70.4 |
| Custer | 85.0 | 80.8 | 57.4 |
| Wayne | 117.4 | 115.0 | 102.0 |
| Southwest to Southeast | | | |
| Hitchcock | 41.6 | 42.1 | 25.5 |
| Harlan | 53.7 | 54.0 | 48.2 |
| Thayer | 76.7 | 76.7 | 79.9 |
| Cass | 100.0 | 100.0 | 100.0 |

*The equivalent acreage divided by the actual acreage.

TABLE 23.—*Cows on hand April 15, 1910, and the production of milk and butter for the calendar year 1909.*

| Type area | Head of dairy cows per farm | Head of other cows per farm | Gallons of milk produced per farm* | Pounds of butter per farm |
|---|---|---|---|---|
| Northwest to North Central | | | | |
| High Plains | 3.7 | 12.7 | 837 | 145 |
| Western Sand Hills | 3.7 | 27.3 | 789 | 140 |
| Eastern Sand Hills | 5.6 | 8.2 | 1113 | 150 |
| Boyd | 6.7 | 9.2 | 1423 | 190 |
| Southwest to Northeast | | | | |
| Chase | 3.8 | 5.7 | 725 | 137 |
| Buffalo | 5.5 | 4.8 | 1660 | 184 |
| Custer | 5.1 | 6.6 | 1270 | 191 |
| Wayne | 5.7 | 4.9 | 1440 | 246 |
| Southwest to Southeast | | | | |
| Hitchcock | 4.8 | 2.7 | 1014 | 142 |
| Harlan | 4.7 | 3.3 | 1160 | 192 |
| Thayer | 4.3 | 2.2 | 1149 | 184 |
| Cass | 4.7 | 3.2 | 1337 | 241 |

*"Milk produced represents all the milk produced during the year (except that fed directly, without being skimmed, to calves, pigs, etc., on the farm), even tho a portion or all of such milk is converted into butter or cheese and reported under these items."

TABLE 24.—*Cattle other than cows on hand April 15, 1910.*

| Type area | Yearling heifers per farm | Spring calves per farm | Yearling steers per farm | Other steers and bulls per farm |
|---|---|---|---|---|
| Northwest to North Central | | | | |
| High Plains | 4.2 | 3.7 | 3.9 | 8.4 |
| Western Sand Hills | 8.0 | 6.9 | 8.1 | 16.4 |
| Eastern Sand Hills | 3.6 | 4.0 | 4.0 | 6.0 |
| Boyd | 4.6 | 5.3 | 6.0 | 9.3 |
| Southwest to Northeast | | | | |
| Chase | 2.4 | 2.4 | 2.4 | 4.1 |
| Buffalo | 3.0 | 3.1 | 2.8 | 4.0 |
| Custer | 3.3 | 3.4 | 3.5 | 4.4 |
| Wayne | 3.1 | 3.1 | 3.0 | 4.8 |
| Southwest to Southeast | | | | |
| Hitchcock | 2.0 | 2.3 | 1.8 | 2.4 |
| Harlan | 2.3 | 2.5 | 2.1 | 1.9 |
| Thayer | 1.8 | 2.0 | 1.6 | 1.8 |
| Cass | 2.3 | 2.3 | 2.0 | 2.0 |

TABLE 25.—*Total number and value of cattle on hand April 15, 1910, and the number sold or slaughtered during the calendar year 1909.*

| Type area | Total number of cattle per farm | Value of cattle per farm | Number of cattle sold or slaughtered |
|---|---|---|---|
| Northwest to North Central | | | |
| High Plains | 36.6 | $939 | 14.8 |
| Western Sand Hills | 70.4 | 1910 | 24.3 |
| Eastern Sand Hills | 31.4 | 756 | 11.3 |
| Boyd | 41.1 | 1000 | 15.4 |
| Southwest to Northeast | | | |
| Chase | 20.8 | 475 | 8.6 |
| Buffalo | 23.2 | 584 | 11.6 |
| Custer | 26.3 | 647 | 12.3 |
| Wayne | 24.6 | 623 | 11.5 |
| Southwest to Southeast | | | |
| Hitchcock | 16.0 | 351 | 6.0 |
| Harlan | 16.8 | 393 | 7.8 |
| Thayer | 13.7 | 337 | 6.5 |
| Cass | 16.5 | 407 | 7.5 |

