UNIVERSITY OF TENNESSEE

Upon the request of the Committee on Graduate Study the undersigned have examined a thesis entitled

An Economic Analysis of Farming in Overton County, Tennessee

presented by Sam W. Atkins

candidate for the degree of Master of Science in Agriculture, and hereby certify that it is worthy of acceptance.

Theodore W. Glocker

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Examiners.

AN ECONOMIC ANALYSIS OF FARMING IN OVERTON COUNTY, TENNESSEE.

****

A THESIS

Written under the Supervision of the Department of Agricultural Economics.

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By
Sam W. Atkins.

*****

Submitted in Partial Fulfillment of the
Requirements for the Degree
of
Master of Science
in
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Introduction

Description of Overton County.

Overton County, used as a basis for this study, is located in the north-central part of the state on the north-eastern section of the Highland Rim. It is bounded on the north by Pickett and Clay Counties, on the west by Jackson County, on the south by Putnam County, and on the east by Fentress County.

There are two physiographic divisions in the county. (1) The Cumberland Plateau and the mountains, forming its eastern border, occupy the south-eastern third of the county. This region is characterized by a rugged topography having a range in altitude from 700 to 2000 feet. (2) The Highland Rim, a broad gently rolling plain extending west and north of the Plateau, occupies the remaining part of the county. Along the west and north-west borders the Rim is cut into valleys by rivers and creeks. These valleys approach the elevation of the Central Basin, and have a soil type very much similar to that area.

Object of Study and Method of Securing Data.

This farm analysis was based on an economic analysis of fifty representative farms in Overton County. The material from this analysis was supplemented by United States Census reports, Climatological records, soil survey reports, and other data that would aid in a complete economic analysis of agricultural conditions and enable definite recommendations to be made for the improvement of agricultural conditions in this area.

The objects of this economic study were:

(1) To determine the factors that affect farm profits in that area.

(2) To discover the most profitable and the least profitable farms, and to study their organization and management to determine the reasons for their success or failure.

(3) To use these facts in making recommendations for changes in the organ-

isation and management of the farms in this county and of those counties on the northeast Highland Rim, having similar conditions.

The data on the farms of Overton County were collected by personal visits to the farmers. A field book containing questions on the farm business was used by the investigator. Each night all the information on the field sheets was copied on permanent office records. These permanent records were then checked carefully by the person in charge of the work in order to find any omissions, inconsistencies, or mathematical errors. These transfers were then checked by another person. All calculations used to determine the labor income on each farm and in making the final tabulations were checked in this way. In tabulating the results only the accurate records were used. From a total of 79 records taken, only 50 were uded in the final tabulations.*

Comparison of Overton County with Other Counties of This Area.

Other counties of this area somewhat similar to Overton are: Pickett, Clay, Putnam, and White. The following is a comparison of these counties:

(1) They are in the same general section. All are adjoining counties with the exception of White County which lies south of Overton County and is separated from it by Putnam.

(2) The topography is similar. The Plateau occupies the eastern part of each of the counties except Clay. The greater part of each county is occupied by the Highland Rim. Putnam and Clay Counties are occupied by a small part of Central Basin soil on the east and south respectively.

(3) The same soil types prevail on the Rim sections and Plateau sections of each county. The richer soil of the Central Basin area, in both Putnam and Clay Counties, does not occur in the other counties except in very small areas on streams. The silt loam of the Highland Rim section of Clay County is not

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* These were corrected as explained in appendix.

as productive as that of the other counties.

(4) Their climatic conditions, such as annual rainfall, temperature, length of growing season, and annual distribution of rainfall, are very similar.

(5) The type of farming is similar in each county. The principal crops are corn, hay and forage, potatoes (sweet and Irish), wheat, and oats. The principal classes of livestock are: horses and mules, beef and dairy cattle, hogs, sheep, poultry, and bees. White County, however, has a considerably higher corn yield, and a greater percentage of its crop acreage in hay and forage. Also there are more beef cattle, sheep, and poultry in the county, notwithstanding its smaller area in square miles. Clay County has the highest corn yield of any of these counties, due largely to its fertile bottom lands along the Cumberland River.

(6) These counties vary however in size as follows, based on the number of square miles in Overton County as 100%: Putnam is 90%, White 81%, Clay 57%, and Pickett 36.3%.

(7) These counties also vary in the percentage the improved land is of the total land area in farms, as follows: White 61%, with 108,556 acres of improved land; Putnam 53.7%, with 117,708 acres of improved land; Overton 47.7%, with 104,297 acres of improved land; Pickett 41.8%, with 36,510 acres improved land; and Clay 41.2%, with 66,144 acres improved land.

Chapter I.

Agricultural History of Overton County (1850 - 1925)

The early history of Overton County was characterized by a self-sufficing agriculture. This is indicated by the production of: (1) raw material for making cloth, as flax, hemp, wool, and cotton; (2) substitutes for sugar; (3) home manufactured products; (4) and other crops and livestock used principally for family consumption.

The production of textile material occurred largely in the first 30 years of this period. 14,647 pounds of flax was produced in 1850. There was a steadier decrease until 1890, when only 234 pounds was produced. Since that time none has been produced in this county. There has been a similar decline in other counties of the state, only four counties reporting a production of this crop in 1910. There has been a similar decrease in the production of other fibers used in the manufacture of cloth. The attempt to produce silk cocoon from the silk-work was discontinued in 1870, only 55 pounds being produced that year. Hemp was produced during the Civil War period but its production was also discontinued at the close of that period. The production of wool, which was 14,200 pounds in 1850, has decreased to 5,514 pounds in 1925.*

(2) Cane sugar was used only to a limited extent. Such substitutes as maple sugar, maple molasses, and sorghum molasses were used. The latter substitute was produced in small quantities until the Civil War period, as shown by the fact that only 345 gallons were produced in 1860. The production increased during the War period to 12,500 gallons. In 1880 there was a production of 23,200 gallons, or an increase of nearly 100%. The production in 1920 was 23,426 gallons, although this is a very small increase over the 1880 census period, it indicates the importance of sugar substitutes at present. On the other hand, maple sugar and syrup production steadily decreased from 1850 until 1890, when their produc-

* All of these figures are based on the present area.

tion was discontinued definitely.

(3) Much of the household and farm equipment was manufactured at home. We would expect an increase in such manufacturing during the Civil War period. This happened as shown by the following statistics: the value of these manufactured products was $41,733 in 1850; 41,403 in 1860; and $51,813 in 1870; an increase of approximately 25%. No data is available on the following census periods but with the increase in factory made products during these periods, and the improvement of marketing and transportation facilities we would expect a decrease in home manufactured goods.

(4) The farmers also produced other crops and livestock in sufficient quantities for family consumption.

Overton County in the early days compared favorably with the other counties of Tennessee, which now are more progressive because of a more rapid development of industries, markets, methods of transportation, etc. All of the counties in the early days were on an approximately equal basis regarding these economic factors. They were largely self-sufficing. Overton County, however, was especially well adapted to this self-sufficing stage in agriculture, for hunting and fishing were good, the range pasture was good for cattle, mast for hogs was abundant, and the Cumberland river was near for shipping out products.

Land Area.

The following annexations of land from Overton County have been made: 55,040 acres to Putnam County in 1854; 69,120 acres to Clay County in 1879; 76,800 acres to Pickett County in 1881.* With these changes in land area the Census figures for these periods are not comparable with the Census figures of the periods following the last annexation.

In order to make correct comparisons of these periods adjustments were made on the basis of the present area of the county. In other words calculations were made as to the number of livestock, crop acres, etc. there would

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* A. P. Foster - State Library, Nashville.

have been at the different Census periods had the size of the county been equal to the present size.

The adjustments for the number of livestock, crop acres, value of farms, etc. were based on improved acres. Approximately the following acres of improved land was annexed: to Putnam County 13,200; to Clay County 23,000; and to Pickett County 34,100. In making these calculations it was assumed that the area annexed had the same percentage of improved land as the area remaining after the annexation.

The following table will show the trend of the land area in farms in this county.*

Table 1. Trend of Land Area in Acres and Percentages.

18	Total Area Acres	Farm Area Acres	Improved Acres	Unimproved Acres	% of total area that is in farms.	% total farm land improved.
1850	285,440	180,414	35,600	144,814	63.3	19.7
1860	"	163,962	46,711	117,251	56.8	28.4
1870	"	170,352	52,840	118,512	59.0	31.0
1880	"	190,000	60,320	129,680	66.6	31.7
1890	"	213,829	81,547	132,282	75.0	38.1
1900	"	235,615	99,419	136,201	82.0	42.2
1910	"	214,801	95,321	129,478	75.0	44.3
1920	"	218,782	104,297	114,485	76.0	47.7
1925	"	216,317	93,662	122,655	75.8	43.3

The land in farms has increased from 180,414 acres in 1850 to 226,217 acres in 1925. For the same periods the percentage of land in farms has increased from 63.3 to 76.0.

At the same time the number and percentage improved acres were increasing at a more rapid rate. In 1850 there were only 35,600 improved acres as compared with 93,662 improved acres in 1925, or approximately only 1/3 as many in the former period. Approximately one-fifth of the farm land was improved

* The material in these tables have been based on the present area of the county.

in 1850, but by 1925 the acres of improved land had increased to over two-fifths of the total farm area.

Decreases in acres of improved land occurred in 1910 and 1925, periods following deflation in prices of agricultural products. It seems that farmers have permitted some land to grow up in bushes rather than cultivate it. This is probably the land that would be least profitable to cultivate in prosperous times.

With an increase in acres of farm land there was an increase in the number of farms, as shown below.

Table 2. Number and Size of Farms.

	Number Farms	Average total acreage	Average improved acreage.
1890	1830	117.0	44
1900	2214	106.0	44
1910	2371	90.6	40
1920	2714	80.6	38
1925	2778	77.9	36

There was an increase of 932 farms, or approximately 50%, from 1890 to 1925. The average total acreage had decreased from 117.0 to 77.9 and the improved acreage decreased from 44 to 36 during this period. However, the average farm had a higher percentage of improved land in 1925 than in 1890, as shown in the previous table. As the farms get smaller a larger percentage is brought into cultivation and use for pasture.

Value of Farms and Farm Machinery.

The total value of farms, including land and buildings, increased from $389,700 in 1850 to $4,265,499 in 1920, or approximately 550% increase. Notwithstanding this large increase, there has been some very outstanding decreases, as shown in the following table:

Table3 . Trend of Farm and Machinery Values 1850 - 1925

Census Period	Farm Value	Machinery Value	Value of machinery per 100 acres improved land.	Value of machinery per 100 crop acres.
1850	$389,700	$ 28,740	$ 47	no data
1860	996,111	32,086	44	no data
1870	800,000	38,750	46	no data
1880	653,380	37,000	46	no data
1890	924,500	46,180	56	$ 122
1900	1,277,000	83,640	84	155
1910	2,570,711	111,805	118	221
1920	4,265,499	256,503	240	368
1925	3,824,918	203,747	200	363

The first decrease in value of farm property occurred in 1870, following the Civil War. One is not at all surprised at the decrease of land values during this period. Not only was there an actual depreciation of land and buildings but there was a total loss of 1087 negro slaves, which would probably amount to $75,000 to $100,000.

Land values failed to increase from 1870 to 1910. In fact there was a decrease of about $150,000 in 1880 due mainly to the agricultural depression during that period. There was another depression in 1893 which kept land values at about the same value as reported in 1880. Since 1900 land values have increased rapidly, doubling both in 1910 and 1920. Although the trend in values has been upward, the large increase in 1920 was largely due to inflated prices of agricultural products caused by the World War, and to the increase in the acres of improved land. There followed a period of deflation causing a decrease in value of farms of almost one-half million dollars in 1925. Yet the value of farms in 1925 is higher than at any time other than in 1920.

The total value of machinery increased from $28,740 in 1850 to $203,747

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* Includes value of slaves.

in 1925. The value per 100 acres of improved land increased from $47 to $200 during the same periods. The peak of values was reached, however, in 1920, due to higher prices and increased buying during the war period. As a result of the depression following the war the value of farm machinery decreased $40 per 100 acres of improved land. The value of machinery per 100 crop acres increased from $122 in 1890 to $363 in 1925.

Although this increase indicates a use of more machinery, this county ranked 90th and 91st in 1910 and 1920 respectively, in the value per 100 crop acres.

Livestock and Livestock Products.

The following table will show the total number of animal units for each census period, and the percentage each class of animal units is of the total number for each period.* The size of each circle represents the total number of animal units for each census period. The relative importance of each class of livestock within each period is represented by the segments of the circle.

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* Due to the annexation of land to other counties at different periods, it was necessary to adjust the number of livestock, and crop acres, etc. for those periods, on the basis of the present area of the county. This was necessary in order to put these different items on a comparable basis. It was assumed that there was the same percentage of animal units, etc. on the land annexed as on the remaining area. (See Appendix for method of calculation).

Chart 1. Relative Importance of Livestock at Each Census Period.

