GEOGRAPHY OF INDIANA AGRICULTURE.

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The importance of agriculture in Indiana and its intimate relations to geographic conditions requires that it receive much attention in any thoroughgoing discussion of Indiana geography. Although the general features of the geography of Indiana's agriculture are well known, many significant phases have only recently come to light, as a result of a detailed study. Some interesting conclusions are given here.

Crop Values.—There is a great contrast among the counties in the total value of crops, Benton County with $4,400,000 in 1924 having most and Brown County, of average size, only $400,000, or less than one-tenth as much per square mile as Benton County.

The section of the state which has the most valuable crops per square mile extends diagonally across the state from Union and Randolph counties on the east to Benton and Newton counties on the northwest. This zone, which is about 70 miles wide, had crops with an average value of about $35 per acre, or more than twice the average for the rest of the state. The county totals were $3,000,000 or more throughout this zone, except in Marion and some of the small but rich counties.

To the northeast of this richest belt, most of the counties had a 1924 crop valued at about two-thirds as much as in the richer belt, or approximately $22 per acre. The northern county producing most in proportion to area was Elkhart and that producing least was Starke. Starke County's crops had an average value of only $10 per acre of crop land, or little more than half the state average of $19. Starke County tied with Brown County in being the poorest in the state in this regard.

South of the rich zone, most of the counties have crops worth less than a third as much as in the richer belt. However, in the lower Wabash Valley there is a notable exception to this generalization, for Knox, Gibson and Posey counties have crops valued at from 4.2 to 3.3 millions and Daviess and Sullivan over 2.3 millions. All of the counties of the unglaciated south-central part of the state have crops having a per acre average value of little more than $11, which is also true of the counties along the Ohio River east of the unglaciated area. This is the more notable because a large share of the cultivated land in these rougher counties is along the valley bottoms, where the soil is relatively rich.

Corn.—In proportion to area, Indiana stands third in corn production. Repeatedly it has had the honor of producing the finest corn exhibited at the International Stock Show.

Corn is by far the main crop. It is grown on almost every farm and the acreage devoted to corn constitutes nearly one-half of the tilled

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land or nearly one-fourth of the total area. In recent years about 4,500,000 acres of corn have produced almost 200,000,000 bushels a year.

There is considerable variation among the counties in the acreage devoted to corn. The average farm in the south-central part of the state has only about ten acres in corn whereas the average farm in the north-central plain has about 32 acres. There is a similar contrast in yield. The south-central and southeastern counties produced an average of only about 500,000 bushels each in 1924; the northern and northeastern quarter an average of about 600,000 to 700,000 bushels each; but the counties in the rich central belt which extends across the state from Benton and Newton counties southeast to Wayne and Union produced an average of about 2,000,000 bushels each. Rush County led the state with 3,040,000 bushels. The lower Wabash Valley ranked high in 1924 also, Posey, Gibson and Knox producing an average of 2,500,000 bushels.

The yield in 1924 was the smallest in many years, an average of 25.6 bushels per acre in contrast to a state average of 43.5 bushels in 1925. Seldom, however, does the state annual yield fluctuate more than 10 per cent from the average, which is about 37 bushels.

Corn is an important crop in Indiana because the climate, soil and topography are all favorable to its production. Indiana's warm, moist summers, the long average period between the last killing frost in the spring and first in the fall and the rarity of severe hail storms are all more favorable for corn than are the conditions in most states. The average yield in Indiana is higher than that in several other important corn states, including Illinois, Missouri, Nebraska, and Minnesota, and is about 40 per cent higher than the average for the United States.

Wheat.—Wheat is second in value among Indiana crops. It has occupied about one-sixth of the crop land until the last few years, when it has occupied one-seventh. It is grown in all parts of the state, in rotation with other crops. The average yield per acre fluctuates widely with the weather. Between 1909 and 1925 the state average ranged from eight bushels per acre in 1912 and 12 bushels in 1916, 1920, and in 1921, to 21 bushels in 1918, 18.5 in 1917 and 17 in 1924. There is a normal fluctuation of 25 per cent from the average yield. This is in sharp contrast to the much more uniform yield of corn, in which there is a normal variation of only 10 per cent from the average. This is because Indiana's climate is much better suited to corn than to wheat. But the very speculative character of wheat is one reason why it is grown so widely in Indiana. The possibility of a large yield encourages the farmer to try it again. Perhaps a crop such as that of 1918 will be received. The fact that wheat requires little work and that at times when the farmer is not especially busy also encourages wheat production.

The distribution of wheat over the state has varied notably. A series of maps for each census since 1839 shows this clearly. The southwestern tip of the state has been important since 1879, when many other western counties grew much wheat, and there was heavy produc-

tion also in the most northern counties. None of the later censuses record much wheat in the western counties north of Knox County, and the production recorded from all the northern counties was small from about 1880 to 1920. The southeast-central counties were important producers in 1879, 1899, 1919 and 1924, but in the other census years were relatively unimportant.