TABLE 26.—*Horses and mules on hand April 15, 1910.*

| Type area | Mature horses per farm | Yearling horses per farm | Mature mules per farm | Yearling mules per farm |
|---|---|---|---|---|
| Northwest to North Central | | | | |
| High Plains | 9.6 | 1.7 | 0.2 | 0.1 |
| Western Sand Hills | 10.8 | 1.7 | 0.3 | 0.1 |
| Eastern Sand Hills | 6.6 | 0.8 | 0.4 | 0.1 |
| Boyd | 7.6 | 0.9 | 0.5 | 0.1 |
| Southwest to Northeast | | | | |
| Chase | 7.9 | 1.0 | 0.7 | 0.2 |
| Buffalo | 6.9 | 0.8 | 0.4 | 0.1 |
| Custer | 7.7 | 1.0 | 0.4 | 0.1 |
| Wayne | 6.8 | 0.6 | 0.2 | 0.0 |
| Southwest to Southeast | | | | |
| Hitchcock | 7.6 | 1.0 | 0.7 | 0.2 |
| Harlan | 6.6 | 0.8 | 0.8 | 0.2 |
| Thayer | 5.8 | 0.6 | 0.7 | 0.1 |
| Cass | 5.8 | 0.5 | 0.6 | 0.1 |

TABLE 27.—*The total number and value of horses and mules and also the approximate number and value of work animals (1910).*

| Type area | Head of all horses and mules per farm | Total value of horses and mules per farm | Approximate number of work animals per farm* | Approximate value of work animals per farm* |
|---|---|---|---|---|
| Northwest to North Central | | | | |
| High Plains | 11.6 | $1022 | 8.0 | $760 |
| Western Sand Hills | 12.9 | 1058 | 9.3 | 809 |
| Eastern Sand Hills | 7.9 | 723 | 6.1 | 586 |
| Boyd | 9.1 | 940 | 7.1 | 767 |
| Southwest to Northeast | | | | |
| Chase | 9.8 | 971 | 7.4 | 770 |
| Buffalo | 8.2 | 993 | 6.4 | 742 |
| Custer | 9.2 | 971 | 7.0 | 777 |
| Wayne | 7.7 | 923 | 6.5 | 795 |
| Southwest to Southeast | | | | |
| Hitchcock | 9.5 | 942 | 7.1 | 738 |
| Harlan | 8.4 | .895 | 6.4 | 710 |
| Thayer | 7.2 | 846 | 5.8 | 650 |
| Cass | 7.0 | 807 | 5.8 | 677 |

*The total number of horses and mules minus twice the number of yearling horses and mules leaves approximately the number of work animals.
†The total value of horses and mules divided by the total number of horse units and mule units (one mature animal or two yearlings) gives approximately the value of one work animal. This value per head multiplied by the number of work animals gives the approximate value of all work animals.

TABLE 28.—*Hogs and corn per farm.*

| Type area | Mature hogs per farm. April 15, 1910 | Hogs sold or slaughtered during year 1909 | Bushels of corn raised per farm 1909 | Bushels of corn per hog unit* |
|---|---|---|---|---|
| Northwest to North Central | | | | |
| High Plains | 2.5 | 3.9 | 180 | 202 |
| Western Sand Hills | 3.2 | 8.1 | 364 | 251 |
| Eastern Sand Hills | 7.3 | 10.2 | 818 | 330 |
| Boyd | 14.4 | 17.5 | 1215 | 262 |
| Southwest to Northeast | | | | |
| Chase | 9.9 | 12.5 | 819 | 253 |
| Buffalo | 18.9 | 26.7 | 1378 | 214 |
| Custer | 22.6 | 29.4 | 1748 | 231 |
| Wayne | 25.9 | 28.8 | 2500 | 310 |
| Southwest to Southeast | | | | |
| Hitchcock | 6.4 | 11.2 | 468 | 195 |
| Harlan | 13.9 | 23.5 | 816 | 159 |
| Thayer | 13.6 | 21.8 | 1079 | 220 |
| Cass | 15.4 | 21.8 | 1652 | 316 |

*Mature hogs on hand April 15, 1910, plus one-half of the hogs sold or slaughtered during the year 1909 and this sum divided by five gives the approximate number of hog units.