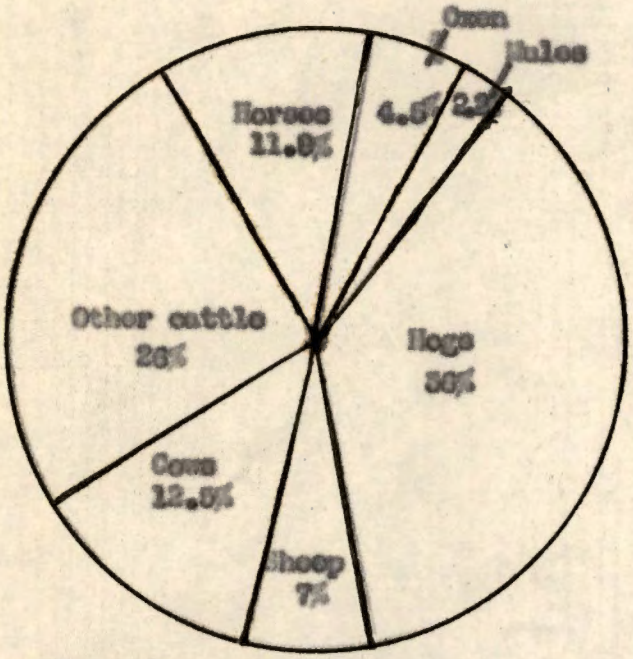


Figure 1. 1850
17,347 animal units.

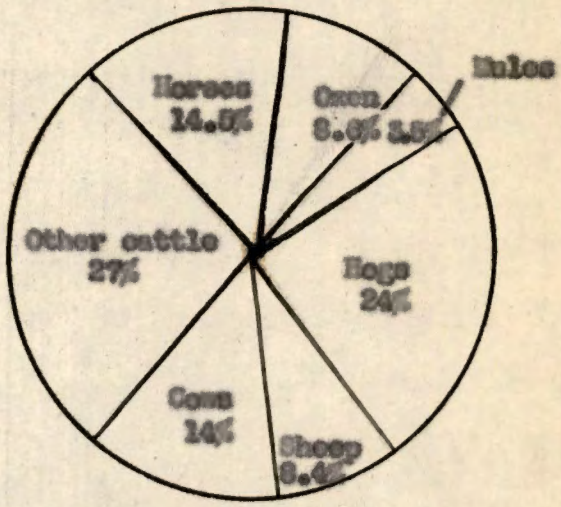


Figure 2. 1860
15,157 animal units

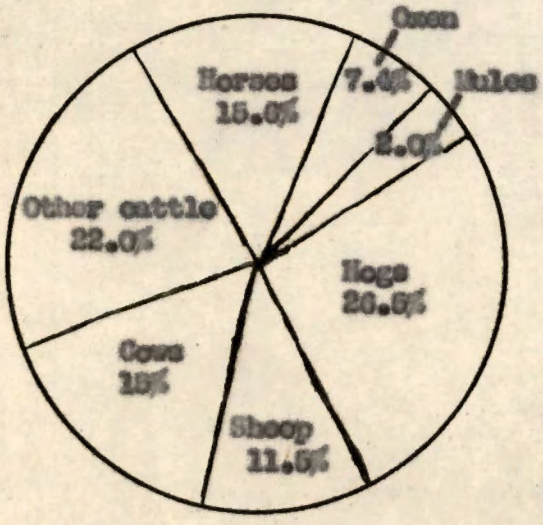


Figure 3. 1870
14,062 animal units.

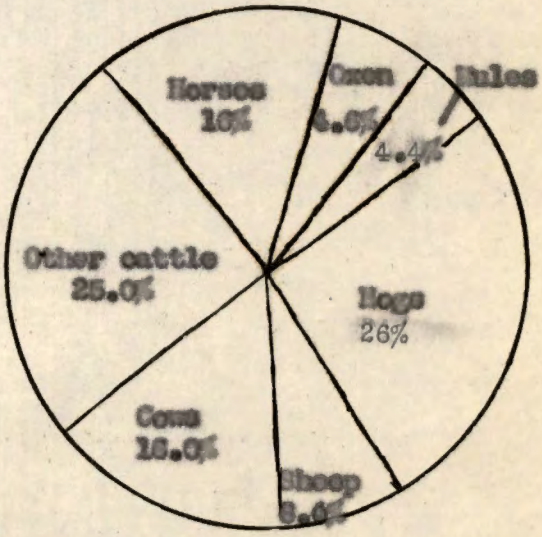


Figure 4. 1880
13,982 animal units.

Chart 1. (continued)

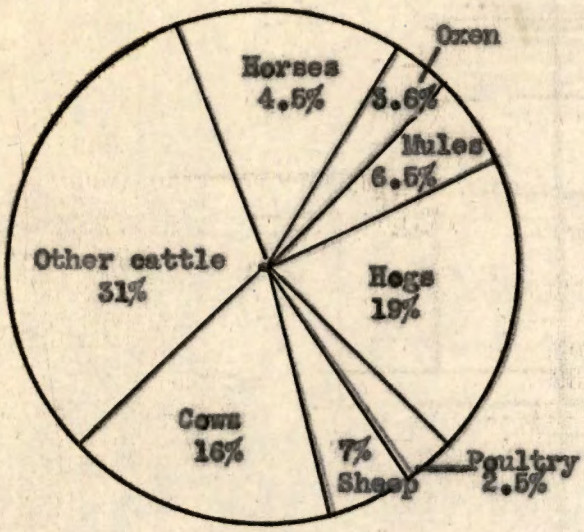


Figure 5. 1890
14,675 animal units

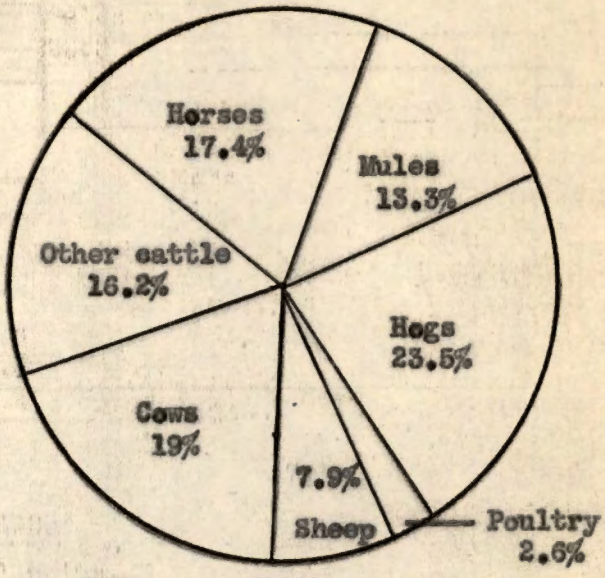


Figure 6. 1900
15,991 animal units

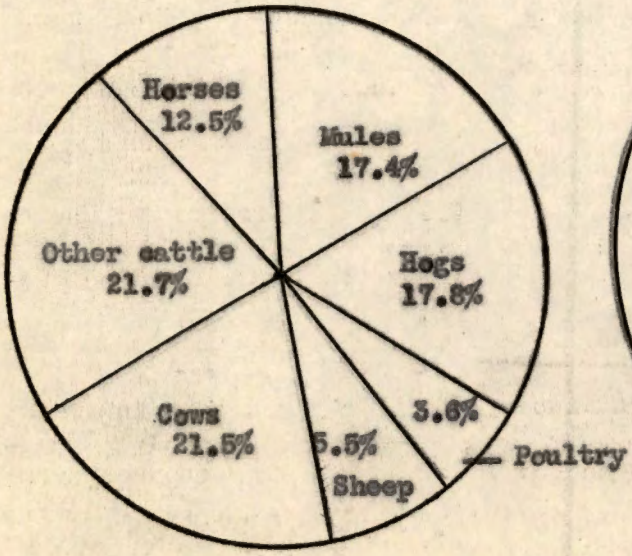


Figure 7. 1910
15,321 animal units.

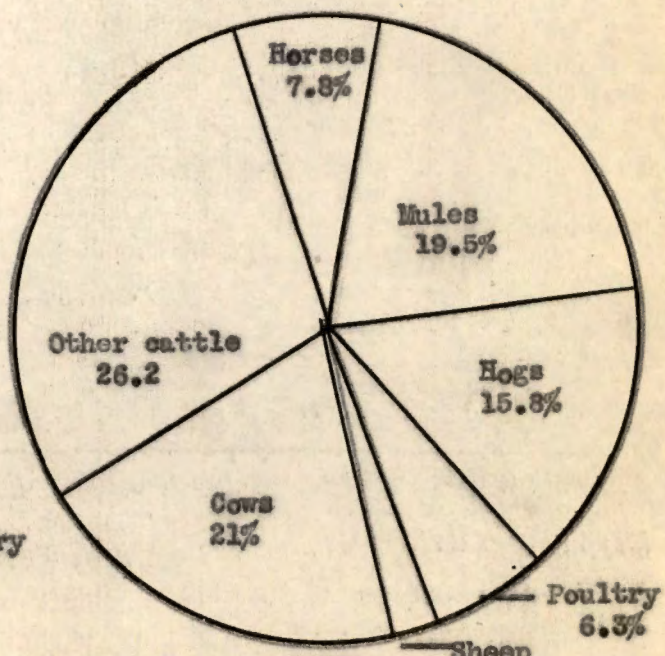


Figure 8. 1920
19,808 animal units.

Chart 1. (continued)

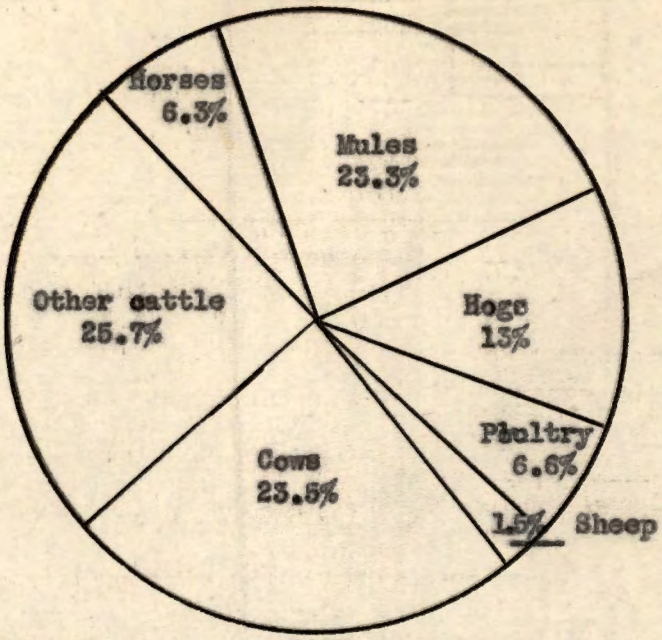


Figure 9. 1925

18,979 animal units.

With the exception of the year 1850, there were fewer animal units in each census period previous to 1900 than in any period following that year. During the earlier periods, however, there were fewer acres of improved land per animal unit than in the later periods. The number of acres per animal unit for these periods were as follows: 1850, 2 acres; 1860, 3.3 acres; 1870, 3.0 acres; 1880, 3.6 acres; 1890, 4.3 acres; 1900, 6.2 acres; 1910, 6.2 acres; 1920, 5.7 acres; and 1925, 5.6 acres. The farmers were able to keep more livestock in proportion to the acres of improved land because of the large ranges of woodland that were available for both cattle and hogs.

The decreases that were noted occurred in 1880, 1910, and 1925, years that followed closely after agricultural depressions. It seems that the farmers decreased the number of livestock because of lower prices which occurred during these depressions.

The general increase in the total number of animal units has been due largely to an increase (1) in the number of improved acres and (2) in the number of farms, and (3) increase in population.

Each census period varies greatly in the percentage the units of each class of livestock were of the total number. The greatest variations are noted in hogs, horses, and mules, oxen, sheep, and poultry. The percentage of hogs, horses, oxen and sheep decreased; and the percentage of mules and chickens increased.

Hogs decreased from 36.0% in 1850 to 16.8% in 1925. In other words, over 1/3 of the livestock units were represented by hogs in the former period as compared with hardly 1/6 of the total number being represented by this class of livestock in 1925. Sheep showed even a greater variation. In 1850 there were 8 sheep units per 100 units of livestock. In 1925 this had decreased to 1.5 sheep units per 100 livestock units. Oxen, which represented 8.6% of all livestock units in 1860 and about 30% of all work stock, ceased to be of any great importance by 1900. The number of horses per 100 units of livestock decreased from 11.8 in 1850 to 6.3 in 1925.

While the percentage of both horses and oxen was decreasing during the different census periods, the percentage of mules was increasing. In 1850 only 2.2% of the total number of animal units was represented by mules. By 1925 this percentage had increased to 23.3. Poultry was not reported until 1890. In that year only 2.5% of the total animals were represented by poultry as compared with 6.6 percent in 1925. Milk cows, which represented 12.5% of the total animal units in 1850, increased to 23.5% of the total number in 1925. The percentage cattle other than milk cows was approximately the same in 1850 and 1925.

The following tables will show the actual number of livestock in each different class of livestock at each census period:

Table 4. Trend of Work Stock From 1850 to 1925.

	Number Horses	Number Mules.	Number Oxen	Horses and Mules per Farm.
1850	2043	385	789	no data
1860	1902	455	1121	" "
1870	2197	276	1047	" "
1880	2162	615	698	
1890	1808	963	632	1.8
1900	2725	2152	none reported	2.2
1910	1910	2674	" "	1.9
1920	1565	3867	" "	2.0
1925	1192	4423	" "	2.0

During the last half of the 19th Century horses and oxen were the principal animals used for work on the farms. Horses have decreased from 2043 in 1850 to 1192 in 1925. Reporting data on oxen was discontinued in 1900. However, oxen have been used for work since that time. None were reported in the survey in 1925, nor were any observed by any members of the survey party. Meanwhile mules have increased from only 385 in 1850 to 4423 in 1925, making a percentage increase of over 1000. At the present rate of increase and decrease there would be 819 horses and 4979 mules in the county in 1930.

