

# *The Labor Required for Crop Production in Ohio*

Being a summary of data collected during  
the summer of 1921 in Perry, Trumbull,  
Seneca, and Mercer Counties, representing  
typical Ohio conditions

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# The Labor Required for Crop Production in Ohio

The problem of the efficient use of man labor on the farm is one the study of which deserves the attention of every thinking farmer. Great variations occur between different sections of the State as well as between individual farmers in the time necessary to perform different farm operations. Some of the differences are due to natural conditions, character of soil, etc. Much of it, however, results from the natural conservatism of men in making changes from methods to which they have long been accustomed.

The material contained herein, showing methods and practices of doing farm work and the time necessary to perform different operations, should be of value mainly in the following ways:



Fig. 1.—The most common method of plowing in Ohio.

1. To furnish standards of labor requirement that will enable the individual farmer to compare the efficiency of his own operations with the average for his section.
2. To give information to those interested as to the common practices in doing farm work in the various sections of the State.
3. To furnish data on the per acre requirement of man labor in the production of corn and wheat which should be of value to the individual farmer in arriving at his approximate production cost.
4. To furnish information on the normal accomplishment with tools of different sizes which should be of aid to the farmer in determining to what lengths he can profitably go in making changes in his equipment in order to increase the efficiency of his labor.

## Source of Information

The material given herewith was collected during the summer of 1921 from personal interviews with 324 farmers in the counties of Perry, Trumbull, Seneca, and Mercer. Data were secured as to the kinds and sizes of tools used in field work and the normal accomplishment in a 10-hour day. Information was also gathered relating to the kinds of crops grown, the acreages and size of fields, as well as methods and practices followed in crop production.

Since there is a wide variation in the types of farming and methods followed in different parts of Ohio, the areas studied were carefully selected with the idea of securing data that would be typical of the most important areas of the State. Perry County in southeastern Ohio is largely rough and rolling; the farms included in the study in the county averaged 140 acres, of which 55 were under cultivation. Mercer County in western Ohio is an area where small farms which are very largely under cultivation prevail. The farms



Fig. 2.—Substitution of horse power for man power. The use of one extra horse eliminates a man, and adds approximately one-third to the work done.

averaged 92 acres, with 60 acres in crops. Seneca County in northwestern Ohio is very typical of a large area in that section of the State. The farms averaged 124 acres, with 70 acres in crop land. Trumbull County is very representative of a large area of the heavy-clay country in northeastern Ohio where the percentage of non-tillable land compares with that in the hilly section of southeastern Ohio. The farms averaged 117 acres, with 43 acres in crops.

## Labor and Power Used

Practically all the farms studied employed some labor, the amount varying from an average of 3 months per year, in addition to the operator, in Mercer to 8 months in Seneca. For power, dependence was placed almost entirely on horses, less than 10 percent using tractors to any extent. The sizes of the horses used in the different counties ranged in the main from 1250 to 1350 pounds.

## The Average Daily Performance With Farm Tools

In the following tables are given data showing the average accomplishment in the different counties in doing field work with tools of different types and sizes. The number of acres per day is based entirely on a 10-hour day, all estimates being made on that basis. There was a great diversity in the kinds and sizes of tools used. Wherever there were less than 10 men who used some particular method the data were not considered sufficiently complete to make fair averages and the figures were not included in the tables. The method of doing the various kinds of work which is in most common use in the county is starred (\*) in each case.

### I. SEEDBED PREPARATION

| Operation              | Size of tool | Power used | Acres per day |          |        |                   |
|------------------------|--------------|------------|---------------|----------|--------|-------------------|
|                        |              |            | Seneca        | Trumbull | Perry  | Mercer            |
| Plowing.....           | 12" walking  | 2 horses   | ....          | 1.53     | 1.09   | ....              |
| Plowing.....           | 14" walking  | 2 horses   | ....          | 1.63*    | 1.26*  | 1.53              |
| Plowing.....           | 14" walking  | 3 horses   | 1.82*         | ....     | 1.35   | 1.70              |
| Plowing.....           | 14" sulky    | 3 horses   | 2.04*         | ....     | 1.70   | 1.92*             |
| Plowing.....           | 2 gang       | Tractor    | 5.80          | 5.90     | ....   | 5.70              |
| Discing, single.....   | 10-12" disc  | 2 horses   | 9.80          | 8.75*    | 8.90   | ....              |
| Discing, single.....   | 10-12" disc  | 3 horses   | 10.60*        | 10.90    | 10.80* | 9.00 <sup>†</sup> |
| Discing, single.....   | 10-12" disc  | 4 horses   | ....          | ....     | ....   | 11.20             |
| Discing, double.....   | 12-14" disc  | 4 horses   | 10.00         | ....     | ....   | ....              |
| Discing, double.....   | 16" disc     | Tractor    | 16.10         | 16.30    | ....   | ....              |
| Harrowing:             |              |            |               |          |        |                   |
| (Spike tooth).....     | 2-section    | 2 horses   | ....          | 11.20*   | 11.50* | 10.20             |
| (Spike tooth).....     | 2-section    | 3 horses   | 13.40*        | 12.80    | 14.20  | 11.30*            |
| (Spike tooth).....     | 3-section    | 4 horses   | 19.30         | ....     | ....   | 17.50             |
| (Spike tooth).....     | 3-section    | Tractor    | ....          | 21.60    | ....   | ....              |
| (Spring tooth).....    | 2-section    | 2 horses   | ....          | 7.60     | 8.00   | ....              |
| (Spring tooth).....    | 2-section    | 3 horses   | 11.50         | ....     | 9.50   | 8.20              |
| Rolling and dragging.. |              | 2 horses   | 13.20         | 10.70    | 10.60* | 12.10             |
| Rolling and dragging.. |              | 3 horses   | ....          | ....     | 14.10  | ....              |
| Cultipacking.....      |              | 2 horses   | 11.40         | ....     | ....   | ....              |