TABLE 29.—*Poultry raised and eggs produced in 1909.*

| Type area | Number of poultry raised per farm | Eggs produced per farm Dozen | Eggs sold Dozen | Approximate number of eggs used in setting* Dozen | Approximate number of eggs used in the home Dozen |
|---|---|---|---|---|---|
| Northwest to North Central | | | | | |
| High Plains | 53 | 238 | 131 | 9 | 98 |
| Western Sand Hills | 54 | 137 | 43 | 9 | 85 |
| Eastern Sand Hills | 66 | 163 | 73 | 11 | 79 |
| Boyd | 88 | 252 | 138 | 15 | 99 |
| Southwest to | | | | | |
| Chase | 78 | 283 | 175 | 13 | 95 |
| Buffalo | 111 | 357 | 211 | 18 | 128 |
| Custer | 95 | 275 | 136 | 16 | 123 |
| Wayne | 113 | 409 | 261 | 19 | 129 |
| Southwest to Southeast | | | | | |
| Hitchcock | 97 | 332 | 220 | 16 | 96 |
| Harlan | 130 | 439 | 303 | 21 | 115 |
| Thayer | 142 | 434 | 285 | 23 | 126 |
| Cass | 131 | 387 | 234 | 22 | 131 |

*Two eggs allowed for each head of poultry raised.

TABLE 30.—*Approximate number of productive animal units per farm.**

| Type area | Cattle units per farm | Hog units per farm | Sheep units per farm | Poultry units per farm | Productive horse units per farm |
|---|---|---|---|---|---|
| Northwest to North Central | | | | | |
| High Plains | 28.85 | 0.89 | 1.60 | 0.53 | 2.70 |
| Western Sand Hills | 55.45 | 1.45 | 0.60 | 0.54 | 2.70 |
| Eastern Sand Hills | 23.60 | 2.48 | 0.19 | 0.66 | 1.35 |
| Boyd | 30.50 | 4.63 | 0.10 | 0.88 | 1.50 |
| Southwest to Northeast | | | | | |
| Chase | 16.00 | 3.23 | 0.06 | 0.78 | 1.80 |
| Buffalo | 17.20 | 6.45 | 0.60 | 1.11 | 1.35 |
| Custer | 19.50 | 7.56 | 0.19 | 0.95 | 1.65 |
| Wayne | 18.45 | 8.06 | 0.19 | 1.13 | 0.96 |
| Southwest to Southeast | | | | | |
| Hitchcock | 11.80 | 2.40 | 0.30 | 0.97 | 1.80 |
| Harlan | 12.10 | 5.13 | 0.10 | 1.30 | 1.50 |
| Thayer | 10.00 | 4.90 | 0.10 | 1.42 | 1.05 |
| Cass | 12.05 | 5.22 | 0.11 | 1.31 | 0.87 |

*All live stock aside from work animals are here classed as productive. In calculating the number of animal units, the number of spring calves, spring colts, spring pigs, etc., are omitted. Of other animals, one cow, two yearling heifers, one horse, two yearling colts, five hogs, seven sheep, or one hundred head of poultry, are used as one animal unit.

TABLE 31.—*The approximate total number of animal units per farm in 1909.*

| Type area | Productive animal units | Units of work stock | Total number of animal units |
|---|---|---|---|
| Northwest to North Central | | | |
| High Plains | 34.6 | 8.0 | 42.6 |
| Western Sand Hills | 60.7 | 9.3 | 70.0 |
| Eastern Sand Hills | 28.3 | 6.1 | 34.4 |
| Boyd | 37.6 | 7.1 | 44.7 |
| Southwest to Northeast | | | |
| Chase | 21.9 | 7.4 | 29.3 |
| Buffalo | 26.7 | 6.4 | 33.1 |
| Custer | 29.8 | 7.0 | 36.8 |
| Wayne | 28.8 | 6.5 | 35.3 |
| Southwest to Southeast | | | |
| Hitchcock | 17.3 | 7.1 | 24.4 |
| Harlan | 20.1 | 6.4 | 26.5 |
| Thayer | 17.5 | 5.8 | 23.3 |
| Cass | 19.6 | 5.8 | 25.4 |