The decrease in the number of horses has been largely due to an increase in the number of automobiles. It is noted from the above table that there was not a very high decrease until 1910, 1920, and 1925. However in 1910 the number of horses was as great as the average for the previous census periods. It was during 1920 and 1925, periods of the increased use of automobiles, that the number of horses was below the previous average. Many of the farmers, instead of keeping horses for both riding and farm work, keep mules for work and an automobile for transportation.

There has been also an increase in the total number of work animals from 3217 in 1850 to 5615 in 1925. However the number per farm remained almost the same, varying from 1.8 in 1890 to 2.0 in 1925. The total increase was due to an increase in the number of farms, during these periods.

The following table will show the efficiency of horse labor based on the number of crop acres per horse.

Table 5. Crop Acres per Mature Work Animal.

	.Number Crop Acres per Mature Work Animal
1890	11.1
1900	11.1
1910	12.0
1920	14.5
1925	10.5

A lack of efficiency in the use of horse labor is shown by the fact that 1 horse was used for only 11.1 crop acres in 1890 and 14.5 crop acres in 1920. The decrease in 1925 to 10.5 acres per horse was due to 16,349 crop acres lying idle that year.

The efficiency of horse labor is also indicated by lack of machinery per 100 acres of crop land as shown in Table 5 .

Table 6. Comparison of Colts Raised with the Number Needed to Maintain the Supply of Horses and Mules*

	State Average				Overton County			
	Mule colts 1 yr. old		Horse colts 1 yr. old		Mule colts 1 yr. old		Horse colts 1 yr. old	
	Number Raised	No. needed for replacement.	Number Raised	No. needed for replacement	Number Raised	No. needed for replacement.	Number Raised	No. needed for replacement.
1910	95	212	176	302	62	192	102	154
1920	350	254	172	272	299	272	61	128
1925	114	273	77	123	100	328	23	99

The number of horse colts raised in Overton County decreased from 102 in 1910 to 23 in 1925. Also the number needed to maintain the supply of horses decreased from 154 in 1910 to 99 in 1925. In other words there were only 2/3 as many raised as there were needed for replacement in 1910; while in 1925 there were only 1/4 as many raised as were needed for replacement. At this rate of production the number of horses will continue to decrease rapidly unless some are bought from other places.

The number of mule colts raised has increased from 62 in 1910 to 100 in 1925. Also the number needed for replacement has increased from 192 to 328 during the same period. In both periods, however, hardly 1/3 as many were

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* In order to maintain the supply of horses it requires 1 colt raised for every 11.7 horses. To maintain the supply of mules it requires 1 colt raised for every 13 mules. Farm Management by G. F. Warren.

raised as were needed for replacement. In 1920, however, 299 were raised, whereas only 272 were needed for replacement, thus giving a surplus of 27. This increased production was due largely to the greater demand for mules during the World War.

The replacement of mules is a greater problem than that of replacing horses. Horses are decreasing while mules are increasing, so that in order to maintain this increase even more mules will be needed than is shown in the above table.

Approximately the same trends have occurred in the state as a whole. However in 1925 more colts were being raised in proportion to the number required for replacement, in that over half as many of both mule and horse colts were raised as were needed to maintain the supply.

Table 7. Trend of Cattle and Sheep 1850 to 1925

	Milk Cows		Other cattle	Sheep
	Total Number.	Number persons per cow	Total Number	Total Number.
1850	2172	no data	4512	8132
1860	1830	no data	3620	7652
1870	2127	no data	3132	11911
1880	2294	no data	3742	7497
1890	2324	5.0	4602*	7199
1900	3026	4.3	2589	8097
1910	3965	4.0	2668	5691
1920	4168	4.2	5192	3815
1925	4465	4.2	4990	1716

Milk cows have increased from 2172 in 1850 to 4465 in 1925. However there has been very little change in the number of persons per cow, as is indicated by the fact that there were 5.0 persons per cow in 1890 as compared with 4.2 in 1925. The four last census periods show approximately no change.

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* Includes all cows over two years old.

The number of cattle other than milk cows have increased from 4512 in 1850 to 4890 in 1925, or an increase of only 378. However during the three census periods following 1850 there was a decrease varying from 900 to 1400 head. The peak of production was reached in 1920 with 5192 head. This was an increase of almost 100% over the previous census period. This increase was partly effected by the high prices that prevailed during the World War.

There were twice as many cattle per 100 acres of improved land in 1850 as in 1925. In 1850 there were 10 head per 100 acres as compared with only 5 head per 100 acres in 1925. This was effected by the free range in the early periods. (See page 2.)

Sheep have decreased from 10,171 in 1870 to 1716 in 1925, or a decrease of almost 600%. A steady decline has been in progress since 1900. Should there be the same rate of decrease from 1925 to 1930 as there was from 1920 to 1925 there would not be a sheep in the county.

This decrease has probably been due largely to diseases of which the average farmer knows little about the control, to decrease in wheat acreage, and to sheep-killing dogs. On the other hand it is well to remember that the sheep producing areas are located in the better agricultural sections not only in Tennessee but in other states.

Table 8. Trend of Swine, Chickens, and Other Poultry 1850 to 1925

	Swine.		Chickens		Other poultry.	
1850	Total No.	No. per farm	Total No.	No. per farm	Total No.	Doz. eggs produced
1850	31,350	no data	no data	no data	no data	no data
1860	15,765	" "	" "	" "	" "	" "
1870	18,550	" "	" "	" "	" "	" "
1880	17,000	" "	" "	" "	" "	115,784
1890	13,665	7.4	23,900	13	15,500	182,537
1900	18,805	8.5	33,300	15	8,500	235,270
1910	13,695	5.7	56,200	24	-	241,209
1920	15,795	5.8	124,500*	46	6,400	415,269
1925	12,495	4.5	126,600	46	no data	518,330

These figures of 1920 are not strictly comparable with these of 1910, since the Census was taken January 1 in the former period, and April 5 in the latter period. Many fowls are killed between January and April.

However there has been an increase from 280 gallons per cow in 1890 to 318 gallons per cow in 1925. The latter figures compare favorably with the state average of 332 gallons per cow.

The production of wool per sheep although increasing from 1.7 pounds in 1850 to 2.7 pounds in 1925 is yet below the state average of 4 pounds per sheep. Sheep growing has been rapidly decreasing and consequently wool production has not been receiving much attention.

Table 10. Trend of Dairy Products 1850 to 1925

	Milk		Butter		Cheese	Cream	Butter Fat
	Gals. Produced.	Gals. Sold	Lbs. Made	Lbs. Sold	Pounds Made	Gallons Sold	Pounds Sold
1850	no data	no data	104,886	no data	1435	no data	no data
1860	" "	" "	87,071	" "	1581	" "	" "
1870	" "	10	121,582	" "	456	" "	" "
1880	" "	66	171,248	" "	623	" "	" "
1890	943,601	-	247,672	" "	743	" "	" "
1900	1,314,336	4114	254,086	3,623	no data	" "	" "
1910	977,304	6574	264,231	8,724	" "	" "	" "
1920	1,079,933	21,976	296,293	9,236	467	43	549
1925	1,253,238	7951	281,044	no data	no data	80	no data

This table shows that dairy products are largely used for home consumption. Only since 1900 has very much milk or butter been sold. In that year 4114 gallons of milk and 3623 pounds of butter were sold. These sales increased in 1920 to 21,976 gallons of milk and 9,236 pounds of butter. No butter sales were reported in 1925, but milk sales declined to 7,951 gallons.

No cream or butter fat was reported sold in the Census periods previous to 1920. In that year 43 gallons of cream and 549 pounds of butter fat were sold. No butter fat was sold in 1925 but the sale of cream was almost doubled. This is made possible by improved methods of transportation.

The number of hogs in 1925 was 12,495, as compared with 34,350 in 1850. In other words there were 2½ times as many hogs in 1850 as in 1925. The biggest part of this decrease occurred in 1860. Since that time the production has never been over 60% of the 1950 production. At the present numerical rate of decrease there would be only approximately 9200 hogs in the county in 1930.

Chickens, on the other hand, have shown an uninterrupted increase since 1890, of over 100,000 birds or an increase of approximately 400%. Other poultry, such as ducks, geese, and turkeys have had a gradual decrease. None were reported in 1925. The number of chickens per farm has increased from 13 to 46.

The increased production of poultry here, as well as in all parts of the United States, has been due largely to the efficiency of poultry in the use of feeds. With the exception of the dairy cow the hen will produce more per pound of feed than any other class of livestock.

The eggs production has not increased at the same rate as have the chickens, as shown by the fact that the farmer increased about 200% as compared with an increase of approximately 400% in the latter. Egg production per hen is shown in the following table.

Table 9. Trend of Production per Sheep, Hen, and Cow 1850 to 1925.

	Pounds wool per sheep	Dozen eggs per hen	Gallons milk per cow.
1850	1.7	no data	no data
1860	1.5	" "	" "
1870	1.5	" "	" "
1880	2.0	3.5	
1890	2.2	1.5	280
1900	3.1	6.0	430
1910	-	4.6	250
1920	2.6	3.5	240
1925	2.7	2.7	318

Egg production per hen has gradually decreased since 1900 from 6.0 dozen to only 2.7 dozen in 1925. This low production is largely due to lack of modern methods of feeding and management, and to mongrel flocks found on most farms.

There has been no remarkable changes in the production of milk per cow.

The practice of cheese making had been discontinued in 1925. There has been an almost gradual decrease, with the exception of slight fluctuations, from 1435 pounds in 1850 to 467 pounds in 1920.

Bees.

Table 11. Trend of Bees and Bee Products 1850 - 1925

666	Number of Hives	Lbs. honey produced	Lbs. wax produced	Value	Value hives	Lbs. honey per hive.
1850	No data	18,455*	no data	no data	no data	no data
1860	" "	31,046	2356	" "	" "	" "
1870	" "	22,610	1161	" "	" "	" "
1880	" "	39,934	1354	" "	" "	" "
1890	" "	25,359	747	" "	" "	" "
1900	" "	36,720	1070	" "	$7,972	" "
1910	1462	14,306	558	$ 2161	3,714	10
1920	3295	49,909	535	13137	13,040	15
1925	no data	no data	no data	no data	no data	no data

The peak of honey production occurred in 1920 with 49,909 pounds. The second highest production occurred in 1880 with 39,934 pounds. The data are incomplete on the number and value of hives. However the increase in the number of hives from 1462 in 1910 to 3295 in 1920 and the increase in value of each hive from $2.50 to $3.00 for the same periods indicates an increased interest in beekeeping.

The production per hive increased from 10 pounds in 1910 to 15 pounds in 1920. However this data is insufficient to determine the trend of production per hive. On the other hand it does indicate a low production which is more than likely due to the lack of improved hives and methods of bee management.

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* This includes both the lbs. honey and the wax produced.

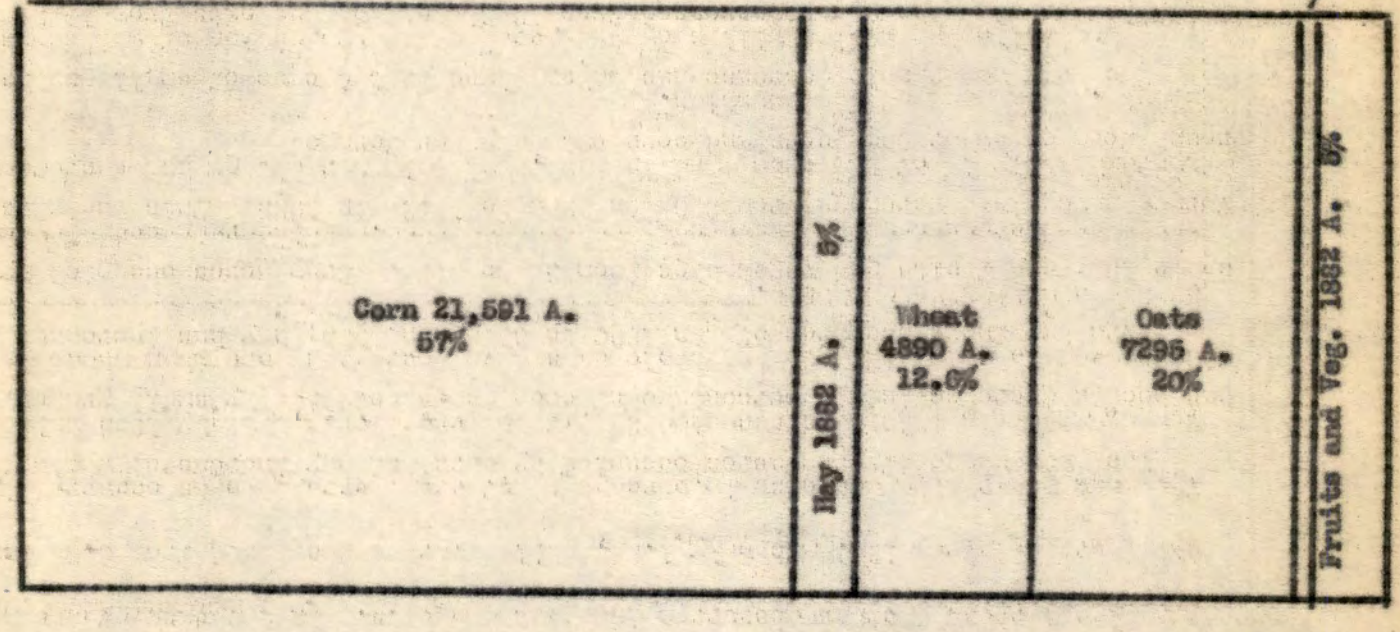
Crops.