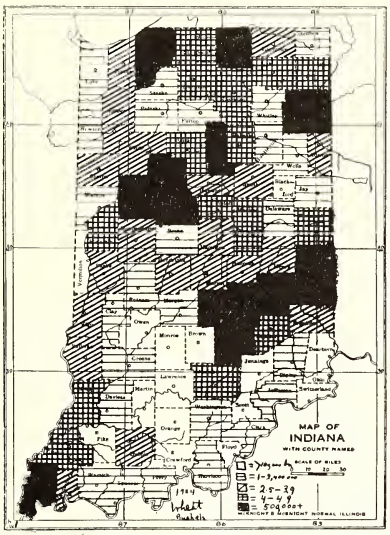

Fig. 1—Wheat yield 1924 (1925 Census) (Seven smallest counties doubled.)

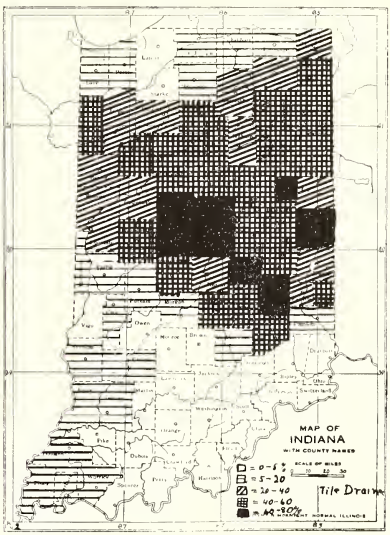

Fig. 2—Land tile-drained in 1924, percentage total area.

The returns for the 1925 census are mapped in figure 1 and reveal a further change in wheat production. It shows a new area of intense production not shown on any map for the census years since 1839, although it is suggested on the map for 1879. The leading counties in Indiana in wheat production in 1924 were Clinton and Tippecanoe with 690,000 and 630,000 bushels, respectively. Several counties nearby also ranked high, producing approximately 500,000 bushels each, or over twice the average for the state. It will be interesting to see whether this region will continue to find wheat profitable or will soon cease to be prominent in wheat production. One of the new varieties of wheat is better suited to conditions in that part of the state than any of the older varieties were.

Oats.—Oats now rank fourth in value among the crops of the state, being surpassed by corn and hay in both acreage and value and by wheat in value but not in acreage. About 1,700,000 acres are devoted to oats, of which about 100,000 acres are not threshed. The threshed part yields about 60,000,000 bushels of grain. The yield per acre varied, for the state average, from 21 bushels (1922) to 42 bushels (1917, 1918). The average for the 17 years 1909-1925 was about 33 bushels per acre.

Oats are grown in all parts of the state, but they occupy several times as large a proportion of the ground in the northern half as in the southern. In the south-central counties the yield is especially small, only 1,000 bushels being raised in Brown County in 1924 and less than 100,000 bushels in most southern and southeastern counties. In contrast, several northwestern counties produced over 2,000,000 bushels each, Benton County leading with 3,300,000. A second center of heavy production is in the northeast-central part of the state, from Grant to Allen counties, with an average of about 1,400,000 bushels.

Lesser Crops.—Many other crops are locally important in Indiana. A few of special interest are rye, barley, tomatoes, sweet corn, sugar beets, tobacco, onions, white potatoes and melons. The distribution of each of these over the state, as shown by maps made of the data collected by the 1925 census, may be briefly given.

Rye is grown most extensively in the central northern counties, La-Porte to LaGrange south almost to the Wabash River. There several counties harvested more than 4,000 acres and Kosciusko sowed nearly 8,000 acres. Several southeastern counties harvested from 1,000 to 3,000 acres. The total acreage harvested in 1924 (133,000 acres) was only one-half that in 1919, but apparently rye culture is spreading.

Barley is likewise chiefly grown in the northern quarter of the state, the counties with greatest production lying, however, at the extreme northwest and northeast corners of the state, and Kosciusko County. The only other counties with more than 10,000 bushels harvested in 1924 are Wayne and Harrison. There is no obvious reason why Harrison County should grow several times as much barley as other southern counties. Harrison County differs, however, from its neighbors conspicuously in regard to various crops and farm animals.

Tomatoes. Indiana is now the leading state in the culture of tomatoes for canning, growing about one-tenth of all the tomatoes grown in the United States and approximately one-fifth of those canned in factories. In 1924 there were 42,000 acres grown, several counties having from 1,000 to 2,000 acres and five counties between 2,000 and 4,000, namely Madison, Tipton, Grant, Jackson and Daviess. The first three of these counties are together and are situated north and northeast of Indianapolis, and are bordered by four counties (Delaware, Henry, Hancock, and Marion), each producing from 1,000 to 2,000 acres. Jackson County is in south-central Indiana and two counties (Scott and Clark) between it and Louisville also grew over 1,000 acres of tomatoes. Daviess County is in southwestern Indiana, and has no neighbor which grows nearly as many tomatoes, although Gibson County, not far away, grew nearly 1,000 acres, especially for the catsup factory at Princeton. The only county in the northern third of the state growing more than about 100 acres is Kosciusko, which grew nearly 1,000 acres.