### II. SEEDING, PLANTING, AND CULTIVATION

| Operation          | Size of tool | Power used | Acres per day |          |       |        |
|--------------------|--------------|------------|---------------|----------|-------|--------|
|                    |              |            | Seneca        | Trumbull | Perry | Mercer |
| Seeding grain..... | 9" disc      | 2 horses   | 9.60          | 7.80     | 8.20* | 9.40*  |
| Seeding grain..... | 11" disc     | 2 horses   | ....          | 9.20*    | 9.50  | 10.80* |
| Planting corn..... | (check row)  | 2 horses   | 11.50         | 8.70     | 9.00* | 10.80  |
| Planting corn..... | (drill)      | 2 horses   | ....          | 8.70*    | 10.00 | ....   |
| Cultivating.....   | 1-row riding | 2 horses   | 5.75          | 5.60     | 5.80  | 5.76   |

III. HARVESTING

| Operation                              | Size of tool  | Power used | Seneca | Trumbull | Perry | Mercer |
|--|---------------|------------|--------|----------|-------|--------|
| Mowing (acres per day)....             | 5 feet        | 2 horses   | 9.30*  | 8.50*    | 8.50* | 9.20*  |
| Mowing (acres per day)....             | 6 feet        | 2 horses   | 10.30  | 9.80     | 9.60  | 9.30   |
| Raking (acres per day).....            | Sulky         | 1-2 horses | 16.50  | 18.00*   | 17.30 | 19.80  |
| Raking (acres per day).....            | Side Delivery | 2 horses   | 16.10* | 16.00    | ....  | ....   |
| Tedding (acres per day).....           |               | 2 horses   | 17.30  | 16.30    | 17.20 | 20.00  |
| Cutting Grain (A. per day)..           | 6 feet        | 2 horses   | ....   | 7.50     | 6.70  | ....   |
| Cutting Grain (A. per day)..           | 6 feet        | 3 horses   | 9.60   | 8.20*    | 9.10* | 9.60*  |
| Cutting Grain (A. per day)..           | 7 feet        | 3 horses   | 11.80* | ....     | 9.40  | 10.30  |
| Cutting Grain (A. per day)..           | 7 feet        | 4 horses   | 12.00  | ....     | 11.20 | 13.20  |
| Cutting Grain (A. per day)..           | 8 feet        | 4 horses   | 16.20  | ....     | ....  | ....   |
| Shocking Wheat (acres per day).....    |               |            | 6.90   | 4.50     | 5.60  | 7.10   |
| Cutting Corn—Hand (acres per day).     |               |            | 1.50   | 1.00*    | 1.19* | 1.36*  |
| Cutting Corn—Binder† (acres per day)   |               | 2 horses   | 5.60*  | 5.06     | 5.50  | 6.00   |
| Cutting Corn—Binder (acres per day).   |               | 3 horses   | ....   | 5.43     | ....  | ....   |
| Cutting Corn—Sled (acres per day)...   |               | 1 horse    | ....   | ....     | 1.85  | ....   |
| Loading Hay—Hand (min. per load)..     |               |            |        |          |       |        |
| 2-man crew.....                        |               | 2 horses   | ....   | 34.0*    | 39.0  | ....   |
| 3-man crew.....                        |               | 2 horses   | ....   | ....     | 31.0* | ....   |
| Loading Hay—Hay loader (min. per load) |               |            |        |          |       |        |
| 2-man crew.....                        |               | 2 horses   | 31.0*  | 30.0     | 31.0  | 35.0   |
| 2-man crew.....                        |               | 3 horses   | 26.0   | ....     | ....  | 35.0   |
| 3-man crew.....                        |               | 4 horses   | ....   | ....     | ....  | 33.0*  |
| Unloading Hay (min. per load)          |               |            |        |          |       |        |
| Hand—2-man crew.....                   |               |            | ....   | 28.0     | ....  | ....   |
| Fork—2-man crew.....                   |               | 1-2 horses | 25.0   | 19.0*    | 26.0  | 31.0*  |
| Fork—3-man crew.....                   |               |            | ....   | ....     | 24.0* | 26.0   |
| Fork and sling—2-man crew.....         |               |            | 26.0*  | ....     | ....  | ....   |
| Sling—2-man crew.....                  |               |            | 15.0   | ....     | ....  | ....   |
| Hauling sheaves (acres per day)        |               |            |        |          |       |        |
| 2 men.....                             |               | 1 team     | 11.5   | 7.5      | 9.2   | ....   |
| Barn threshing wheat (bu. per day)...  |               |            | 691*   | 375*     | 451*  | ....   |
| Men in crew.....                       |               |            | 11     | 9        | 9     | ....   |
| Field threshing wheat (bu. per day)... |               |            | 724    | 317      | 398   | 437*   |
| Men in crew.....                       |               |            | 14     | 12       | 9     | 16     |
| Teams used.....                        |               |            | 6      | 4        | 4     | 6      |