The following charts will show the total number of crop acres, the number of crop acres occupied by each crop, and the percentage of the total crop acres occupied by each crop at each Census period:

Chart 2.* HOW CROP LAND WAS OCCUPIED FROM 1890 TO 1925.

1890
Total Crop Acres 37,792

Figure 1.



1900
Total Crop Acres 54,184

Figure 2.

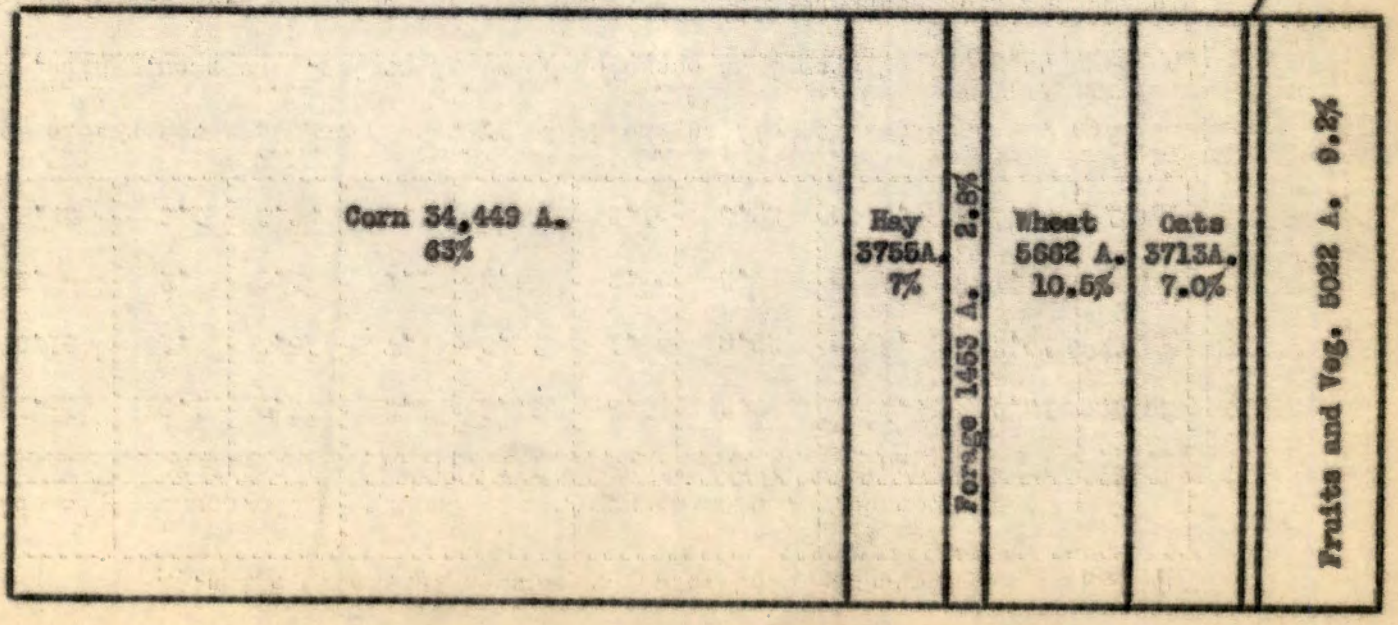
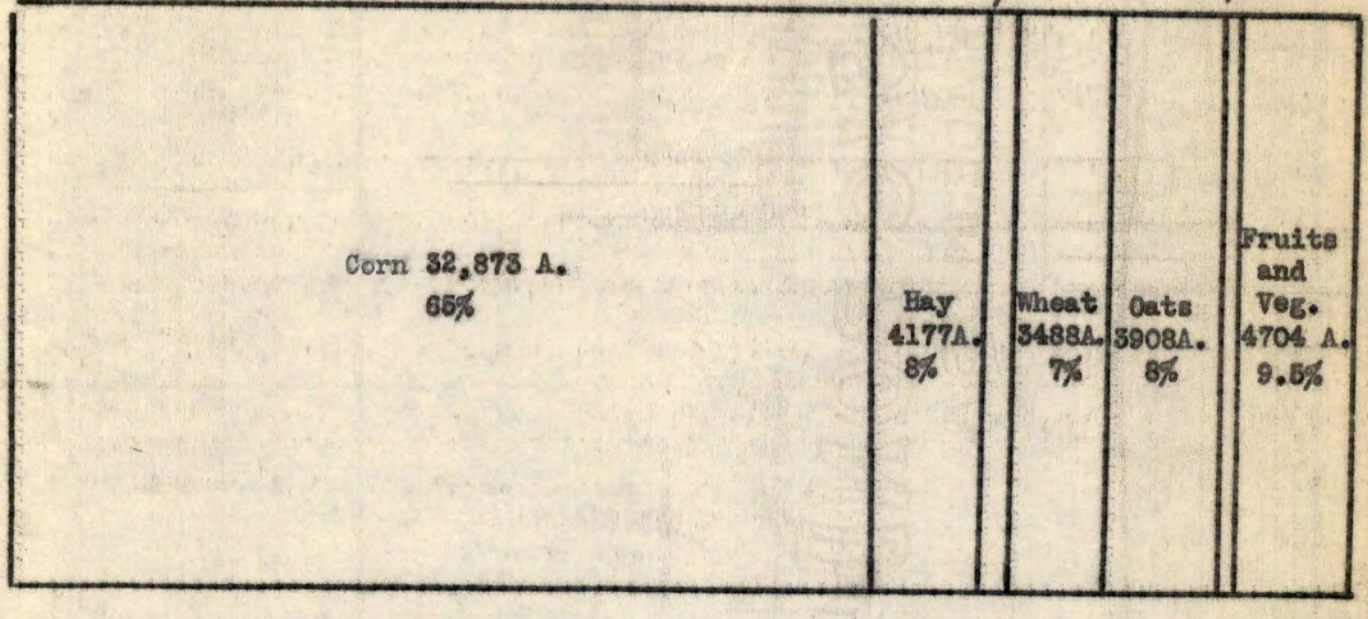


Chart 2 (continued)

1910
Total Crop Acres 50,457.

Figure 3.



1920
Total Crop Acres 61.891

Figure 4.

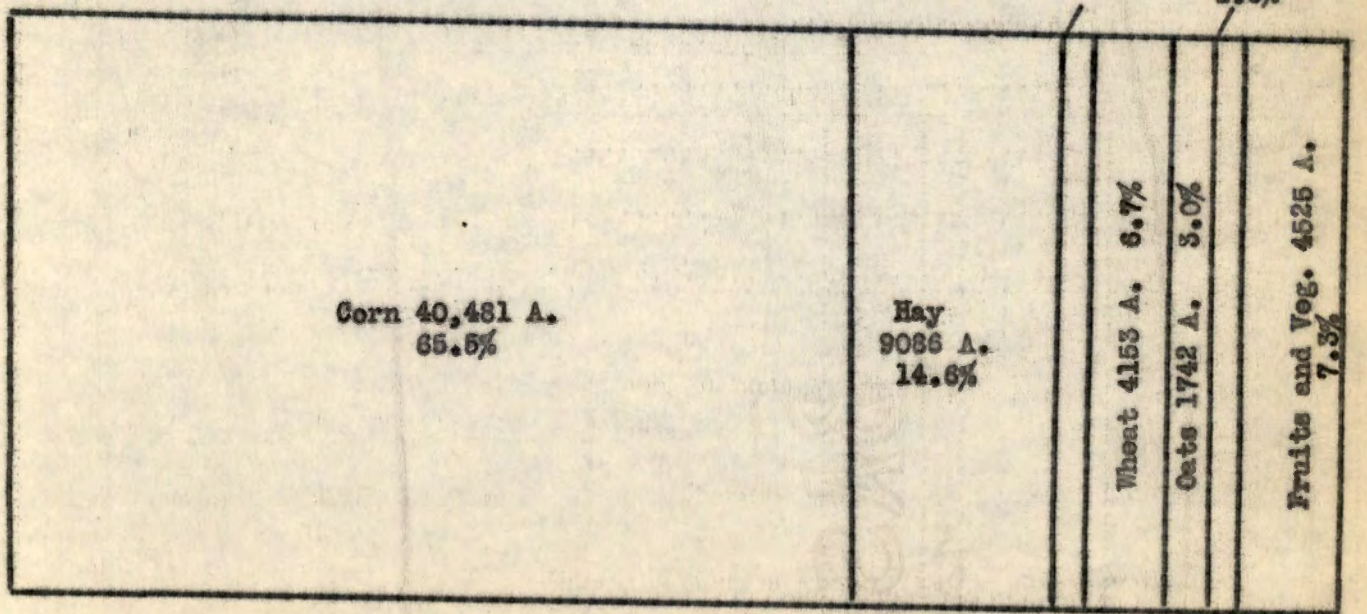
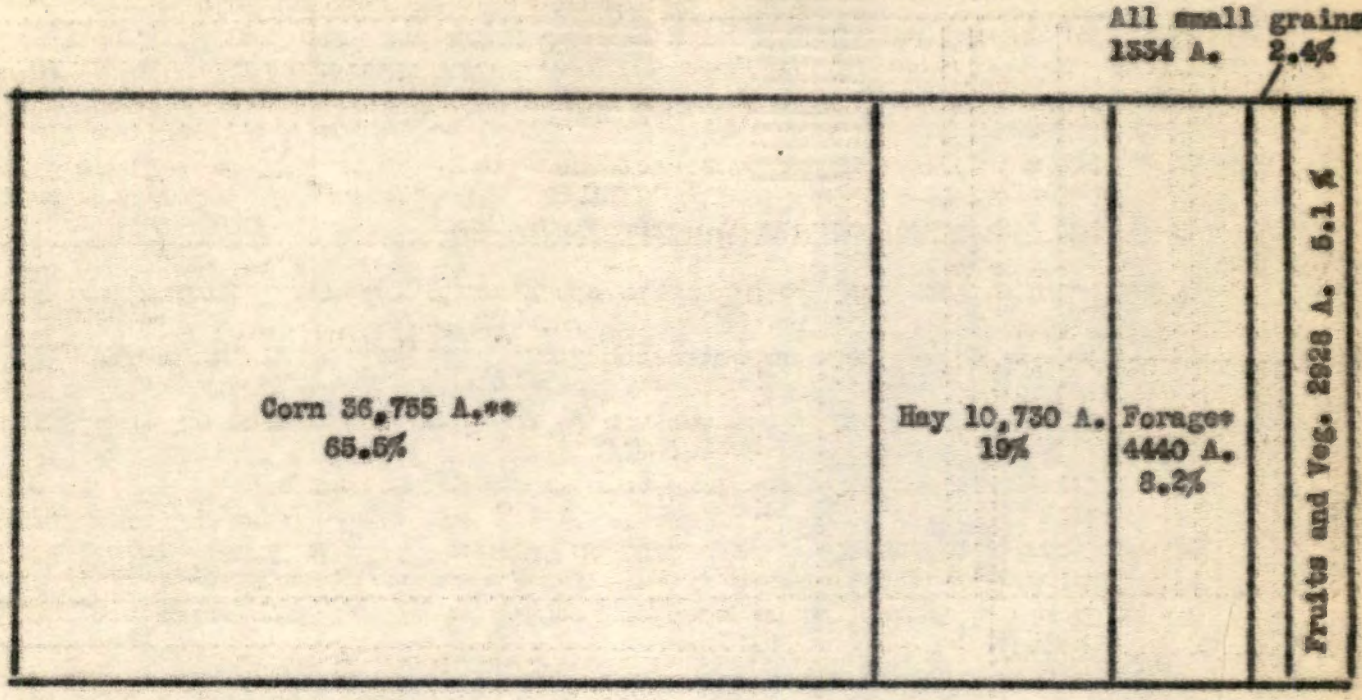


Chart 2 (continued)

1925
Total Crop Acres 56,189



The percentage of crop acres occupied by corn and hay increased, while there has been a decrease in the percentage of crop acres occupied by small grains.

Corn has increased from 57% in 1890 to 65.5% in 1925; hay has increased from 5% to 19%; and fruits and vegetables from 5% to 5.1%. Crop acres occupied by forage have also increased from 2.8% in 1900 to 18.2% in 1925. This includes only rough forages other than corn and corn cut only for forage.

The most remarkable decrease has taken place in the case of small grains during this period. Wheat has decreased from 12.6% to 1.5% and oats from 10.2% to 0.1%, and rye from 0.5% to 0.1%. In other words, all small grains have decreased from 29.3% to 1.8% during the past 35 years.

Fruits and vegetables have decreased from 9.2% in 1900 to 5.1% in 1925. The figures for 1890 are not comparable, since only bearing trees were reported.

The general trend during the past 35 years has been largely from small grains to hay and forage and corn for grain.

The following table will show these crop trends in the other counties of the

* Includes 1024 acres oats cut and fed unthreshed.
** Includes 109 acres "hogged off".

Rim section as compared with the state average from 1890 to 1925:

Table12 . Percentage of Total Crop Acres in Hay

	1890	1900	1910	1920	1925
Overton County	5.0	7.0	8.0	13.0	19.0
Putnam County	5.1	6.7	12.2	16.0	25.0
White County	7.3	9.5	16.1	26.4	32.6
Pickett County	2.5	6.6	4.5	11.4	9.1
State Average	10.0	11.5	15.7	19.1	21.3

Each county in the above table has had a rapid and gradual increase in the percentage of crop land in hay from 1890 to 1925. The largest increases have occurred in Putnam and White Counties, the former increasing from 5% to 25% and the latter from 7.3% to 32.6% during this period. These counties rank highest in this area during 1925.