TABLE 32.—*The approximate division of live-stock capital between productive stock and work animals.*

| Type area | Value of all live stock per farm | Approximate value of work stock | Approximate value of productive live stock | Approximate per cent of live-stock capital that was in productive live stock |
|---|---|---|---|---|
| Northwest to North Central | | | | |
| High Plains | $2084 | $760 | $1324 | 64% |
| Western Sand Hills | 3090 | 809 | 2281 | 74 |
| Eastern Sand Hills | 1624 | 586 | 1038 | 64 |
| Boyd | 2188 | 767 | 1421 | 65 |
| Southwest to Northeast | | | | |
| Chase | 1616 | 770 | 846 | 52 |
| Buffalo | 1849 | 742 | 1107 | 60 |
| Custer | 1998 | 777 | 1221 | 61 |
| Wayne | 1984 | 795 | 1189 | 60 |
| Southwest to Southeast | | | | |
| Hitchcock | 1429 | 738 | 691 | 48 |
| Harlan | 1543 | 710 | 824 | 54 |
| Thayer | 1440 | 650 | 790 | 55 |
| Cass | 1510 | 677 | 833 | 55 |

### TABLE 33.—*Receipts from live stock in 1909.*

| Type area | Receipts from the sale of animals | Value of animals slaught-ered | Value of dairy pro-ducts* | Value of poultry and eggs produced | Value of wool pro-duced | Total receipts from live stock |
|---|---|---|---|---|---|---|
| Northwest to North Central | | | | | | |
| High Plains | $636 | $43 | $54 | $66 | $20 | $819 |
| Western Sand Hills | 934 | 32 | 48 | 43 | 6 | 1063 |
| Eastern Sand Hills | 600 | 27 | 67 | 50 | 1 | 745 |
| Boyd | 808 | 39 | 92 | 70 | 1 | 1010 |
| Southwest to Northeast | | | | | | |
| Chase | 442 | 32 | 41 | 77 | 1 | 593 |
| Buffalo | 997 | 42 | 98 | 102 | 4 | 1243 |
| Custer | 1012 | 38 | 78 | 79 | 1 | 1208 |
| Wayne | 1030 | 49 | 95 | 109 | 1 | 1284 |
| Southwest to Southeast | | | | | | |
| Hitchcock | 462 | 41 | 62 | 88 | 0 | 653 |
| Harlan | 718 | 39 | 74 | 117 | 1 | 948 |
| Thayer | 684 | 42 | 73 | 129 | 1 | 929 |
| Cass | 693 | 45 | 84 | 129 | 1 | 952 |

*The census omits here the milk and cream used in the home.

### TABLE 34.—*Labor hired in 1909.**

| Type area | Per cent of farms re-porting labor hired in 1909 | Cash spent per farms reporting labor hired | Value of board furnished | Wages and board per farm reporting labor hired |
|---|---|---|---|---|
| Northwest to North Central | | | | |
| High Plains | 38.7 | $192 | $64 | $256 |
| Western Sand Hills | 37.5 | 319 | 82 | 401 |
| Eastern Sand Hills | 38.1 | 173 | 46 | 219 |
| Boyd | 43.6 | 181 | 54 | 235 |
| Southwest to Northeast | | | | |
| Chase | 37.8 | 162 | 54 | 216 |
| Buffalo | 47.0 | 184 | 59 | 243 |
| Custer | 44.0 | 179 | 61 | 240 |
| Wayne | 55.0 | 202 | 68 | 270 |
| Southwest to Southeast | | | | |
| Hitchcock | 60.0 | 182 | 41 | 223 |
| Harlan | 54.0 | 215 | 41 | 256 |
| Thayer | 54.0 | 149 | 47 | 196 |
| Cass | 49.0 | 180 | 52 | 232 |

*According to field studies the average farm in Nebraska requires about 20 months of man labor per year. As a rule the operator contributes 12 months, his boys or other members of his family the equivalent of 5 months, and hired labor about 3 months.