Sweet Corn. Indiana farmers grew about 31,000 acres of sweet corn for canning, or about one-twelfth of the nation's total, in 1924. Indiana was notably surpassed only by Illinois and Iowa. In Indiana,

a dozen central counties grow three-fourths of the state's sweet corn and an even larger percentage of the corn for canning. The leading counties with their acreage are Shelby (5,200), Miami (2,800), Madison (1,920), Bartholomew (1,620), Tipton (1,500), Marion and Wabash (each 1,250), and Boone, Hamilton and Johnson (each 500 to 900). The only other counties having over 500 acres are Vigo and Vermillion, along the western state line, each with slightly over 500. None of the southern counties have as much as 100 acres except Vanderburgh (200) and Floyd (120). None of the northernmost counties have more than about 200 acres except Lake County (300).

Sugar beets occupied 6,600 acres in 1924, three counties growing two-thirds of the crop, namely Allen (1,200), Adams (1,250) and Grant (1,000). Other important counties are Wells (830), Jay (600), Tipton (420) and Madison (250). All of these counties are near together in the northeast-central part of the state. No other county had as many as 25 acres.

Tobacco. Indiana farmers devoted 20,700 acres to tobacco in 1924, and produced about 19,000,000 pounds, valued at $3,113,000, chiefly in counties situated along the Ohio River. The leading counties are Switzerland (3,450), Jefferson (3,100), Spencer (2,625), and Warrick (2,160). Other counties with more than 1,000 acres in tobacco were Clark (1,400), Harrison (1,325) and Dearborn (1,245), along the Ohio River also, and in addition, Franklin County (1,290), adjacent to the area of extensive tobacco culture in Ohio, and just north of Dearborn County. No county in the northern two-thirds of the state raised as much as 100 acres of tobacco except Randolph, on the Ohio boundary. Tobacco is reported from only three counties of the northern half of the state. Very little is also given in the southwestern counties north or west of Warrick County, which is on the Ohio River just east of Evansville. Indiana grows far less tobacco than is grown in counties in Kentucky and Ohio just across the state line, where climate and soil are similar to areas in Indiana. This is not unfortunate, however, as tobacco exhausts the fertility of the soil very rapidly, and, as most tobacco fields in this region are on rather steep hillsides, soil erosion also is rapid. Such hillsides had far better grow trees.

Onions (dry) occupied 8,345 acres in 1924, chiefly in the northern counties. No central or southern county had as much as 100 acres. The leading counties in onion growing are in the northeastern corner of the state and are as follows: Whitley (1,440 acres), Noble (1,422), Kosciusko (927).

White potatoes were grown on about 44,000 acres in 1924, the average yield being nearly 100 bushels per acre. More than 500 acres per county are grown in almost all of the counties bordering the Ohio River, Harrison with 1,500 acres leading in this group. The potatoes grown in these southern counties are chiefly early varieties. The northernmost counties of the state grow many late potatoes, St. Joseph County leading with 2,600 acres. Others with over 1,000 acres are LaPorte, Elkhart, LaGrange, DeKalb, Allen, Kosciusko and Marshall.

Melons are chiefly grown in the lower Wabash Valley. Of the state's 13,000 acres of melons, about a half are grown in three counties. Gibson County raised about 2,000 acres of muskmelons and canteloupes and 1,200 acres of watermelons. Knox County raised 800 acres of watermelons and 1,300 acres of other melons. Jackson county, in south-central Indiana, devoted about 1,000 acres to melons, half of it to watermelons.

Poultry.—Indiana is a leading poultry state, raising a total of over 25,000,000 chickens in 1924, valued at about $20,000,000, and laying 87,000,000 dozen eggs valued at $25,000,000. Hence poultry yielded over $45,000,000 or nearly $15 for each person in the state.

The distribution of poultry over the state is by no means uniform. A map, based on the 1926 report from the Department of Agricultural Statistics, reveals that the counties having most poultry are in the northeastern quarter of the state, except two, Ripley and Harrison. The counties with fewest poultry are situated south and southeast of Indianapolis, but the western tier of counties also have relatively few, except Sullivan and Knox, which have about 150,000 each.

Comparisons with other geographic maps of Indiana reveal some interesting correspondences and differences. The northeastern counties which have most poultry are, except Hamilton County, situated in the region where the average period between the last killing frost in spring and the first in the fall is less than 160 days. Apparently in the neighboring counties to the west and south, where the growing season is longer than 160 days, corn production succeeds enough better so that there is less incentive to raise chickens than in these cooler more northeastern counties. The relative sparsity of poultry in the western tier of counties corresponds with the distribution of silos, cows, tenancy and the percentage of corn crop sold for cash. None of the counties having most valuable farm land, on the average, or those which produce the most valuable crops per acre are black in the poultry map (have more than 14,000 dozen poultry), with the exception of Hamilton County. No one of the poorest counties in the state or the counties which lost population between 1910 and 1920 or between 1890 and 1920 have much poultry. Apparently the extensive raising of poultry is associated with moderate prosperity, though not with opulence. No county with the fewest sheep have also few chickens, except Marion County. Several of the counties with most sheep also have most poultry. All of the counties having numerous sheep also have numerous poultry except Fountain and Parke. Of special interest is the fact that all of the counties having most poultry (more than 150,000) have had, for the average of eight years, relatively few deaths of infants under one year, except Ripley County. This may be a mere coincidence, but experts on diet have recently been stressing the importance for children of the vitamines found in eggs.