† Cutting corn with binder does not include setting up in shocks. From 2 to 3 men seem ordinarily to be necessary to keep up with binder.

IV. HAULING AND SPREADING MANURE

|               | Number of men | Loads per day |          |       |        |
|---------------|---------------|---------------|----------|-------|--------|
|               |               | Seneca        | Trumbull | Perry | Mercer |
| By hand.....  | 1             | ...           | 10       | 9     | 11     |
| By hand.....  | 2             | ...           | ...      | 13    | ...    |
| Spreader..... | 1             | 15*           | 13*      | 11*   | 12*    |
| Spreader..... | 2             | 20            | 18       | 16    | 19     |

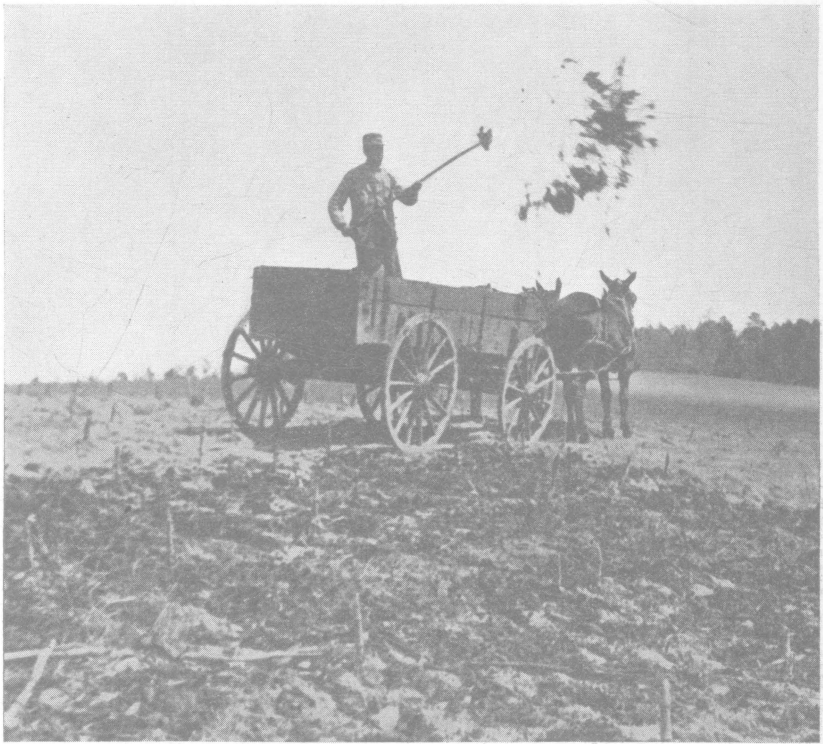


Fig. 3.—Spreading manure by hand—wasteful of time and does not give a good distribution of the manure.



Fig. 4.—The use of the manure spreader not only increases the efficiency of man power by a large percentage, but also secures a better distribution of the manure over the land.

## Methods of Seed-bed Preparation in the Four Counties

The tools used in the various counties in doing field work were similar. There was a very definite difference, however, between the various counties in the number of times that different operations were performed in preparation of the land for the planting and cultivating of corn, and for the seeding of wheat.