The state average has gradually increased from 10% to 21.3%, but the rate of increase has not been as rapid as noted in the above counties.

Table 13 Percentage of Total Crop Acres in Corn.

	1890	1900	1910	1920	1925
Overton County	57	63	65	59	65
Putnam County	52	59	59	56	60
White County	55	55	58	49	54
Pickett County	51	60	67	59	72
State Average	48	53	49	45	46

Each of the above counties, except White County, had a larger percentage of the crop area in corn in 1925 than in 1890. White has decreased 1%. Pickett County showed the greatest changes, having increased from 51% in 1890 to 72% in 1925. Both Overton County and Putnam County had an 8% increase. These increases are in marked contrast to a decrease in the average county from 48% to 46% in the same period.

Table 14. Percentage of Total Crop Acres in Small Grains.

	State Average.		Overton County		Putnam County		White County		Pickett County	
	1890	1925	1890	1925	1890	1925	1890	1925	1890	1925
Wheat	15.2	3.1	8.8	1.5	13.2	2.2	12.0	1.0	18.1	1.2
Oats	10.2	.6	20.0	.1	16.0	.7	15.2	.1	11.0	.2
Rye	.1	.1	.5	.2	1.2	1.2	1.0	.2	.5	.1
Total	25.4	3.8	29.3	1.8	30.4	4.1	28.2	1.3	29.6	1.5

All the counties as well as the state average have had a remarkable decrease in the percentage of crop land occupied by small grains. Overton, White, and Pickett Counties decreased from approximately 29% to about 1.5% from 1890 to 1925. Putnam decreased from 30.4% to 4.1%. The state average decreased from 25.4% to 3.8% during the same period.

The largest decrease occurred in wheat and oats. In the case of wheat Pickett decreased from 18.1% to only 1.2%, while Overton decreased from 8.8% to 1.5%. The most remarkable decrease in percentage of crop acres in oats occurred in Overton County. In 1890 oats occupied 20% of the crop acres, but by 1925 this had decreased to only .1%. On the whole oats have decreased more than wheat in all of the counties noted above.

The decreases in rye have not been very marked. This grain occupied only approximately 1% of the crop land in 1890, but this percentage had decreased to about .2% in most of the counties.

The following tables will show the acreage and production of all crops at the different Census periods.

1. Corn.

The production of corn has increased from 366,168 bushels in 1850 to 542,399 bushels in 1925. The number of acres has increased also, in about the same proportion. In 1925, however, there was a decrease of almost 4000 acres and 30,000 bushels. This decrease was largely due to (1) 16,349 acres of crop land lying idle, (2) a decrease of about 800 animal units.

Other decreases occurred in 1870 and 1910. It can be assumed that the de-

crease in 1870 was largely due to the effects of the Civil War on the agriculture of that area. The decrease in 1910, as in 1925 was very likely due to the decrease in the number of animal units caused by decreased prices. In other words, it seems that the farmers have decreased their corn acreage as they decreased the number of livestock.

Table 15. Trend of Corn, Hay, Wheat, and Oats.

	Corn		Hay alone		Wheat		Oats	
Year	Acres	Bushels	Acres	Tons	Acres	Bushels	Acres	Bushels
1850	no data	366,168	no data	64	no data	9,739	no data	37,544
1860	" "	330,138	" "	145	" "	30,730	" "	13,509
1870	" "	250,550	" "	184	" "	27,671	" "	44,583
1880	2,270	411,240	295	302	7,183	29,989	3,135	24,635
1890	21,591	385,604	1,882	1481	4,890	20,815	7,595	65,883
1900	34,449	469,740	3,755	3374	5,662	29,410	3,713	28,780
1910	32,873	455,756	4,177	4130	3,488	25,008	3,908	32,699
1920	40,481	571,000	9,086	7721	4,152	19,594	1,742	13,967
1925	36,647	542,399	10,731	6193	1,031	7,976	100	1,103

Not only has the total number of acres in corn increased, but the number of acres per animal unit has increased from 1.6 in 1880 to 1.9 in 1925. This increase is very likely the result of (1) a decrease in yields per acre of 3.1 bushels, or 17.5% and (2) to better feeding practices, which has been prevalent over the state.

2.Hay.

The production of hay has had the most remarkable increase. The number of tons has increased from 64 in 1850 to 6,193 in 1925. In other words there were approximately 100 tons of hay produced in 1925 for every ton produced in 1850. The number of acres has increased at every census period. On the other hand a decrease in production occurred in 1925. This decrease was due to (1) a possible error in collecting the information*, and (2) to a decrease in yields

* The total production of hay was obtained in 1925, instead of the production of each class of hay separately. More difficulty was experienced by the reporters in obtaining accurate figures by this method. (U.S Census for Tenn. p. 6)

per acre.

When the trend of hay production was put on the basis of the number of animal units per acre of hay the large increase in hay production was further indicated. The following are the animal units (hay consuming only) per acre of hay crops at the different census periods: 31.0 in 1880; 6.1 in 1890; 3.0 in 1900; 2.2 in 1910; 1.7 in 1920; and 1.4 in 1925. In other words the farmers were growing about 20 times as much hay per animal unit in 1925 as they were in 1890.

It is difficult to determine the cause for this but it seems that is was partly affected by the change in number of the different kinds of livestock. Oxen and cattle other than milk cows, which consume rough feed, have decreased about 400 animal units. On the other hand milk cows,and work stock which do not consume large amounts of roughage have increased. Besides these changes the farmers in general are feeding more hay and less forage to their cows and horses than they were 30 years ago.

3. Wheat.

The acreage of wheat in 1925 was only 1031 as compared with 6120 in 1880. In other words there was only about one-sixth the number of acres in 1925 as 45 years ago. The large increase in acreage in 1920 over that of 1910 was due to the increased demand for wheat and corresponding high prices. But in the next five years there was a decrease of over 5000 acres, due to low prices following the war.

The general decline of wheat production is due (1) to low yields and relatively high cost per bushel, (2) to increased transportation, making it possible to import flour, (3) to more uniform grade of product obtained from large mills.

4. Oats.

The decrease in the acreage and production of oats has been more marked. The number of acres has decreased from 7595 in 1890 to only 100 in 1925*, and the number of bushels has decreased from 85,883 to 1,103 during the same period.

* Figures for 1925 do not include oats feed unthreshed.

This is probably due to the increased practice of feeding corn to workhorses, since corn has increased in production, notwithstanding a decrease in the number of hogs. The low yields of oats in comparison to the yields of corn has been largely the reason for this change.

5. Miscellaneous Crops.

Table 16. Trend of Miscellaneous Crops 1890 - 1925.

	Irish Potatoes		Sweet Potatoes.		Tobacco		Rye	
	Acres	Production Bus.	Acres	Production Bus.	Acres	Production lbs.	Acres	Production Bus.
1850	no data	11,156	no data	21,642	no data	37,501	no data	660
1860	" "	9,600	" "	17,225	" "	58,200	" "	2,351
1870	" "	11,970	" "	9,245	" "	119,230	" "	1,207
1880	" "	9,000	364	21,200	50	33,150	" "	2,191
1890	245	21,025	250	21,868	45	31,573	157	754
1900	237	12,264	326	24,173	97	46,780	130	490
1910	401	33,718	341	40,516	44	16,332	352	1,562
1920	423	29,258	413	57,048	34	22,170	844	2,932
1925	509	39,397	302	27,545	25	10,262	203	1,156

The number of acres in Irish potatoes has increased from 245 acres in 1890 to 509 acres in 1925, or approximately 100%. There was a corresponding increase in the number of bushels produced.

Sweet potatoes increased from 313 acres in 1880 to 413 acres in 1920. In 1925, however, there was a decrease of over 100 acres. The average decrease per county in the state was from 417 acres to 282 acres during the same period. This indicates a general decrease over the state.

The increase in production of both sweet and Irish potatoes has been largely due to the increase in population, as shown by the number of bushels produced per capita during each census period.

Table 17. Bushels of Potatoes Produced Per Capita 1890 - 1925.

	1890	1900	1910	1920	1925	Average.
Bushels sweet potatoes	1.9	1.8	2.6	3.2	1.5	2.2
Bushels Irish potatoes	1.8	.9	2.2	1.7	2.1	1.8

The production per capita of Irish potatoes was 1.8 bushels in 1890 and 2.1 bushels in 1925. There was an increase of sweet potato production per capita from 1.9 bushels in 1890 to 3.2 bushels in 1920. This, however, decreased to 1.5 bushels in 1925. On the whole, however, the increased production has corresponded very closely to the increase in population. In other words, potato production in this county has been largely a matter of producing for family consumption.

Tobacco has gradually decreased both in acreage and production. At the present rate of decrease there will be no tobacco grown in 1940. It is grown only for home use.

Rye has not been grown very extensively. Its acreage has varied from 157 in 1890 to 840 in 1920. However there was a decrease of over 600 acres in 1925. That it is not a profitable cash crop, neither a good feed for livestock in comparison with corn, or oats, nor its advantages as a cover or pasture crop widely know, accounts for the small acreage.

Table 18. Trend of Other Miscellaneous Crops.

Crops that have not been reported since 1850.		Crops grown in 1925 that were not grown in 1910*	
Kind	Yr. discontinued	Kind.	Year reported.
Clover and Grass Seed	1900	Soybeans	1920
Hops, Hemp, and Flax	1880	Alfalfa	1920
Rice	1860	Silage	1920
Peanuts	1920		
Barley	1925		

* Although these crops were not reported until 1920 they were being grown in the period from 1910 to 1920.

6. Fruits.

Table 19. Trend of Apples, Peaches, Cherries, and Strawberries.

	Apples		Peaches		Cherries, etc.		Strawberries.	
	Bus. harvested	Trees all ages.	Bus. harvested	Trees all ages.	Bus. harvested	Trees all ages.	Qts. harvested.	Acres.
1890*	89,300	52,000	15,000	10,200	280	712	no data	no data
1900	203,556	143,716	66	19,942	44	2297	" "	2
1910	116,595	84,864	19,760	25,660	337	1944	" "	2
1920	8,852	68,996	11,172	38,123	267	3591	7227	9
1925	74,326	67,123	15,523	29,877	no data.	no data	no data	6

Apples and peaches have been the principal orchard fruits since 1890, as indicated by the number of trees reported in each census period. The other fruits are plums, cherries, pears, grapes, and strawberries.

The number of apple trees have decreased from 143,716 in 1900 to 67,123 in 1925. The greatest decrease occurred in 1910. Since that period the decrease has been gradual.

The number of peach trees increased from 19,942 in 1900 to 38,123 in 1920. However a decrease of over 8000 trees occurred in 1925.

Table 20. Historical Trend of Miscellaneous Fruits.

	Pears		Plums		Grape vines.	Blackberries.***	
	Bushels	Trees	Bushels	Trees	Number	Quarts harvested	Acres
1890**	400	260	1045	1140	no data	no data	no data
1900	245	1677	516	7447	3117	no data	4
1910	440	1158	2396	7199	1681	696	1
1920	433	2359	702	7932	2732	10,050	13
1925	no data.	2616	no data.	8358	4193	no data	no data.

* Only bearing trees were reported. These figures are not comparable with those for the other periods.

** Only bearing trees were reported.

*** Does not include blackberries that grow wild.

The number of cherry, pear, and plum trees have increased since 1900. (No cherry trees reported in 1925). The production per tree of these fruits are low. With the exception of plums in 1890 and 1910, the production per tree of each of these fruits was less than two gallons in each census period.

Strawberries and blackberries, although of minor importance, have increased from 1900 to 1920 - strawberries from 2 acres to 9 acres and blackberries from 4 acres to 13 acres.

7. Yields per Acre.

The following tables will show the yields per acre of farm crops from 1890 to 1925:

Table 21. Yields per Acre of Sweet and Irish Potatoes.

	Sweet Potatoes		Irish Potatoes	
	State Average (bus.)	Overton County (bus.)	State Average. (bus)	Overton County (bus.)
1890	83	87	76	86
1900	69	74	86	82
1910	97	119	71	82
1920	112	139	66	79
1925	89	90	69	79

The yields per acre of sweet potatoes in Overton County have varied from 74 bushels in 1900 to 139 bushels in 1920. The yields in this county have been higher than the state average in every census period. Furthermore the yields here have exceeded the yields in the 7 highest producing counties by 19 bushels in 1920 and 2 bushels in 1925.

Irish potatoes have decreased 7 bushels per acre in both Overton County and the average of the state. Overton County however has maintained a higher average than the state in all census periods except 1900.

Natural conditions, as sandy soil, and moisture, and fairly cool nights during the growing, are favorable to Irish potato production, especially in the Plateau section of the county.

Table 22. Crop Yields per Acre of Corn, Hay, and Rye.

	Corn		Hay		Rye	
	State Average (bus.)	Overton County (bus.)	State Average (tons)	Overton County (tons)	State Average (bus.)	Overton County (bus.)
1890	21.9	17.9	1.1	.8	6.4	4.6
1900	19.9	13.8	.9	1.0	6.5	4.0
1910	21.5	13.8	1.0	.8	7.0	4.4
1920	21.4	14.1	.9	.9	6.1	3.5
1925	21.0	14.8	.8	.6	7.6	5.7

Corn yields in Overton have decreased from 17.9 bushels in 1890 to 14.8 bushels in 1925, as compared with a state average decrease from 21.9 bushels to 21.0 bushels during the same period. However since 1910 there has been a gradual increase in Overton County to 14.8 bushels per acre.

Very little change has taken place in hay yields per acre. The decrease from 9 tons in 1910 to .6 tons in 1925 was probably due to errors in enumerating the census, on hay, as mentioned in the previous discussion of hay.