Milk Cows.—The distribution of milk cows over the state has been mapped and reveals some rather striking contrasts among the counties. The counties along the western margin of the state from Lake to Knox

have relatively few milk cows, from 3,100 to 5,000, and the counties along the Ohio have relatively few also, except those counties which are nearest to Louisville and Cincinnati. Also the counties of the rougher, unglaciated part of the state have less than 6,000, except the four counties nearest Louisville. On the other hand, the counties surrounding Marion County have 6,000 or more, except Morgan County. Hamilton with about 10,000 is surpassed only by Elkhart County, with 10,600. Kosciusko, Marshall and LaPorte counties have nearly 10,000 apiece and other northern counties rank high, except Starke.

In proportion to population, 22 of the 92 counties have a cow for not more than three persons, whereas the six counties having the state's largest cities have ten or more persons per cow. The counties with relatively many cows in proportion to population are in the northern part of the state, north of the North Central Plain upon which corn dominates. Three counties bordering Marion also have many cows in proportion to population, namely Hendricks, Hamilton and Hancock. Washington and Harrison counties apparently contribute to Louisville's milk supply and Jennings, Ripley, Franklin, Switzerland, and Ohio, to Cincinnati's supply. Aside from the counties with large cities, the counties having fewest cows in proportion to population are Vermillion, Floyd, Madison, Grant, and Delaware.

Comparisons with the map showing the distribution of silos reveals rather close correspondence with the number of cows, as might be expected since silage is chiefly fed to milk cows. There are, however, relatively more silos in proportion to cows in the northern part of the state and fewer in the southern, where there is less snowfall and a longer grazing season.

Beef Cattle.—Indiana farmers had 102,000 steers over a year old in 1925, according to the agricultural census of that year. Their distribution over the state is very irregular and shows some interesting relationship. Steers are relatively few in the southern half of the state, there being on the average less than 1,000 in each county; indeed, 17 counties have less than 500 each. Only two counties have more than 1,600, but these two, Decatur (4,130) and Hendricks (3,100) are among the state's leaders. In the northern half of the state, only one county (Starke) has less than about 400 steers and ten counties have over 2,000, while five have over 3,000. Jasper County led the state in 1925 with 4,700 steers over a year old on farms. The section of the state with most steers is that north of the Wabash River and Benton County; in other words, north of the Corn Belt proper. In that section, only Starke and St. Joseph counties have less than 500 and the average is fully 2,000 per county.

It is interesting to note that none of the counties leading in the number of milk cows also leads in beef cattle. Likewise, and even more surprising, is the fact that none of the counties having over 2,000 steers are leaders in the number of swine, and conversely, no county having relatively many swine (over 50,000) has relatively many steers (over 2,500).

Sheep.—Indiana has about 600,000 sheep, but they are distributed over the state very unequally. The northeastern six counties have most, Steuben leading with 20,000. Jay and Boone counties, however, also have about 11,000 each. The counties of the southern third of the state have relatively few sheep, almost all of them less than 3,000 apiece, and a dozen of them have less than 1,000 apiece. It would appear that these rougher southern counties might advantageously pasture many more sheep. But there are so many dogs in that part of the state that sheep raising is precarious, in spite of the fact that sheep killed by dogs are eventually paid for out of the dog-tax fund.

The relatively extensive sheep raising in the northeastern corner of the state is partly in response to the fact that because of the higher elevation and the northern location, that section is the coolest in the state, on the average, and is too cool for the extensive production of corn. All of the counties in the part of the state having a growing season of less than 160 days, on the average, have more than 5,000 sheep each. The only other counties with that many sheep are just west and northwest of Indianapolis and just east of Indianapolis.

Mules.—There were 101,000 mules in Indiana at the taking of the 1925 federal agricultural census, about 1,000 more than at the 1920 census, whereas that five-year period showed a decrease of 161,000 horses. Hence the mule is increasingly worthy of respect. More than three-fourths of the mules are found in the southwestern half of the state, no county northeast of a line drawn from Lake County to Dearborn County having as many as 1,000 mules, and most of them having only about 500. The counties southwest of that line have an average of about 2,000 mules each, although some of them have slightly less than 1,000. The counties with most mules are in the extreme southwest corner, Knox to Posey and Warrick, with from about 3,000 to 4,200 each. Jackson County also has approximately 4,000 mules. None of the counties in the northern two-thirds of the state have more than about 1,000 mules, whereas the counties in the southern third of the state average about 2,000 each. The fact that most democratic counties are situated in the southern third of the state might be thought to explain the distribution of mules. However, three of the six counties having most mules are predominately republican in politics! The numerous mules on the lower Wabash Valley is apparently related in part to the high average summer temperature there.