### THE AVERAGE NUMBER OF TIMES VARIOUS OPERATIONS ARE PERFORMED IN CORN PRODUCTION IN THE FOUR COUNTIES

(Each time over the ground is considered as once over.)

| Operation                    | Seneca | Trumbull | Perry | Mercer |
|------------------------------|--------|----------|-------|--------|
| Plowing.....                 | 1.00   | 1.00     | 1.00  | 1.00   |
| Discing.....                 | 1.63   | 1.80     | 1.56  | 1.65   |
| Harrowing.....               | 2.20   | 2.33     | 1.53  | 1.80   |
| Planking.....                | .27    | .70      | .68   | .24    |
| Spring tothing.....          | .11    | ....     | .23   | ....   |
| Rolling.....                 | .63    | .90      | ....  | .33    |
| Cultipacking.....            | .28    | ....     | ....  | ....   |
| Harrowing after planting.... | .53    | 1.00     | .58   | .45    |
| Weeder after planting.....   | ....   | ....     | .12   | ....   |
| Rolling after planting.....  | .10    | ....     | ....  | .16    |
| Cultivating.....             | 3.58   | 3.50     | 3.50  | 3.15   |

### THE AVERAGE NUMBER OF TIMES VARIOUS OPERATIONS ARE PERFORMED IN WHEAT PRODUCTION IN THE FOUR COUNTIES

(Each time over the ground is considered as once over.)

| Operation         | Seneca | Trumbull | Perry | Mercer |
|-------------------|--------|----------|-------|--------|
| Plowing.....      | .36    | 1.00     | ....  | .35    |
| Rolling.....      | .31    | 1.31     | ....  | .47    |
| Discing.....      | 1.33   | 1.26     | 1.65  | .96    |
| Harrowing.....    | 1.00   | 2.90     | .82   | 1.26   |
| Planking.....     | .11    | .51      | .25   | .22    |
| Cultipacking..... | .20    | ....     | ....  | ....   |

## The Man-labor Requirement in the Production of Corn in the Four Counties

Using the tables showing the day's work ordinarily accomplished with various tools, and combining with this the data as to the number of times each operation was most commonly performed in crop production in that county, the following tables were evolved. There is apparently a very definite variation in the man-labor requirement of corn and wheat production in the four counties, the reason for which can be readily found by a study of the tables.

SENECA COUNTY

Seneca County is one of the good corn counties of northwestern Ohio. The average yield for the past decade, tho only 38 bushels per acre, is above the State average. The common rotation followed is corn, wheat, and clover, tho some oats are grown. The farms included in the study averaged 24 acres of corn per farm.



Fig. 5.—The common method of corn cultivation in Ohio at the present time. This method has supplanted the 1-horse 1-row in common use a generation ago and still used in some sections of the State.

*Seneca County Corn Production Data*

| Operation                           | Hours per acre once over | Times operation generally performed | Total hours per acre |
|-------------------------------------|--------------------------|-------------------------------------|----------------------|
| Plowing.....                        | 5.26                     | One                                 | 5.26                 |
| Discing.....                        | .92                      | Two                                 | 1.84                 |
| Harrowing.....                      | .75                      | Two                                 | 1.50                 |
| Rolling.....                        | .76                      | One                                 | .76                  |
| Hauling manure.....                 | ....                     | 5.1 loads per A.                    | 3.41                 |
| Preparing seed.....                 | ....                     | .....                               | .42                  |
| Planting.....                       | .87                      | One                                 | .87                  |
| Harrowing after planting.....       | .75                      | One                                 | .75                  |
| Cultivating.....                    | 1.74                     | Four                                | 6.96                 |
| Cutting corn.....                   | 6.70                     | .....                               | 6.70                 |
| Husking.....                        | 7.00                     | .....                               | 7.00                 |
| Cribbing.....                       | 3.00                     | .....                               | 3.00                 |
| Total hours man labor per acre..... |                          |                                     | 38.47                |



PERRY COUNTY

Perry County is in the corn, wheat, clover rotation section of southeastern Ohio, some farmers leaving their land in hay more than one year. The average acreage of corn for those farms included in the study was 16, and the average yield of corn during the past decade in the county has been 33 bushels.



Fig. 6.—Twenty-five farmers in Greene County report 90 percent increase in acreage cultivated per day per man by use of the 2-row cultivator. Cultivation is the peak load of labor on many western Ohio farms. In Perry and Trumbull Counties many men still use the 1-horse-1-row method.