TABLE 35.—*A calculation of the value per acre of such land
as was not reported in the census.* *(1909).*

| Type area | Acres of land per farm reported in the census (1909) | Per cent of land reported | Value per acre of such land as was reported | Approximate acreage of land per farm not reported | Calculated value per acre of such land as was not reported* |
|---|---|---|---|---|---|
| Northwest to North Central | | | | | |
| High Plains | 746 | 66.0 | $11.18 | 383 A | $7.38 |
| Western Sand Hills | 859 | 48.0 | 6.38 | 922 | 3.06 |
| Eastern Sand Hills | 629 | 73.0 | 10.88 | 230 | 7.94 |
| Boyd | 549 | 77.5 | 23.10 | 42 | 17.90 |
| Southwest to Northeast | | | | | |
| Chase | 502 | 60.4 | 13.12 | 329 | 7.92 |
| Buffalo | 240 | 92.3 | 49.40 | 20 | 45.60 |
| Custer | 316 | 91.3 | 35.10 | 29 | 32.06 |
| Wayne | 213 | 93.0 | 69.90 | 16 | 65.01 |
| Southwest to Southeast | | | | | |
| Hitchcock | 531 | 79.0 | 16.40 | 143 | 12.95 |
| Harlan | 264 | 95.0 | 35.50 | 14 | 33.72 |
| Thayer | 178 | 96.4 | 74.80 | 6 | 72.10 |
| Cass | 164 | 96.0 | 86.10 | 7 | 82.66 |

*The value of land not reported is here made to bear the same relation to the
value of land reported as the per cent of land reported bears to 100 per cent of
all land.

TABLE 36.—*Approximate value of land per farm in 1910.*

| Type area | Total value of the land reported in the census | Calculated total value of the land not reported | Approximate total value of all land | Approxi mate value per acre of all land |
|---|---|---|---|---|
| Northwest to North Central | | | | |
| High Plains | $8,340 | $2,826 | $11,166 | $9 89 |
| Western Sand Hills | 5,480 | 2,821 | 8,301 | 4.66 |
| Eastern Sand Hills | 6,844 | 1,826 | 8,670 | 10.10 |
| Boyd | 12,682 | 752 | 13,434 | 22.73 |
| Southwest to Northeast | | | | |
| Chase | 6,586 | 2,606 | 9,192 | 11.06 |
| Buffalo | 11,856 | .912 | 12,768 | 49.10 |
| Custer | 11,092 | .929 | 12,021 | 34.83 |
| Wayne | 14,889 | 1,040 | 15,929 | 69.50 |
| Southwest to Southeast | | | | |
| Harlan | 9,372 | 472 | 9,844 | 35.40 |
| Hitchcock | 8,708 | 1,852 | 10,560 | 15.67 |
| Thayer | 13,314 | 433 | 13,747 | 74.60 |
| Cass | 14,120 | 578 | 14,698 | 85.90 |

**TABLE 37.**—*Capital in live stock, machinery, buildings, and land (1910).*

| Type area | Value of live stock per farm | Value of machinery per farm | Value of buildings per farm | Approximate value of land per farm |
|---|---|---|---|---|
| Northwest to North Central | | | | |
| High Plains | $2,084 | $290 | $1,015 | $11,166 |
| Western Sand Hills | 3,090 | 215 | 802 | 8,301 |
| Eastern Sand Hills | 1,624 | 235 | 918 | 8,670 |
| Boyd | 2,188 | 334 | 1,287 | 13,434 |
| Southwest to Northwest | | | | |
| Chase | 1,616 | 294 | 885 | 9,192 |
| Buffalo | 1,849 | 366 | 1,558 | 12,768 |
| Custer | 1,998 | 327 | 1,419 | 12,021 |
| Wayne | 1,984 | 423 | 1,982 | 15,929 |
| Southwest to Southeast | | | | |
| Hitchcock | 1,429 | 350 | 938 | 10,560 |
| Harlan | 1,534 | 306 | 1,251 | 9,844 |
| Thayer | 1,440 | 358 | 1,591 | 13,747 |
| Cass | 1,510 | 362 | 1,887 | 14,698 |

**TABLE 38.**—*The approximate amount of capital per farm in 1910.*

| Type area | Total capital per farm | Total capital per acre |
|---|---|---|
| Northwest to North Central | | |
| High Plains | $14,555 | $12.90 |
| Western Sand Hills | 12,408 | 7.00 |
| Eastern Sand Hills | 11,447 | 13.30 |
| Boyd | 17,243 | 29.20 |
| Southwest to Northeast | | |
| Chase | 11.987 | 14.40 |
| Buffalo | 16.541 | 63.60 |
| Custer | 15,765 | 45.60 |
| Wayne | 20,318 | 88.70 |
| Southwest to Southeast | | |
| Hitchcock | 13.277 | 19.70 |
| Harlan | 12.935 | 46.50 |
| Thayer | 17,136 | 93.10 |
| Cass | 18,457 | 108.00 |