Swine.—There were almost exactly 3,000,000 swine on Indiana farms on January 1, 1925, nearly one per person in the state, and nearly four for each person on the farms. Their distribution over the state was decidedly irregular. However, Rush County with 82,500, had nearly 30 times as many as Brown County, which is almost as large. Other leading hog producing counties are Henry, Randolph, Montgomery, Hendricks, each with from 64,000 to 67,000, and in proportion to their size, also Fayette and Union. The leading hog raising counties make a triangular area with its apex as Montgomery County and the base along the Ohio border from Allen to Union counties. In that area the

counties have approximately 60,000 hogs, except Marion (24), Jay (30), and Adams (37). No Indiana counties not in this triangle or bordering it had as many as 40,000 hogs except Knox and Gibson, in the lower Wabash Valley, which had 42,000 and 45,000. The other counties in the southern third of the state had an average of about 20,000 hogs, but ten of them had fewer than 10,000, and five of them less than 6,000 (Ohio, Switzerland, Floyd, Crawford, and Brown). The northern counties with fewest hogs are Starke (8.6), Lake (13.2), and Vermillion (14.9).

Farm Tenancy.—According to the special agricultural census, returns for which have recently been issued by the U. S. Bureau of Census, 29.2 per cent of Indiana's farmers were tenants in 1925. In other words, of the approximately 200,000 farms in the state, about 60,000 were in the hands of tenants. The percentage of farms worked by tenants varies widely among the 92 counties, ranging from 58 per cent in Benton County to 10 per cent in Perry County.

When the percentage of tenancy in Indiana is mapped, it is seen that the northwest-central part of the state has the most tenancy and the south-central part the least. The counties having the largest percentage of rented farms are Benton, Jasper, Newton, White and Warren, with from 58 per cent to 46 per cent. These contiguous counties are in the area of most intense corn production, adjacent to the part of Illinois which produces most corn. Counties where from 40 to 45 per cent of all the farms are rented are Tippecanoe, Montgomery, Clinton, Pulaski, and Tipton, all near the counties having most tenancy. Rush County, southeast of Indianapolis, also has much tenancy (42 per cent).

The other counties of the North Central Plain have from 30 to 39 per cent of their farms rented, as is also true of three counties in the lower Wabash Valley, namely, Posey, Gibson and Knox.

In the more rugged and less fertile parts of the state, most farms will not readily produce enough to support two families, a tenant and the owner. Indeed, many of the farms will not adequately support one family. Hence tenancy is far less general. The counties which were not smoothed off by the ancient glaciers have only about 1/10 to 1/8 of their farms rented, and many of which yield the owners very little rent. The counties where from 10 to 13 per cent of the farms are rented are Perry, Lawrence, Dubois, Orange, Floyd, Brown, Monroe and Washington. These are close together. To the east of this area, Ripley County, much of which has relatively unproductive soils, has only 14 per cent of tenancy, in contrast with neighbors which have from 21 to 29 per cent.

Farm tenancy in Indiana is less now than it was in 1920 or in 1910. A recent special federal report on tenancy in the corn belt states concludes that there is no occasion for great alarm concerning farm tenancy even in that area where, as in several Indiana counties, about half the land is in the hands of tenants. Most of the tenant farmers in these fine counties are sons or sons-in-laws of the owners. Few owners have more than two farms and most owners have more than two children, among whom the land will be divided.

Most farm tenants in Indiana are share tenants, only one-thirteenth of the crop-land being rented for cash. A map showing the distribution of cash rentals resembles in a general way the map of all tenancy but reveals some interesting contrasts. Cash renting is most prevalent in the North Central Plain, but not in the northwestern part, where total tenancy is most conspicuous. The counties having over 4,000 acres rented for cash are nearly all situated to the northeast of Indianapolis, between it and Ft. Wayne. Exceptions are Lake County, and adjacent Porter and Newton, where truck farmers raise many onions, cabbages, etc., for the markets of Chicago.

Farm Improvements.—Travelers often judge the progressiveness of people and the value of land by the character of the farm buildings and other improvements. A large share of Indiana's farms are well improved. On the average the improvements have an assessed value of about $10,000 a square mile. In other words, as there are in Indiana about six farms to the square mile, the average improvements on each farm have an assessed value approaching $2,000. However, there are marked contrasts in the value of improvements in different parts of the state, as is seen when a map is made showing the average value a square mile (obtained by dividing the total assessed value of improvements on farms in each county as given in the last report of the State Auditor, by the area of each county). Almost all the counties having farm improvements assessed at $9,000 or more a square mile are situated in the central part of the state, forming a triangle with its western point as Tippecanoe County and its base along the eastern margin of the state from the northeastern corner south to Union County. In that third of the state only one county, Jay, has less than an average of $9,400 worth a square mile of assessed improvement on farms. The best improved counties according to these data are Marion, Howard and Delaware. Only four counties not in this triangular area had assessed improvements on farms averaging over $9,000. They were Elkhart, St. Joseph, Vigo, and Vanderburgh. Doubtless a considerable share of the improvements not on city lots in the last two counties were coal mining tipples and hoists, as these counties mine much coal.