*Perry County Corn Production Data*

| Operation                           | Hours per acre once over | Times operation generally performed | Total hours per acre |
|-------------------------------------|--------------------------|-------------------------------------|----------------------|
| Plowing.....                        | 8.55                     | One                                 | 8.55                 |
| Discing.....                        | .97                      | Two                                 | 1.94                 |
| Harrowing.....                      | .87                      | One                                 | .87                  |
| Dragging.....                       | .94                      | One                                 | .94                  |
| Hauling manure.....                 | ....                     | 5½ loads per A.                     | 4.45                 |
| Preparing seed.....                 | ....                     | ....                                | .42                  |
| Planting.....                       | 1.05                     | One                                 | 1.05                 |
| Harrowing after planting.....       | .87                      | One                                 | .87                  |
| Cultivating.....                    | 1.72                     | Three                               | 5.16                 |
| Hoeing.....                         | ....                     | ....                                | 1.34                 |
| Cutting corn.....                   | 8.40                     | ....                                | 8.40                 |
| Husking corn.....                   | 11.11                    | ....                                | 11.11                |
| Cribbing.....                       | 3.00                     | ....                                | 3.00                 |
| Total hours man labor per acre..... |                          |                                     | 48.10                |

MERCER COUNTY

The farmers of Mercer County generally follow a 3-year rotation of corn, oats, and hay. The average acreage of corn per farm for the farms studied was 23, which has averaged a yield of 40 bushels per acre during the past decade.

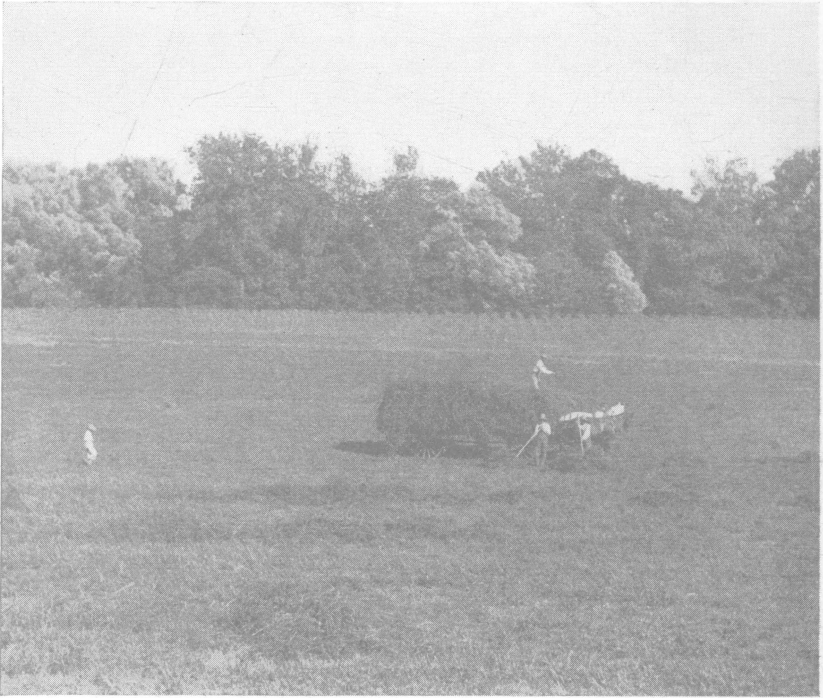


Fig. 7.—Much hay is still pitched by hand, particularly in northeastern Ohio and in the hilly sections.

*Mercer County Corn Production Data*

| Operation                           | Hours per acre once over | Times operation generally performed | Total hours per acre |
|-------------------------------------|--------------------------|-------------------------------------|----------------------|
| Plowing.....                        | 5.71                     | One                                 | 5.71                 |
| Discing.....                        | 1.11                     | Two                                 | 2.22                 |
| Harrowing.....                      | .89                      | Two                                 | 1.78                 |
| Hauling manure.....                 | ....                     | 2.7 loads per A.                    | 2.16                 |
| Preparing seed.....                 | ....                     | ....                                | .42                  |
| Planting.....                       | .97                      | One                                 | .97                  |
| Harrowing after planting.....       | .89                      | One                                 | .89                  |
| Cultivating.....                    | 1.73                     | Three                               | 5.19                 |
| Hoeing.....                         | ....                     | ....                                | .50                  |
| Cutting corn.....                   | 7.40                     | ....                                | 7.40                 |
| Husking.....                        | 11.10                    | ....                                | 11.10                |
| Cribbing.....                       | 3.00                     | ....                                | 3.00                 |
| Total hours man labor per acre..... |                          |                                     | 41.34                |

TRUMBULL COUNTY

The farmers of Trumbull County generally follow the 5-year rotation of corn, oats, wheat, hay 2 years. Quite a large percentage of the corn is put into the silo, the average yield of corn in the county for the past decade being 32 bushels. The average acreage of corn per farm of those farms studied was 10 acres.

The soil of this county is a very heavy clay which is difficult to work. The farmers also generally have their farms divided into very small fields and use smaller tools and less horsepower than is the case in many western Ohio counties. All of these factors contribute to the heavy man-labor requirement of corn production for the county.