Table 23. Crop Yields per Acre of Wheat, Oats, and Barley.

	Wheat		Oats		Barley	
	State Average (bus.)	Overton County (bus.)	State Average (bus.)	Overton County (bus.)	State Average (bus.)	Overton County (bus.)
1890	9.4	4.2	12.5	8.8	17.8	7.0
1900	8.5	5.2	11.5	7.8	13.4	4.0
1910	10.5	7.1	14.0	8.2	21.0	-
1920	9.2	4.7	21.0	8.0	16.0	6.0
1925	10.0	7.8	18.2	11.0	16.6	-

The yields per acre of all small grains have increased since 1890 in both Overton County and the average county. The state average for wheat has increased from 9.4 bushels in 1890 to 10.0 bushels in 1925; while the average for Overton County has increased from 4.2 bushels to 7.8 bushels for the same period.

The yields of barley in Overton are the lowest in comparison to the state average. These low yields show that barley is not well adapted to the average

soils of the county.

The increase in the yields of small grains has been due largely to two factors: (1) the tendency to grow these grains on the better land as the total acreage decreases, and (2) to an increase in the use of fertilizer.

With the exception of Irish and sweet potatoes the crop yields of all crops have been below the state average during the past 35 years. This has been due largely to the cropping system which has not been conducive to either soil maintenance, or improvement. (See Chapter III, page 73.)

Chapter II.

Fundamental Economic Factors

For a thorough understanding and interpretation of the agricultural conditions of this area it is necessary to have a knowledge of such fundamental economic factors as population, ownership and tenancy, transportation, markets, soil, climate, etc.

Before an area can compete with other areas in marketing its agricultural products, the yields should be relatively high and cost of transportation relatively low. Due to the low fertility of the soil, long distance to outside markets, and the high freight rates, Overton County is seriously handicapped in the development of her agriculture. She is further handicapped by lack of local markets of sufficient size to absorb very large quantities of produce, and a relatively high percentage of tenancy for conditions in the county. On the other hand, the county has a favorable climate for growing both crops and livestock and has a population equal in intelligence to the population of other counties more favorably situated in regard to these economic factors.

Transportation.

Transportation was a difficult problem at the time of the first settlements in Overton County. Not only were the markets for buying household necessities and selling surplus farm products far away, but the facilities for transporting them were very crude. Oftentimes such goods as salt, dry goods, etc. were hauled by wagon over rough mountainous roads from Baltimore, Maryland. These necessities were hauled altogether by wagons, whether from Baltimore or a nearer market as Nashville.

About as much difficulty was experienced in disposing of surplus farm products. These were usually shipped by flat boat down the Cumberland, Ohio,

and Mississippi Rivers to New Orleans. As this method was necessarily slow, often requiring from three to four weeks to make the trip, only non-perishable commodities such as grain and meat could be marketed. These products were hauled by wagon to the Cumberland River, as there are no rivers in the county large enough to transport anything except logs and canoes. The shippers had to walk back from New Orleans.

Livestock was marketed by driving to the market places, usually to other states. Hogs, which usually had been allowed to fatten on the range were collected into large droves and driven to Georgia and Alabama to be sold to the cotton planters. Cattle were driven across the mountains and sold in Virginia, Kentucky, and North Carolina. Prior to 1860 many mules were raised and taken to the South, there to be sold to the cotton planters. From 1865 to 1890 this practice of driving livestock was discontinued, due to the demoralizing effect of the Civil War on agricultural conditions. Since 1890, however, there has been a gradual improvement in the agriculture of the county.

Overton County was progressive and prosperous, comparing favorably with other sections of the state, up to the era of railroad construction, which began about 1860. The sections which were fortunate enough to be traversed by these early railroads made much more rapid progress than did Overton County.

There are two outstanding reasons why the railroads avoided this section. (1) They naturally wished to avoid the rough mountainous country, especially when it did not lie on the direct route between two important centers. This gave the more level sections the advantage in developing their agricultural resources. (2) The Cumberland River, which drains the north-eastern section of the Highland Rim, would be a strong competitor for freight, since this river transportation was not only an established but a cheap method of conveying goods to market. Similar conditions prevailed along the Tennessee River in the western part of the state.

The first railroad was built in Overton County in 1901. This was a branch

line of the Tennessee-Central extending into the south-eastern part of the county for the purpose of taking out the coal and the timber. In 1906 the Overton County railroad was built from Algood, located on the Tennessee-Central in Putnam County, to Livingston. This road is now operated by the Tennessee, Kentucky, and Northern Railroad Company, under a lease from the Cincinnati, Nashville, and Southern Railway Company.

These two branch roads have a total mileage of 30. The T. K. and N. operates 17.1 miles and the Tennessee-Central 12.9 miles.

The quality of these roads is very poor. They have a total value of $199,000, or a value of $6,633 per mile, which is very much less than the value per mile of railroads in similar counties. The value per mile of the railroads is $65,000 in Rutherford County, $97,120 in Rhea County, $58,675 in Hamblen County, and $63,000 in Sullivan County. The value of the latter roads vary from ten to fifteen times that of the roads in Overton County. This great variation in value is due to the fact that the Overton County roads are only branch lines and can therefore be patronized by only a limited number of people, while the more valuable roads are parts of the main lines built between central points. The builders of this branch road would not have been justified in an expenditure per mile equal to that of the main line railroads.

Notwithstanding the low value per mile, the freight rates on these roads are excessive. The rates on the main line of the Tennessee-Central, with which the T. K. & N. connects, are also higher than those of the larger railroads.

Table 24. Freight Rates on T. K. & N. and T. C. Railroads.

	Less than car-lots Livingston to Nashville	Car-lots Livingston to Nashville	Car-lots Algood to Nashville	Total in car-lots	% the T.K.&N. rates are of the total.
Potatoes per 100#	.51	.17	.25	.42	40.4
Corn and wheat (1)	.56	.11½	.22½	.22 .34	33.8
Hay per 100#	—	17.00	30.40	47.40	35.5
Young cattle per car	—	17.00	38.80	55.80	30.4
Grown cattle per car	—	.25	.60½	.85½	30.0
Poultry per 100#	—	.17	.32	.49	34.7
~~Machinery per 100#~~					

(1) Wheat and corn have a milling-in-transit rate which accounts for low rate.

The rates on shipments in car load lots per 100# from Livingston to Nashville vary from 22¢ on small grain to 88½¢ on poultry. From 30% to 40.4% of these freight charges occur on the T. K. & N. road, while the distance over this road is approximately only 18% of the total distance between Livingston and Nashville. The difference in the rates over the two roads is also shown by the percentage the T. K. & N. rates from Livingston to Algood are of the T. C. rates from Algood to Nashville. This varies from 25% on poultry to 64% on potatoes, although the distance between Livingston and Algood is only 20% of the distance from Algood to Nashville.

It should be noted in this connection that the charges per mile on poultry from Livingston to Algood correspond very closely to the charges per mile from Algood to Nashville, while there is a much wider variation in the charges on potatoes, hay, machinery, etc.

The difference in freight rates on less-than-car-lot and on car-lot shipments is very marked on potatoes; for instance, the rates are increased from 42¢ per 100# on car-lot shipments from Livingston to Nashville, to 56¢ per 100# on less-than-car-lot shipments, an increase of 21%. The rates on hay are 68% greater on less-than-car-lot shipments, or an increase of 22¢ per 100#.

The freight rates per 100# are approximately twice as high on poultry as on potatoes. However the freight charge on the potatoes is a smaller percentage of the value than is the charges on the poultry. With an average selling price of potatoes of $3.00 per 100# and poultry at $20 per 100#, the freight charges would be 14% of the producer's price on the potatoes and only 4.2% of the producer's price on poultry. This has an important bearing on the type of agriculture in the county, as will be shown in a later discussion.

Table 25. Number and Percentage of Farms on the Different Kinds of Roads in this Area Compared with State Average in 1924.

Kind of Road	State Average		Overton County		Putnam County		Pickett County	
	No. Farms	% of Total	No. Farms	% of Total	No. Farms	% of Total	No. Farms	% of Total
Unimproved Dirt	1200	46.1	2261	82.0	1967	62.6	892	91.0
Improved Dirt	783	29.5	313	11.0	674	21.0	-	-
Macadam and Gravel	600	22.6	164	5.6	408	13.6	72	7.3
Brick and Concrete	18	.6	-	-	-	-	-	-
Other Roads	59	2.2	40	1.5	80	3.0	14	1.7
Total	2660	100.0	2778	100.0	3129	100.0	978	100.0

The majority of the farms in Overton, Pickett, and Putnam Counties are located on unimproved dirt roads. Overton County ranks high with 2261 farms or 82% of the total farms located on this type of road as compared with the state average of 1200 farms or 46.1% of the total.

While only 313 farms, or 11.0% of the total number of farms in Overton County are located on improved dirt roads, the average county has 783 farms, or 29.5% located on this type of road.

Only 164 farms, 25.8% of the total farm in Overton County, are located on macadam or asphalt roads, as compared with 600 farms, or 22.6% of the total farms located on these types of roads in the average county.

About the same condition prevails in Pickett County except that there are no farms located on improved dirt roads, thus increasing the percentage that are located on unimproved dirt roads to 91.

On the other hand the farmers in Putnam County are more favorably situated as to improved roads. Over 20% are located on improved dirt roads and 13.6% on macadam or asphalt*.

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*These figures were taken from Census data in 1924. Since that time there has been some progress in improved road construction.

Road conditions in Overton County, on the whole, have been very poor until recently. There were no hard surfaced roads in the county. At present there are four roads of this kind: (1) an asphalt road from Algood, through Livingston by Byrdtown in Pickett County; (2) a macadam road from Livingston to Celina in Clay County; (3) a macadam road from Hickman to Monterey; (4) and a macadam road extending from Livingston to a distance of 3 miles north-east on the road to Crawford.

A graded road, macadamized for 3 miles, as mentioned above, leads from Livingston to Crawford. This road will probably be macadamized at an early date. It is a splendid road in summer but almost impassible in winter.

The other roads in the county on the whole are in very poor condition. Those yet ungraded often have steep grades, are rocky, and often impassible in winter. An exception should be made of the ungraded roads in the Plateau section of the county. These roads usually follow the top of the Plateau and are constructed mostly of hard packed sand. This type of road rarely becomes impassible.

Pickett, Clay, Putnam, and White Counties, as is Overton County, are fairly well supplied with improved roads. Putnam and White County, however, rank highest in the number of state highways, with four radiating from near the central part of each county. Pickett and Clay Counties have two and three improved roads leading into the county respectively. All of these roads, with the exception of the one leading from Algood, in Putnam County, into Overton County are good stone or gravel maintained by the state. The unimproved roads, constituting the majority of the roads in these counties, are in very much the same condition as those in Overton County.

These counties do not have equal advantages in railroad transportation. Putnam and White Counties have 49 and 36 miles of railroad respectively. On the other hand, Pickett and Clay Counties do not have any railroads. The value of the railroads per mile varies from $9,930 in Putnam County to $16,560 in White

County. The road through the latter county is a branch of the N. C. & St. L., which accounts for its higher mileage value.

Clay, although handicapped by a lack of railroads, is ideally situated as to river transportation, since steamboats ply the Cumberland River from Nashville to Celina.

The hard surfaced roads have made possible transportation by motor trucks and motor buses. The Tennessee, Kentucky, and Northern Railway operates a truck from Algood to Livingston, Byrdstown, and Jamestown. The Cookeville Ice Cream and Butter Company operates a truck from Cookeville to Livingston. Other trucks are also operated between these towns. However their sphere of operation is limited mainly to the improved roads. The farmers on the unimproved roads will necessarily have to depend on hauling their products by wagon, either to the pike where they can be collected by trucks, or direct to the railway shipping points.

The question is often asked as to the possibilities of the future operation of the Tennessee, Kentucky, and Northern Railroad. No definite answer can be made to this question, which involves the supply of forest products, the future development of the county's agriculture, and motor transportation.

At the present the railroad is depending primarily on shipments of timber for its receipts. The timber supply is being diminished annually. The amount shipped at present is being supplied from forests farther from the railroad. Timber is often hauled distances of 12 to 15 miles, which has been made possible by the improved roads and to some extent by the advent of motor trucks as a method of transportation, though some lumber is being hauled that distance on wagons. Approximately 110 car loads are shipped from Livingston and other points on the T. K. & N. monthly. At this rate it will be a matter of only a few years until the supply will be practically exhausted.

With the probability of a future shortage of timber the railroad officials realize that unless agriculture is developed to the point where considerable

shipments of commodities out of the county in carload lots is made, they will have to discontinue operation. They have intimated that they would help in this development to the extent of lowering the rates on such shipments as an inducement to commercial production. Of course these lower rates would be possible only to the extent that several farmers cooperated in producing large amounts for such shipment. At present scarcely any farm commodities are shipped out of the county, with the exception of livestock shipments.

The advent of the motor truck and passenger bus as factors in transportation have not served to increase the possibilities of the railroad operating in the future. Their number has increased rapidly in the county and in them the railroad has a strong competitor, for both freight and passengers. In fact the passenger service on the railroad has already been practically discontinued.

Markets.

The self-sufficing agriculture of this county was due largely to the lack of markets for its products. As mentioned in the discussion of transportation in this county, the only available markets, such as New Orleans, other parts of the cotton area, and parts of North Carolina and Kentucky, were almost inaccessible because of the lack of proper transportation methods. These markets could not however absorb large quantities of produce at prices to warrant their production and transportation under the existing difficulties. Many times loads of produce were sold for less than the shipper had paid for them at the assembling points.