TABLE 39.—*The nativity of farm operators.*

| Type area | Per cent native | Per cent foreign born |
|---|---|---|
| Northwest to North Central | | |
| High Plains | 78 | 22 |
| Western Sand Hills | 85 | 15 |
| Eastern Sand Hills | 87 | 13 |
| Boyd | 72 | 28 |
| Southeast to Northeast | | |
| Chase | 86 | 14 |
| Buffalo | 70 | 30 |
| Custer | 85 | 15 |
| Wayne | 61 | 39 |
| Southwest to Southeast | | |
| Hitchcock | 81 | 19 |
| Harlan | 81 | 19 |
| Thayer | 73 | 27 |
| Cass | 69 | 31 |

TABLE 40.—*Degree of ownership.*

| Type area | Per cent of farms operated by strictly owners | Per cent of farms operated by part owners | Per cent of farms operated by tenants | Per cent of farms operated by managers |
|---|---|---|---|---|
| Northwest to North Central | | | | |
| High Plains | 75 | 15 | 9 | 1 |
| Western Sand Hills | 83 | 13 | 3 | 1 |
| Eastern Sand Hills | 68 | 19 | 12 | 1 |
| Boyd | 49 | 23 | 27 | 1 |
| Southwest to Northeast | | | | |
| Chase | 55 | 28 | 17 | 0 |
| Buffalo | 45 | 15 | 39 | 1 |
| Custer | 45 | 17 | 38 | 1 |
| Wayne | 44 | 13 | 42 | 1 |
| Southwest to Southeast | | | | |
| Hitchcock | 35 | 38 | 26 | 1 |
| Harlan | 38 | 22 | 40 | 0 |
| Thayer | 39 | 15 | 45 | 1 |
| Cass | 42 | 13 | 44 | 1 |

TABLE 41.—*The forms of tenancy.*

| Type area | Per cent of tenants classed as share and share-cash | Per cent classed as strictly cash tenants | Per cent not classified |
|---|---|---|---|
| **Northwest to North Central** | | | |
| High Plains | 48% | 27% | 25% |
| Western Sand Hills | 52 | 24 | 24 |
| Eastern Sand Hills | 65 | 16 | 19 |
| Boyd | 70 | 23 | 7 |
| **Southwest to Northeast** | | | |
| Chase | 82 | 5 | 13 |
| Buffalo | 80 | 13 | 7 |
| Custer | 77 | 13 | 10 |
| Wayne | 50 | 45 | 5 |
| **Southwest to Southeast** | | | |
| Hitchcock | 85 | 4 | 11 |
| Harlan | 89 | 6 | 5 |
| Thayer | 85 | 11 | 4 |
| Cass | 60 | 35 | 5 |

TABLE 42.—*A calculation of the average distance from farm to town.*

| Type area | Average number of sections of land per town* | Calculated diameter of trade territory† | Calculated average distance to town*† |
|---|---|---|---|
| **Northwest to North Central** | Sq. Miles | Miles | Miles |
| High Plains | 825 | 32 | 11.4 |
| Western Sand Hills | 1514 | 44 | 15.5 |
| Eastern Sand Hills | 1170 | 39 | 13.6 |
| Boyd | 284 | 19 | 6.7 |
| **Southwest to Northeast** | | | |
| Chase | 444 | 24 | 8.4 |
| Buffalo | 120 | 12 | 4.4 |
| Custer | 201 | 16 | 5.6 |
| Wayne | 108 | 12 | 4.1 |
| **Southwest to Southeast** | | | |
| Hitchcock | 439 | 24 | 8.3 |
| Harlan | 154 | 14 | 5.0 |
| Thayer | 81 | 10 | 3.6 |
| Cass | 59 | 9 | 3.1 |

*Sections of land in the counties chosen to represent a type area divided by the number of towns contained.

†The square root of the quantity obtained by dividing the average number of sections per town by 0.7845.

*†The square root of the quantity obtained by dividing one-half of the average number of sections per town by 3.1416.

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