Fig. 8.—The hay loader is long past the experimental stage on most Ohio farms that are reasonably level.

*Trumbull County Corn Production Data*

| Operation                            | Hours per acre once over | Times operation generally performed | Total hours per acre |
|--------------------------------------|--------------------------|-------------------------------------|----------------------|
| Plowing.....                         | 6.14                     | One                                 | 6.14                 |
| Discing.....                         | 1.15                     | Two                                 | 2.30                 |
| Rolling.....                         | .93                      | One                                 | .93                  |
| Harrowing.....                       | .89                      | Two                                 | 1.78                 |
| Planking.....                        | .93                      | One                                 | .93                  |
| Hauling manure.....                  | ....                     | 8.13 loads per A.                   | 6.42                 |
| Drilling fertilizer.....             | 1.09                     | One                                 | 1.09                 |
| Preparing seed.....                  | ....                     | ....                                | .42                  |
| Planting.....                        | 1.14                     | One                                 | 1.14                 |
| Harrowing after planting.....        | .89                      | One                                 | .89                  |
| Cultivating.....                     | 1.80                     | Four                                | 7.20                 |
| Hoing.....                           | ....                     | ....                                | 3.80                 |
| Cutting corn.....                    | 10.00                    | ....                                | 10.00                |
| Husking.....                         | 11.11                    | ....                                | 11.11                |
| Cribbing.....                        | 3.00                     | ....                                | 3.00                 |
| Total hours man labor per. acre..... |                          |                                     | 57.15                |

## The Man-labor Requirement in the Production of Wheat in the Four Counties

The man-labor requirement in wheat production for Seneca, Mercer, and Perry Counties is very similar; most of the wheat follows corn in the rotation, so plowing is not generally necessary. In Trumbull County, however, where wheat follows oats in the rotation, plowing for wheat is almost universally practiced, the labor of plowing with the extra fitting necessary to get the seedbed in shape for sowing greatly increases the man-labor per acre over that used in other sections of the State.



Fig. 9.—Cradling wheat.—Few Ohio farmers realize that this method of grain harvesting is still in use in Ohio.

### SENECA COUNTY

The farms studied averaged 23 acres of wheat, while the average yield during the past decade has been 18.5 bushels per acre. About two-thirds of the farmers interviewed put their wheat in the barn prior to threshing, while one-third threshed direct from the field.

#### *Seneca County Wheat Production Data*

| Operation                           | Hours per acre<br>once over | Times operation<br>generally performed | Total hours<br>per acre |
|-------------------------------------|-----------------------------|--|-------------------------|
| Discing.....                        | .94                         | Two                                    | 1.88                    |
| Harrowing.....                      | .75                         | One                                    | .75                     |
| Preparing seed.....                 | ....                        | .....                                  | .47                     |
| Seeding.....                        | 1.04                        | One                                    | 1.04                    |
| Cutting grain.....                  | .85                         | .....                                  | .85                     |
| Shocking.....                       | 1.45                        | One                                    | 1.45                    |
| Hauling sheaves.....                | ....                        | .....                                  | 1.74                    |
| Threshing (barn).....               | ....                        | .....                                  | 2.88                    |
| Hauling coal and fertilizer...      | ....                        | .....                                  | .27                     |
| Total hours man labor per acre..... |                             |  | 11.33                   |

MERCER COUNTY

Oats were much more important than wheat on the farms studied, the averages being 18 acres in oats and 6 in wheat. The yield of wheat for the county has averaged 17 bushels for the past 10 years. Field threshing is followed almost entirely. The bulk of the threshing is done cooperatively with threshing rings, the number of men employed in proportion to the bushels threshed per day is much larger than for field threshing in any of the other counties.



Fig. 10.—By the modern method of grain harvesting one man and three horses cut and bind from four to six times as much as by the method shown on the opposite page.

*Mercer County Wheat Production Data*

| Operation                           | Hours per acre once over | Times operation generally performed | Total hours per acre |
|-------------------------------------|--------------------------|-------------------------------------|----------------------|
| Discing.....                        | 1.11                     | One                                 | 1.11                 |
| Harrowing.....                      | .89                      | Two                                 | 1.78                 |
| Preparing seed.....                 | ....                     | ....                                | .47                  |
| Seeding.....                        | 1.06                     | One                                 | 1.06                 |
| Cutting grain.....                  | 1.04                     | ....                                | 1.04                 |
| Shocking.....                       | 1.41                     | One                                 | 1.41                 |
| Threshing (field).....              | ....                     | ....                                | 6.38                 |
| Hauling coal and fertilizer...      | ....                     | ....                                | .27                  |
| Total hours man labor per acre..... |                          |                                     | 13.52                |

PERRY COUNTY

The farms studied averaged 16 acres in wheat, the average yield during the past 10 years having been 17 bushels. Barn threshing is the most common method.