The south-central counties have farm improvements assessed at an average of only about $4,000 per square mile. The poorest counties in this regard are Brown (1.5), Crawford (1.9), Martin (2.1), Perry (2.3), Washington (3.3), Dubois (3.5), and Owen (3.6). The low rank of these counties in value of improvements is not unexpected, as rough land is common and in most of it the people are relatively poor. It is surprising, however, to discover that four counties in the northwestern part of the state have farm improvements only a little more valuable per average square mile than those in the state's poorest counties. These four counties are Newton (3.9), Jasper and Pulaski (each 4.6), and Warren (4.9). Benton and White counties also are far below the average for the state. Tenants are common in these counties and the average farm is large, and obviously not very well improved.

None of the counties in the southern third of the state have farm improvements assessed for more than about $5,000 per average square

mile except Vanderburgh (19.7), Knox (8.6), Gibson (7.6), Floyd (8.1), and Decatur (8.5).

Farm Machinery.—Indiana farms had machinery and implements valued at $80,000,000, according to the special agricultural census of 1925. Conspicuous regional contrast is present, all of the counties which have more than about $1,000,000 worth of farm machinery being situated in the northeastern half of the state. None of the counties southwest of a line extending from Benton County southeast to the southeastern corner of the state have more than about $1,000,000 worth and only Knox, Gibson and Jackson closely approach that figure. On the average this southwestern nearly one-half of the state reported farm machinery and implements worth only $500,000 per county. The poorest counties were Brown ($200,000), Crawford, Monroe, Martin, Scott and Owen (each about $300,000), and Lawrence, Orange, Perry and Jennings (each about $400,000).

In the northeastern half of the state only a few counties have less than $1,000,000 worth of reported farm implements and machinery, the poorest being Starke (.7), Steuben, Howard, and Tipton (.8 each) and tiny Blackford, Union and Fayette (.4 to .6). The richest are Allen, Kosciusko, Carroll and Shelby with from 1.5 to $2,000,000.

Tractors on Farms.—Indiana farmers had about 2,400 tractors in 1925, according to the special agricultural census. Thus, if they were distributed equally, each county would contain about 250, and one farmer in every eight would have one. But, of course, the distribution is not uniform. Tractors are relatively few in the southern third of the state, the third which is the more rugged and less prosperous. Counties with especially few are Ohio (20), Brown (26), Crawford (40), Owen (48), Monroe (69), Switzerland (75), Pike (76), Perry (90), and Martin (91). None of the southern counties have more than about 200 tractors except Knox, Gibson and Posey, in the lower Wabash, with about 300 apiece.

On the other hand, 15 counties in the east-central part of the state (Tippecanoe to Allen and Rush) have more than 400 tractors each. Allen has 795, Wells 507, and Hamilton 505. Few counties of the northern two-thirds of the state have fewer than about 200 tractors except tiny Blackford (70) and Steuben (130); few, in fact, have less than 300 tractors.

The 1920 Census did not enumerate farm tractors, but the Cooperative Bureau of Agricultural Statistics reported 15,000 in 1920. The increase of 9,000 by 1925 represents more than a 60 per cent increase, and it appears that the tractor has won a place for itself on the better equipped farms in central and northern Indiana.

Silos on Farms.—There were, according to the special federal agricultural census, about 17,000 silos in Indiana in 1925. The northernmost counties all have many silos, from 210 in DeKalb County to 610 in Lake and 650 in Porter. No other group of several counties in the state has as many silos as these, but nowhere else in the state are the winters quite so cold or so long or is there so much snow. The

increase in number of silos from the northeast corner towards the northwest is apparently in response to the large market for fresh milk in Chicago.

The second group of counties with more than 300 silos each are counties sending much milk to Indianapolis. Madison, Hamilton, Delaware, Hendricks, and Marion each have 300 to 400 silos.

The only other counties in the state with 300 or more silos are Dearborn (370) and Ripley (350) both of which send much milk to Cincinnati; and Clark (310), across the river from Louisville.

Nearly all of the counties of the western part of the state south of Lake County have relatively few silos. Benton County, which usually leads the state in total corn production, has only 100 silos. Much of the corn of this area is sold for use in Chicago. Vigo and other western counties formerly sold much of their corn to Terre Haute distilleries. A large share of the corn raised in the lower Wabash Valley is grown on the low bottoms which are subject to flooding. The stalks there are also very rank, having relatively less value for silage than in most of the state. Thus the relative sparsity of silos in western Indiana is apparently due to a combination of unfavorable conditions. Nevertheless, Knox and Daviess counties have from 140 to 190 silos, or about twice as many as their neighbors.

Tiled Land.—Much of Indiana was wet land a century ago, and there were many marshes. Wild ducks nested in large numbers in the state, and mosquitoes were prevalent, and malarial fever or ague common.

Many of the pioneers of a century ago, after traveling about the state in search of land, settled on lands that today have only a small fraction of the value now possessed by lands long unoccupied. The pioneers could not anticipate future inventions and development and did not realize the abiding worth of the nearly level acres of deep soil. To many of the earlier pioneers, the rolling land of southern Indiana seemed the best in the state. It was naturally well-drained, possessed fine woods, abundant game, numerous springs, and attractive forage. Furthermore, when first cleared, the soil was fertile. Travel from place to place by the common modes of those days, which was afoot, on horseback, or with oxen, was less hindered by the ruggedness of much of southern Indiana than it was in the more level northern regions where swamps and relatively deep, unbridged streams interfered greatly.