There were no towns in the county of a sufficient size to furnish a market for these products. Livingston, which was the largest town, had a population of only 240 in 1870 and 320 in 1880. Each of the other small towns, Monroe, Hilken, Oakley, and Crawford, had a smaller population than did Livingston. The people in these towns were usually supplied with vegetables from their own gardens, with milk and butter from the family cow, and with eggs from their small flock of chickens. They depended, however, largely on nearby farmers for the food for

their eggs and chickens. It is obvious, therefore, that the local demand for farm products was extremely limited.

These marketing conditions remained very much the same until the construction of the two railroads in 1901 and 1906, and the recent improvement of the public roads. With these improved transportation facilities new markets are now available, and the distances to the same have been shortened, thus reducing the time and cost in the marketing operations.

The small towns, although larger at present than 50 years ago, can absorb only a limited quantity of produce. Livingston, the county seat with a population of 1215, is the largest town in the county. Should the production be put on a larger commercial scale it would necessitate the opening up of new markets outside the county. At present, however, the demand for crops, as corn, hay, potatoes, etc. is <u>not</u> supplied by the farmers of the county. Approximately the following car loads of produce were shipped to Livingston in 1925: flour 75, wheat 10, hay 30, corn 50, and potatoes 10. Only 50% of these shipments were consumed in Overton County, the other 50% being consumed in Clay and Pickett Counties.

It must be remembered, however, that due to the drought of that year crop yields were considerably lower than the average. Therefore many farmers were purchasers of these products who had ordinarily a small surplus or at least enough for home consumption. All of these shipments, consumed in Overton County that year, then were not consumed by the people in the small towns.

Each farmer should watch for unsupplied local demands and supply them. At present there is a demand (1) for feed for logging and mining teams and other livestock not on farms, (2) for vegetables and fruits, (3) for milk and butter. A few farmers have taken advantage of these local demands by supplying these products. One farmer has developed a profitable herd of purebred cattle. He supplies not only local demands but those of nearby counties. Another has supplied the local demand for fruits. A few have sold hay and corn. Without an exception

these farmers have made a better income than did the average farmer.

On the other hand, these local markets may be easily glutted. While there were approximately 700 animal units not on farms that consumed hay, one must consider these facts: (1) that some of these animals were logging teams owned by farmers who raised their feed; (2) other animals were kept in the towns, for which feed was raised on farms operated by owners who lived in town; (3) that horses are being displaced rapidly by motor trucks and automobiles; and (4) that logging teams will continue to decrease as the timber supply is diminished.

Selling on local markets is especially advantageous in the saving on freight. The local price here is usually determined by the market quotation plus the freight on goods shipped in. On the other hand, the price on goods shipped out is determined by the market quotation less the freight to the terminal markets. In other words, the farmer who supplies local demand gets the wholesale price plus the freight, whereas if he shipped to outside markets the freight costs would be deducted from the price of the commodity.

Cooperative buying and selling has not been developed extensively in this area, as shown by the following table:

Table 26. Value of Products Sold and Supplies Purchased Cooperatively in this Area Compared with the State Average

	State Average	Overton County	Putnam County	White County	Pickett County	Clay County
Value Products Sold	$74,420	$ 466	$ 230	$ 326	$ 2706	0
Value Supplies Purchased	4,690	439	46	622	122	0

Overton County sold only $466 worth of farm products cooperatively as compared with the state average of $74,420; and purchased only $439 worth of supplies by this method, as compared with the state average of $4,690.

Clay County ranks lowest in this area with no products sold or supplies bought. The other counties compared favorably with Overton County except Pickett

County which reported $2706 worth of products sold by cooperation.

Overton County ranked among all of the counties as follows: 92nd in both cooperative buying and selling; 87th in cooperative selling; and 77th in cooperative buying.

Livingston is the assembling point for most of the produce that is shipped from the county. Cattle, hogs, and poultry, are the only products shipped out in large quantities. During 1925 approximately the following carloads were shipped: poultry 60, cattle 25, hogs 25. Approximately 25% of the poultry was shipped by truck, while the cattle and hogs were shipped by rail. About 50% of these shipments came from Clay County. None came from Pickett or Fentress Counties.

The excessive railroad freight rates have greatly handicapped the farmers of the county in competing with farmers more favorably situated as to railroad transportation. However some products require a less percentage of the producers' value for freight rates than do others, which fact can be taken advantage of by the farmer. Poultry and eggs, cattle and hogs, dairy products, especially butter and cheese, are products that have a high unit value.* Hay, grain, potatoes, etc. have, on the other hand, a low unit value.

The cost for shipping products of the farmer group varies from 2.5% to 7.5%, while the cost for shipping the products of the latter group varies from 10% to 30% of their farm value.**

These facts should aid us in our decision as to what commodities should be marketed by railroad from Overton County. Shall they be the bulky and low unit value products such as hay, potatoes, grain, etc., or the more concentrated and high unit value products, as poultry and eggs, cattle, hogs, etc? The farmers have probably unconsciously answered this question. They are shipping only the

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* A product has a high unit value when it has a high price per pound.

** Hibbard - Marketing Farm Products.

products with a high unit value, which is the practice they should continue to pursue, especially as long as the high freight rates exist. However, commodities with a high unit value can be transported for a less percentage of their value than can those with a low unit value, regardless of the freight rates. But the goods with a low unit value will be shipped at a greater disadvantage when rates are high.

The motor truck has made it more convenient to market produce in small lots outside the county at such towns as Algood and Cookeville, where it is either consumed or assembled for shipment in car-load-lots, as in the case of poultry and poultry products. Cream, whether the surplus from the cows kept for the family or from a few cows kept for commercial purpose, could very conveniently be shipped to Cookeville by any of the different freight trucks. This would be especially convenient for the farmers who live near the main highway.

Population.

Overton County had a total population of 17,617 in 1920. Of this number only 1,215 were living in Livingston, the only incorporated town in the county. Putnam County has the largest population of this area with 22,251, while Pickett County ranks last with only 5,206. These two counties maintain this rank in the population of all incorporated places, the former having 5,012, and the latter having only 125.

Overton County has had a steady increase in population since 1900, as follows: 1900 to 1910, 10.6%; 1900 to 1910, 13.7%; 1910 to 1920, 11.1%. However, from 1900 to 1890 a decrease of 0.7% occurred, due to the annexation of part of the county to Pickett County. The increase in 1920 is remarkable, since the average increase per county was only 7% for that year and that 37 counties had a decrease of from 0.2% to 15.6%, for that census period.

None of the other four counties of this area had a decrease during these census periods, except Pickett County, which had a 5% decrease in 1910.

Table 27. Composition of Population in Overton County 1890 - 1920.

	1920		1910		1900		1890	
	Number	%	Number	%	Number	%	Number	%
Native Whites	17,400	98.8	15,536	98.0	13,038	98.2	11,769	98.0
Foreign Born Whites	7	.1	20	.1	4	.1	6	.2
Negroes	201	1.1	299	1.9	273	1.7	234	1.9

This county is populated largely with native born white people. In no census period did this class of people constitute less than 98% of the total population. Negroes and foreign born whites constitute the remaining percentage. However the percentage was only 1.2 in 1920.

This table also shows that the number of negroes has decreased from 264 in 1890 to 201 in 1920, and that their percentage of the total population was only 1.1% in 1920. This is due largely to a lack of towns and to the type of farming in this county. The highest percentage of negroes is found in counties with larger towns or cities, and in those having a large percent of such cash crops as cotton and tobacco. This is shown as follows: Hardeman, Lauderdale, Shelby, Fayette, and Haywood Counties, having a high percentage of their acreage in cotton, have from 40%- 64% of its total population in negroes; Montgomery and Robertson, leading tobacco counties, have from 21.8% to 37% negro population, respectively. On the other hand, the negro population in the counties adjoining Overton County, varies from only .1% to 8% of their total population.

The number of negro farmers in Overton County has decreased from 25 in 1920 to 12 in 1925, while the number of white farmers have increased from 2,687 to 2,736 during the same period. This is a further indication of the trend of negroes away from the farms of this section.

The farm families both white and colored in Overton County are larger than in the average county of the state. The average size per family was 5 for the whites and 6.4 for the colored in Overton County in 1925, as compared with 4.6 for whites and 4.8 for the colored in the average county of the state.

Overton County had a farm population of 14, 120 and total population of 18,586 in 1925 as compared with the state average of 12,350 farm population and 25,460 total population*. In other words the farm population is 77% of the total population in this county as compared with state average of 45%. Hardly one-fourth of the people are engaged in other kinds of work in this area while more than one-half are engaged in other occupations in the average county of the state.

The other occupations in which Overton County people engage in are as follows: merchandising, manufacturing, mining, professions (medical, teaching, and legal) and such miscellaneous occupations as usually found in small towns.

There are 4,460 people engaged in these occupations. This of course includes women and children as well as the wage earners. With 14,120 farm population, there are 3½ people engaged in farming to 1 person engaged in other occupations. This means (1) that there is a small local demand for the farmers' products, since many of those engaged in other occupations grow at least a part of their food, (2) that the burden of taxation is largely on the farm population, since a large percentage of the people engaged in other occupations are only wage earners and are not property owners. This is borne out by the fact that the assessed valuation of farm property is 80% of the total assessed valuation of all property in the county.

It takes a much higher order of intelligence to make a success of farming in an unfavorable environment than under one where both natural and artificial economic forces are aiding the farmer. Where soil, topography, transportation facilities, and distance to market are unfavorable, as they are in Overton County, it is very difficult for the farmer to prosper.

There are many parts of Tennessee where farmers have nearly always been prosperous. Some years have been more profitable than others, but the farmers have

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*The total population was not given in the census material for 1925. The census method was used in estimating it - i.e., multiplying the total population of 1920 by ½ the percentage increase during that period and adding the product to the total population.

nearly always been prosperous. Some years have been more profitable than others, but the farmers have not failed to live comfortably. In such regions they live in comfortable houses, have good schools and churches, and often send their sons and daughters to college. Farmers in these regions are usually last to feel adversity.

On the other hand, there are other sections of Tennessee where many men of ability are struggling along for a lifetime under adverse conditions, making only a bare living. They are continually moving up into the hills, mountains, and on barren lands, fighting against forests and topography. Success in such cases is rare because land is being cultivated that should be used for pasture and forests. The Federal Bureau of Forestry estimates that only 51% of the land area of the United States can ever be profitably used for agricultural purposes, 26% can be used for arid ranges, and 23% is mostly adapted to forest purposes. Even in the best agricultural sections of Tennessee there are small areas on farms that are adapted only to woods and pasture. However, with a change in economic conditions this mountainous and arid land may afford a comfortable living, but at present the farmers in such regions are finding it almost impossible to compete in world markets for agricultural products.

Again, the farmers are not succeeding because they are not following the type of farming adapted to the economic conditions of that region. An adjustment of the type of farming to present conditions in such regions would result in an improvement in the farmers' conditions.

And so the farmers of Overton County are in very unfavorable environment. Both natural and artificial conditions are against them. Hence it is not surprising that they are not making money in competition with the more favored regions.

But in general we should not too lightly condemn the experience of others who have for generations faced the problem as it is. Many times the feeble efforts of the native population are sneered at by the newcomer or passers-by. The farmers are too often blamed for their poor conditions. It is well to remember, however, that the white population of America is all of one stock. This is almost unbelievable when one sees the improvidence in some sections. But to be convinced

one needs only to see the transformation that takes place when such persons move to regions having better economic conditions.

It is no reflection on the intelligence of the present farm population of this county that they now live under unfavorable conditions. They were born and reared there. There is always an inclination to remain near one's relatives and friends, and in an environment with which one is acquainted.

Neither is it any reflection on the intelligence of their ancestors who first settled there for conditions in this county were well adapted to the self-sufficing agriculture that was prevalent there and in the other counties of the state.

Further evidence of the intelligence of the native stock of people in this county is shown by the following list of men and women who have held, or who now hold responsible positions in the state and nation:

Judge Cullon, lawyer and jurist, one time mentioned for President Jackson's Cabinet; the late Judge Goodpasture, a prominent lawyer and jurist; A. H. Roberts, lawyer and former governor of Tennessee; Cordell Hull, present congressman from the 4th district, and formerly Chairman of the Democratic National Committee; Judge Officer, lawyer and jurist; Ridley Mitchell, lawyer and jurist; John Mitchell, lawyer and jurist; and J G. Sims, Secretary to Senator L. D. Tyson; and many others.

These men, born and reared on farms of this county, have attained as great success as have men from other counties in the state more fortunately situated.

Economic conditions in general have vastly changed since days of the pioneers but the people of Overton County are yet not as fortunately situated in regard to transportation, markets, and topography, as are those of many counties in Tennessee. Hence the farmers, the sons of these intelligent pioneers, are attempting to farm what in many respects is submarginal land. They are not altogether to blame for this nor were their families. On the other hand, children of pioneers who settled in other areas are living comfortably, due primarily to (1) the increase in land values due to the nearby development of cities, or (2) the more favorable economic conditions existing at present in those areas.

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* Chapter I, Agricultural History.

Undoubtedly the farmers of this county, who have had the greatest handicaps and hardships, had they been located under a more favorable environment would now be a more prosperous and progressive group — in fact would be as prosperous as are the present occupant of those more favored lands.

Despite the handicaps of the region some men engaged in farming have made some money. These men are the shrewdest business men of the region and have become its capitalists, thus corresponding to the "Captains of Industry" in the cities. There is just as great difference in their success and that of the average man in the regions, as there is between the city capitalist and the average of city men. If these men had been located in more favorable regions undoubtedly they would have been shrewd enough to have done much better.