*Perry County Wheat Production Data*

| Operation                           | Hours per acre once over | Times operation generally performed | Total hours per acre |
|-------------------------------------|--------------------------|-------------------------------------|----------------------|
| Discing.....                        | .97                      | Two                                 | 1.94                 |
| Harrowing.....                      | .87                      | One                                 | .87                  |
| Preparing seed.....                 | ....                     | ....                                | .47                  |
| Seeding.....                        | 1.22                     | One                                 | 1.22                 |
| Cutting grain.....                  | 1.10                     | ....                                | 1.10                 |
| Shocking.....                       | 1.80                     | One                                 | 1.80                 |
| Hauling sheaves.....                | ....                     | ....                                | 2.18                 |
| Threshing (barn).....               | ....                     | ....                                | 3.19                 |
| Hauling coal and fertilizer...      | ....                     | ....                                | .27                  |
| Total hours man labor per acre..... |                          |                                     | 13.04                |

TRUMBULL COUNTY

The farms studied averaged 6 acres of wheat, while the average yield for the past 10 years has been 18.5 bushels per acre. Practically all the wheat is put in the barn prior to threshing.

*Trumbull County Wheat Production Data*

| Operation                           | Hours per acre once over | Times operation generally performed | Total hours per acre |
|-------------------------------------|--------------------------|-------------------------------------|----------------------|
| Plowing.....                        | 6.14                     | One                                 | 6.14                 |
| Rolling.....                        | .94                      | Two                                 | 1.88                 |
| Discing.....                        | 1.14                     | Two                                 | 2.28                 |
| Harrowing.....                      | .90                      | Three                               | 2.70                 |
| Preparing seed.....                 | ....                     | ....                                | .47                  |
| Seeding.....                        | 1.09                     | One                                 | 1.09                 |
| Cutting grain.....                  | 1.22                     | ....                                | 1.22                 |
| Shocking.....                       | 2.22                     | One                                 | 2.22                 |
| Hauling sheaves.....                | ....                     | ....                                | 2.66                 |
| Threshing (barn).....               | ....                     | ....                                | 4.60                 |
| Hauling coal and threshing...       | ....                     | ....                                | .27                  |
| Total hours man labor per acre..... |                          |                                     | 25.53                |

From the data already presented it is clear that two main reasons exist which cause the relatively heavy labor requirement in crop production in some counties as compared to others. These are, first, the longer time spent per acre in going once over with individual operations; and second, the greater number of times which the farmers of some counties seem to find essential to go over their land with the same tool in order to get their land in condition. The reason for the first variation is usually found in the sizes of the tools used in the county, the reason for the second is quite largely due to soil type or a poor adaptation of tools used to the work to be done.

## Relation of Size of Fields to Efficiency of Man and Horse Labor

Another large influence in the efficiency of labor is the size of fields on which the work is done. Small, ill-shaped fields mean a great increase in turning and point rows, which greatly increase the time necessary to farm a given area and decrease the possibility of use of large scale tools.

From the data on the size of fields and the man and horse labor employed information was secured for the following tables.

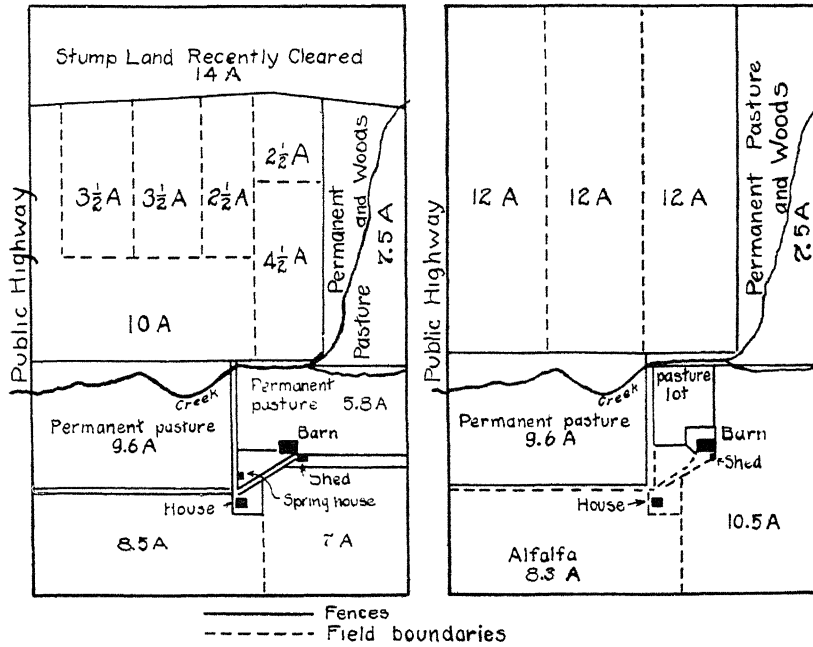


Fig. 11.—A Columbiana County farm (left) as it was; (right) as it now is. The rearrangement of fields eliminated 315 rods of fence and saved 3200 turns with a team in the performance of the year's field work. Large rectangular fields are ideal for efficient farm work.