The construction of roads and railroads, and artificial drainage has of course changed the situation greatly. There are in Indiana hundreds of miles of open ditches and tens of thousands of miles of drain tile converting many formerly worthless swamps into choice farm lands. A map showing the distribution of tiled land has recently been made. Figure 2 reveals a notable concentration of tile drainage in the north-central plain, where most of the counties have about half of their areas tiled. Boone, Hendricks, Hamilton, Hancock, Rush, Randolph and Blackford have over 60 per cent, and Tipton has over 90 per cent. In contrast, none of the south-central or far southeastern counties have as much as five per cent of their land tiled, nor do Vigo, LaPorte and Starke counties. None of the southwestern or the far northern counties

have more than 20 per cent tiled, except Steuben (25 per cent). But some of those have extensive open ditch drainage.

Farm Woodland.—The 1925 special agricultural census classified Indiana farm lands more thoroughly than previous federal censuses have done. Of the 20,000,000 acres in farms, 12,000,000 was classed as cropland, and 5,700,000 as pasture-land. About half of the pasture is plowable and half of the remainder is woodland pasture. In addition to 1,900,000 of woodland pasture there were in 1925 about 840,000 acres of woodland not used for pasture. In other words, slightly more than one-eighth of the state is classed as woodland, two-thirds of which is regularly pastured, and practically all of it has been cut-over repeatedly, so that little large valuable timber remains. In 1925 it yielded about 1,000,000 cords of firewood, according to these census returns. A century ago at least four-fifths of the state was forested, most of it with timber of exceptional size and quality.

The distribution over the state of woodland reveals interesting irregularity. Of the total woodland Benton County has only 4,000 acres, practically all of which is pastured. Other counties having less than 20,000 acres are Warren, Lake, Porter, Adams, Clinton, and Howard, Tipton, Johnson, as well as the five extreme southwestern counties (and the six smallest counties in the state). At the other extreme, there are 12 counties with over 50,000 acres of woodland, all located in the south-central part of the state or the southwest-central part. Perry County, on the Ohio River, has most, 78,500 acres, but Washington, Parke and Putnam each have over 73,000 acres. These counties are mostly in the unglaciated, more rugged part of the state, or along the rocky belt just east of the Wabash Lowland. The only counties in the northern half of the state having more than 30,000 acres of farm woodland form a belt from Jasper east to Allen County, along the more rugged south margin of the area covered by the last Great Ice Sheet which extended into Indiana

Woodland not used for pasture in 1925 is conspicuously sparse in all the central counties, where few have as much as 2,000 acres. On the other hand, it is relatively very extensive in the south-central counties from Brown to Harrison and along the Ohio River from Clark to Perry County. These counties have from 20,000 to 52,000 (Perry County) acres of unpastured woodland belonging to farms as well as many areas not in any farm. Neighboring counties have from 12,000 to 20,000 acres. The limestone belt (Monroe, Lawrence, Orange) has conspicuously less unpastured woodland than the rougher adjacent counties to the east and west.

The northern counties, those north of the North Central Plain (Tipton Till Plain), were covered by the last advance of the continental glacier and have many undrained depressions, and small hills. These counties have an average of about 7,000 acres of unpastured woodland, Starke County having most (11,400).

Farm Size.—The average farm in Indiana contains 102 acres, according to the 1925 agricultural census. The variation among the 92

counties of the state is notable. The farms of Newton and Benton counties are about three times as large, on the average, as those of Floyd and Vanderburgh counties (207 acres vs. 68). When the average acreage of farms is mapped, interesting regional contrasts become conspicuous. The counties having the largest average farms are all between the Kankakee and the Wabash rivers in northwest-central Indiana. The six western counties of that area have averages above 155 acres per farm and the average for the six counties is 177 acres. Newton and Benton average 208 and 207 acres. In no part of the state except the northwest quarter do the farms average as much as 120 acres except in the southeast-central part. There, in Rush, Decatur, Fayette, and Union counties, the farms average about 130 acres.

The farms of most of central Indiana are notably smaller than those in the flat, black-soil area of the Kankakee region. The average farm of east-central Indiana has only about 90 acres, and many farms have only one eighty. Many of these smaller farms afford excellent examples to the farmers of other regions. The United States Department of Agriculture issued a Farmers' Bulletin recently on "Successful Eighty Acre Farms in the Corn Belt of Indiana." This bulletin, which was based on a study of individual farms, showed how even in the trying years of 1921-1924 farm owners who showed the proper resourcefulness, industry and skill were able to make a fair return on 8-acre farms in the favored region. The implication was that by the use of similar methods, farmers in other regions could make a fair return on somewhat larger farms.

One might expect that the richer land of central Indiana could be divided into smaller farms than the poorer land of southern Indiana, where a larger acreage is required to adequately support a family. However, the average farm of the southern third of the state is distinctly smaller than the state's average, and a smaller percentage of each farm is in crops. As the average yield per acre is less also, this means that in general the farmers of southern Indiana have to live more economically than the farm owners of the rest of the state.