### PERRY COUNTY

|                                    | Size of fields |           |            |             |
|------------------------------------|----------------|-----------|------------|-------------|
|                                    | 3-7 acres      | 7-9 acres | 9-12 acres | 13-21 acres |
| Average size of fields, acres..... | 5.5            | 8.7       | 10.4       | 14.7        |
| Number of farms.....               | 19.0           | 20.0      | 20.0       | 20.0        |
| Crop acres per man.....            | 36.3           | 33.4      | 37.1       | 42.2        |
| Crop acres per horse.....          | 14.2           | 15.5      | 16.3       | 17.3        |

### TRUMBULL COUNTY

|                                    | Size of fields |            |          |         |
|------------------------------------|----------------|------------|----------|---------|
|                                    | 2.5-4.5 A.     | 4.6-5.3 A. | 5.4-7 A. | 8-21 A. |
| Average size of fields, acres..... | 3.6            | 5.0        | 5.6      | 12.0    |
| Number of farms.....               | 19.0           | 20.0       | 18.0     | 21.0    |
| Crop acres per man.....            | 23.4           | 26.4       | 27.4     | 33.9    |
| Crop acres per horse.....          | 10.3           | 13.9       | 16.0     | 19.5    |

MERCER COUNTY

|                                    | Size of fields |            |             |             |
|------------------------------------|----------------|------------|-------------|-------------|
|                                    | 4-8 acres      | 9-11 acres | 12-14 acres | 15-45 acres |
| Average size of fields, acres..... | 7.0            | 9.9        | 12.7        | 20.7        |
| Number of farms.....               | 21.0           | 24.0       | 23.0        | 22.0        |
| Crop acres per man.....            | 31.5           | 43.8       | 56.1        | 51.1        |
| Crop acres per horse.....          | 12.9           | 14.6       | 20.6        | 18.1        |

SENECA COUNTY

|                                    | Size of fields |             |             |             |
|------------------------------------|----------------|-------------|-------------|-------------|
|                                    | 4-10 acres     | 10-11 acres | 12-15 acres | 16-30 acres |
| Average size of fields, acres..... | 7.7            | 10.4        | 13.0        | 19.5        |
| Number of farms.....               | 18.0           | 20.0        | 21.0        | 14.0        |
| Crop acres per man.....            | 34.5           | 39.4        | 46.1        | 53.0        |
| Crop acres per horse.....          | 15.2           | 15.5        | 19.2        | 20.4        |

GREENE COUNTY

|                                    | Size of fields |             |             |             |
|------------------------------------|----------------|-------------|-------------|-------------|
|                                    | 7-13 acres     | 13-16 acres | 16-20 acres | 20-42 acres |
| Average size of fields, acres..... | 10.8           | 14.6        | 17.4        | 24.5        |
| Number of farms.....               | 20.0           | 20.0        | 17.0        | 17.0        |
| Crop acres per man.....            | 42.4           | 52.7        | 59.4        | 63.4        |
| Crop acres per horse.....          | 14.3           | 17.8        | 18.6        | 19.8        |

\* Data was secured on size of fields in Greene County in 1918 and is herewith included.

The above tables show that in all the five counties there is a very definite increase in efficiency of man and horse labor as the size of fields farmed increases.

**Comparison of Five Typical Counties as to Size of Fields and Efficiency of Man and Horse Labor**

|                                | Trumbull | Perry | Mercer | Seneca | Greene |
|--------------------------------|----------|-------|--------|--------|--------|
| Average size of fields, acres. | 6.5      | 9.8   | 12.5   | 12.6   | 16.8   |
| Number of farms.....           | 78       | 79    | 90     | 73     | 74     |
| Crop acres per man.....        | 29.6     | 37.6  | 46.9   | 44.3   | 55.1   |
| Crop acres per horse.....      | 15.3     | 16.1  | 17.0   | 17.8   | 17.9   |

The great development of the country industrially, drawing many men from the rural districts to the city, is causing more attention to be given to means of saving labor on the farm. The substitution of horse or other economical power for man-power in farming deserves the attention of thousands of farmers of Ohio as one of the best means of decreasing cost of production and increasing profits.