The average size of Indiana's farms is increasing. In 1925 it was two acres more than in 1920 and three acres more than in 1910, when the average farm had 99 acres. A map showing the change between 1910 and 1925 in the average acreage reveals that in the northern quarter of the state farms are being subdivided slightly more than they are being combined, and hence the average acreage in 1925 was a little less than in 1910. In central Indiana the average farm is notably larger now than in 1910, for most counties about 10 acres larger. In the southern third of the state, there has been little change in average size of farms. In five counties the average farm is now about 80 acres larger than in 1910, while in five counties it is about that much smaller. In the remaining counties the change has been less; in eight counties less than an acre change.

Farm Land Values.—At the 1920 census the average value of farm land, not including the value of the buildings, was for Indiana $104.60 per acre. At the 1925 census, the corresponding figure was $63.71,

showing a drop of about $40.00 for the average acre. However, the present value is higher than that at the 1910 census and if the prices of the things which farmers must buy had dropped since 1920 as much as the value of his land has dropped, the farmers, on the average, would not have much basis for complaint.

A map showing the distribution of per acre farm land values (excluding buildings) reveals some interesting conditions.

In none of the counties of the southern third of the state was the farm land alone reported to the census takers as being worth more than an average of about $50 per acre, except in Knox ($75), Vanderburgh ($66) and Bartholomew ($72) counties. The only counties of the northern two-thirds of the state with land worth less than about $60 an acre on the average were Steuben ($42), Noble ($52), Whitley ($53), and four counties adjoining the poor south-central section, namely Morgan ($51), Putnam ($44), Clay ($44), and Owen ($27). Fifteen southern counties had an average value of less than $30 per acre. The poorest were Brown, Crawford, and Perry ($15 each), Martin ($18), Harrison ($20), Orange ($21), Jennings ($22), Washington ($24), Jefferson ($26), Ripley and Owen ($27), Scott and Dubois ($28).

Except Marion County ($184), with values inflated by the marvelous growth of Indianapolis, the counties with the most valuable farm land alone are Benton ($142), Tipton ($113), Newton ($104), Tippecanoe ($103), Clinton ($101), and Howard ($100).

In respect to glaciation, Indiana may be divided into four regions. First, the south-central area, which was not glaciated, where the farm land had in 1925 an average value of about $20 an acre, and where there is much waste land, not included in the farm area. Second, the areas to the east and west of the unglaciated area, which were covered by an early ice sheet only (the Illinoian). There the soil has had time to lose a considerable part of its fertility, and to become sour, on level areas. The average value of land in this area of ancient glaciation is about twice as great as in the unglaciated area, although the counties in the southeastern part of the state, along the Ohio River, are rough or possess much relatively infertile clay from shale, and have an average value of only about $30 per acre. The greater part of Indiana, the North Central Plain, was covered by the Early Wisconsin Glacier and not enough time has elapsed since for the fertility to be leached from the soil or for it to sour. In this large region, the average value of the land alone is about $90 per acre, or four and a half times as much as in the unglaciated section, and three times as much as in the section covered only by the Illinoian ice sheet. Fourth, the northern fourth of the state was covered by the Late Wisconsin Ice Sheet, the last to advance into the state, and many of the marshes and lakes it created are still present, and numerous small areas are hilly with small hills and others are sandy. Hence the average value of the land is less, about $60 if the effect of the cities of Lake and St. Joseph counties be discounted. But still it is three times as valuable as the unglaciated area.

Cooperative Selling.--Farmers are highly individualistic and hence cooperative activity is relatively slight. However, the recent "hard

times" have made many farmers realize that they must cooperate if they are to receive a fair price for their products, and if they are to have anything to say as to what is a fair price for the commodities which they purchase. Therefore there has been a notable growth in cooperative marketing. As yet in Indiana this is largely confined to cooperative selling. In 1924, according to the 1925 Agricultural Census, Indiana farmers sold cooperatively a total of $17,200,000 worth of farm products. But they purchased a total of only $1,800,000 worth of products, or only about one-tenth as much.

The southern third of the state displays relatively very little cooperation; in general, the poorest counties standing lowest. The farmers of Brown and Crawford counties each sold only about $200,000 worth cooperatively. The richer counties of the lower Wabash Valley are indeed not far below the state's average, but only Knox County sold more than about $270,000 worth. Knox sold $444,000. To be sure, most of these southern counties produce much less than most northern counties, and themselves use a larger portion of what they produce, but even after due allowance has been made for these conditions, the southern counties are seen to fall behind in cooperative selling, as they likewise do in education and in many other respects.

In the northern two-thirds of the state, there is notably more cooperative selling in the eastern half than in the western. The counties where a large percentage of the farms are rented display relatively poor cooperation. Tenants apparently are less interested in cooperation than are farmers who own their land. The leading counties in cooperative selling are LaGrange, Marshall, Kosciusko, Whitley, Wells, Randolph, Wayne, Fayette, and Rush, each of which sold more than $400,000 worth. Kosciusko County leads with $591,000, although in proportion to its size Fayette did as well. In counties bordering these nine are several counties selling from $300,000 to $400,000 worth, in which class are also five counties bordering Boone County in west-central Indiana.