It is one of the fundamental laws of economics that the most efficient farmers eventually get possession of the best land. But that applies more universally to lands that lie within a given region than it does to a differentiation between regions. That is, the most efficient farmers get possession of the best land in that region rather than to move to some other more favorable area. Many examples of that kind are found in Overton County. Many hill farmers, having accumulated some money, have moved to the more level and fertile land. This being the case, it does not appear that Overton County has lost very heavily of its most efficient farmers, through their migration to other counties.

Many of the younger people of the county are either in the northern states, working in the factories, had been there, or were planning to go, but in the majority of cases they were planning to return to Overton County to make their permanent home.

Farm Ownership and Tenancy.

The percentage of farm tenancy in Overton County is unusually high for a county outside the cotton and dark tobacco belt. This is accounted for largely by the high percentage of the crop area of the county planted in corn,* a crop

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requiring a considerable amount of labor. The state average of farms operated by tenants was 41.0% in 1925, while in Overton it was 55.6%. While this is below the state average, it is too high for conditions in the county.

There are two factors exceedingly unfavorable to farm tenancy in this county; (1) low yields which are due mainly to the low fertility of the soil; (2) the small percentage of the total area in improved land. In 1920 the average improved acreage per tenant farm was only 29.8.

These small, infertile farms are not sufficiently productive to support both the tenant and the landlord. For this reason most areas in the state of relatively low productivity have also a low percentage of tenancy. The other counties in the state with approximately the same production as Overton County had an average of only 24% tenancy. This is a further indication of the relatively high percentage in Overton County for such unfavorable conditions.

Table No. 28. Incomes of Tenants, Landlords, and Owners on 50 Farms in Overton County

	Tenants	Landlords	Owners
Number of farms	3	3	47
Labor income*	$ -8	$-196	$-109
Net income**	$ 325	$-196	$ 107

It is noted that the average income of the landlords was less than that of either the tenants or owners. While there are not a sufficient number of tenant farms reported here to make any definite conclusions, it indicated that the landlord could make more by eliminating some of the tenants, and put less crop area in corn.

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* The labor income was obtained by deducting the interest on the investment at 6% from the farm income, the difference between the total farm receipts and total farm expenses.

** The net income was obtained by adding the amount of family living from the farm to the labor income and then deducting the value of the operators' labor.

As a matter of fact this is what they are doing. In 1920, 69% of the crop area was in corn while in 1925 only 50.8% was in this crop. During this same period the number of farms operated by tenants decreased from 37.2% to 33.8% with a corresponding increase of farm owners. There was also a decrease in tenancy in 1910 from 38.6% to 37.2%. This is further evidence of the tendency toward fewer farms operated by tenants.

It is significant that the greatest decrease has occurred during the past five years. This is not difficult to explain when one considers the large number of tenants that have left the county and have gone to work in the northern factories. However it is their announced intention to return to Overton County to make their home, after they have accumulated funds sufficient to buy a farm or to engage in some other business.

It is very difficult for the average tenant on farms in this county to accumulate enough to buy a farm, unless they engage in some outside occupation, such as logging, mill work, hauling timber, etc. This is what has occurred in many cases, as shown below:

Table No. 29. How Farmers Became Owners on 40 Farms in Overton.

	Number of farms	% of total.
Tenant to Owner	12	30.0
Farm laborer to tenant to owner	6	15.0
Farm laborer to owner	6	15.0
Other occupations	9	22.5
Inherited	7	17.5

It is significant to note from the above table that 22.5% or more than one out of five owners had some occupation other than farming previous to ownership. While this is less than the percentage of owners who were tenants, previous to ownership it is a good indication of the importance of outside work, other than farm work, as a means of acquiring land.

The majority of the farm tenants operate on a share basis in Overton County. In fact only 34 or 3.6% of the total number in Overton County are cash tenants and 68 or 7.8% are unspecified. On the other hand, 90.7 or 81.6% are share tenants. Of these tenants 742 furnish their own team and tools, while 168 furnish only the labor, depending on the landlord to furnish all equipment.

Table 30. Percentage of Cash-Tenants in Two Different Areas in Tennessee 1920

Highland Rim Section		Cotton Section	
Overton County	3.6%	Shelby County	29.5%
Putnam County	4.7%	Fayette County	34.2%
White County	8.6%	Tipton County	24.3%
Clay County	3.4%	Haywood County	22.0%
Pickett County	4.6%	Hardeman County	23.0%
Average	5.0%	Average	26.6%

It is noted that the Highland Rim section has only 5% of its tenants renting on a cash basis as compared with 26.6% in the cotton section, where there is a cash crop with which to pay cash rent. The disadvantages of cash renting to tenants of the Highland Rim area are shown below.

It can be readily understood why share tenancy is more popular in this county when it is remembered (1) that most of the crops are grown for home use and that very little is sold because of lack of markets. This of course results in a scarcity of money, especially when no outside work is available. The necessary capital under these conditions will not therefore be available with which to pay cash rent. (2) The marketing facilities of the tenant are poorer than that of the owner because (1) they do not have the capital to hold the crops for sale, (2) they do not have the necessary storage for such a purpose, and (3) they are not ordinarily as well informed on market conditions and possibilities.

No doubt that the owner would prefer to rent for cash provided the tenant

would pay the rent promptly, and care for the land properly. By this method they would be insured a market for that part of the crop grown on their farms by the tenants.

Although cash rent* is cheaper because of a less risk on the part of the owner, we may expect, under present conditions, that most of the renting in Overton County will continue on a share basis.

Soils.

The soils in Overton County, with the exception of the bottom lands, were formed by the decomposition and disintegration of the underlying rocks.

The Highland Rim soils are mainly of limestone formation, with some chert and siliceous matter. Both red and gray silty soils occur. They are included in the Decatur and Clarksville series respectively. The Clarksville gray silt loam is the predominating soil of this area, occupying 28.2% of the total area. Approximately one-half of the improved land of this area consists of this type of soil. Although not as productive as the red soils it is one of the most desirable soils for farming due to the ease with which it can be cultivated and its rolling topography.

The Clarksville stony loam soil is found in the northern part of the county and along streams in other areas. It occupies 18.3% of the total area. The Decatur loam occurs in small areas over the county. It reaches its greatest development, however, around Livingston and Oakhill.

These soil types sometimes lose their characteristic red and gray color in the transition from one type to the other, resulting in a variation in color. The methods of farming and the kind of crops grown are about the same on both types. Both are adapted to corn, wheat, and various hay and forage crops. Clover and grasses, however, are obtained with more difficulty on the gray soils.

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* Warren: Farm Management - page 321.

The gray soils, however, are well adapted to truck crops.

The Plateau soils are characterized by a uniform gray color and a larger percentage of sand than is found in the Highland Rim Soils. The DeKalb stony loam, occupying 24% of the total area is the predominating soil in the mountainous section of the Plateau. The greater part is in woods and pasture. The DeKalb silt loam occurs in small areas at altitudes ranging from 1,200 feet to 1,400 feet in the south central, central, and north central part of the county.

These Plateau soils are not as productive as the soils of the Rim area. They compare more favorably in production with the gray soils of the Rim, being especially well adapted to truck crops. They are not however well adapted to hay production.

In general the soils of this county are not highly productive and are deficient in both lime and phosphates.

Climate.

This region has a comparatively mild climate, the temperature seldom being near zero in winter or above 90 degrees in summer. The average mean temperature from 1921 to 1926 was 59 degrees. This varied from 55.9 degrees in 1924 to 63.4 in 1921. The temperature for 1925 was 58.9 degrees, lacking only .1 degree of being normal.

Table No. 31. The Mean Average Temperature by Months.

Period	Jan.	Feb.	Mch.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Ave.
1917 to 1926	39.8	41.8	49.2	59.5	64.6	75.2	77.1	76.8	73.9	59.2	48.5	43.4	59.5

The average mean temperature for the three winter months, December, January, and February, is 42 degrees. The average for the months from May to September is 73.5 degrees, with June, July, and August averaging 76.3 degrees. This summer temperature is ample for the best growth of all summer crops grown in this area.

Table No. 32. Average Distribution of Rainfall by Months 1917-1926

	Jan.	Feb.	Mch.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Rainfall in Inches	5.5	4.1	5.2	4.9	4.2	4.0	5.1	5.2	3.0	4.2	4.1	5.0

The five seeding and growing months from April to August, with an average of 4.7 inches rainfall, have sufficient moisture for germination of the seed and growing good crops. September is the driest month with only 3 inches rainfall. January ranks highest with an average rainfall of 5.5 inches. The average for the 10 year period from 1917 to 1926 was 54.5 inches.

The region has an average growing season of about 130 days, April 15 to October 15. This gives ample time for any of the crops now grown here to mature. The dates of the earliest and latest killing frost in the Spring were April 2, 1922, and May 3, 1918, respectively. October 11, 1917, and November 10, 1922, were the dates of the earliest and latest killing frosts in the fall.

The year 1925, which was the year for which this study was made, was unusually dry. The average rainfall for June, July, and August was only 2.97 inches. August and October were the driest months with 0.61 inches and 0.01 inches respectively. The total rainfall for the year was only 45.03 inches. This will partly account for some of the exceedingly low yields of crops shown by the farm analyses.

Chapter III.

Crops and Cropping Systems.

Before attempting to plan a cropping system for a given region one should have, first, a knowledge of the crops that are best adapted to conditions there, and second, a knowledge of crop rotations, as to the reasons for rotating crops and the requirements of a rotation that will be best adapted to local conditions.

Distribution of Crops.

Growing crops on 50 farms in Overton County utilized approximately 33% of the total farm area, and 59.5% of the improved land. The principal crops are corn for grain and hay and forage. The relative importance of the different groups of crops is shown below.*

Table 33. Area and Percentage of Crop Area of Crops on 50 Farms.

	Acres	% of Crop Area.
Corn for grain	1035.0	55.0
Hay and forage	580.5	30.5
Small grains	106.5	5.8
Orchards and gardens	104.7	5.5
Grain for pasture and green manure	42.8	2.4
Seeds	13.5	.8
Total	1883.0	100.0

The two principal crops, corn and hay, utilize over 85% of the crop area, 55% of which is in corn.* The remaining 15% is occupied by small grains, orchards and gardens, and green manure or pasture crops.

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* See Chapter I, Pages 19 & 20

Corn for Grain.

The importance of corn for grain as a crop in this county is indicated by the fact that each farm in the county produced 200 bushels as compared with a production per farm of 4 bushels of small grain and 5 tons of hay. On the 50 farms studied the production per farm of these crops was: corn 295 bushels, small grains 12 bushels, and hay 9 tons.

Corn is mainly a supply crop. Of the total production on 50 farms only 13.7% was sold. 79.3% was fed to livestock and 7% was used by the family.

There is an increasing practice of "hogging off" corn. This method of harvesting this crop was not reported in 1920. In 1925, however, 109 acres was "hogged off", as compared with a state average of 383 acres.

Hay, Forage, and Cover Crops.

1. Relative Importance.

Table 34. Relative Importance of the Different Hay and Forage Crops in Overton County in 1925.

	Acres.	Acres.	%	%
Forage, total		4549		30
Corn cut for forage	1751		11.7	
Sorghum	1545		10.3	
Silage	129		.8	
Oats fed unthrashed	1024		7.2	
Tame or cultivated grass, total		7635		50
Timothy	66		.4	
Timothy and clover	778		5.0	
Clover (Red, Alsike, and Mammoth)	449		2.8	
Clover (Sweet, Crimson, and Jap)	61		.4	
Alfalfa	15		.5	
Other tame grasses	6266		41.0	
Miscellaneous, total		3096		20
Small grains cut for hay	75.4		5.0	
Annual legumes	192.1		12.5	
Wild grass	421.0		2.5	
Total hay and forage		15280		100

It is noted that there are 4549 acres of forage crops in Overton County or almost one-third of the total hay and forage acreage as compared with state average of 2752 acres. Approximately 1751 acres of this forage acreage was corn. This is a decrease from a total of 7737 acres in 1920. This decrease is partly accounted for by an increase of approximately 500 acres of sorghum for forage; 1800 acres of other tame and cultivated grasses; and 100 acres of silage crops. There was a general decline of this crop throughout the state. The state average decreased from 3086 acres in 1920 to only 557 acres in 1925. The 12 East Tennessee counties that ranked higher than Overton County in 1920 ranked far below her in 1925; and notwithstanding her large decrease, that year she ranked sixth in the state.

In 1925 there were 7699 acres in tame or cultivated grasses or 50% of the total acreage as compared with the state average of 10,730 acres. Approximately 90% of this grass in Overton is listed as other tame or cultivated grass, and as indicated by the survey, it consists mainly of red top and millet in about equal proportions. Timothy and alfalfa rank lowest with 66 acres and 79 acres respectively, as compared with state average of 760 acres and 132 acres respectively. Timothy and clover mixed utilized 778 acres or 55% of total acreage as compared with state average of 2592 acres, over three times as much. Clover alone, utilized only 449 acres or 3.6% as compared with a state average of 2771. Of the total clover acreage 61 acres were in Sweet, Crimson, and Japanese Clover, as compared with the state average of 1510. In other words the average county has 25 times as many acres of these latter clovers as Overton County. This county is far behind the average county in the use of these soil improving crops.

Only 15 acres were occupied by alfalfa as compared with a state average of 133 acres.

Annual legumes in Overton County have a higher rank in comparison with the state average than do any other kind of hay or forage. The former has 1921 acres and the latter has 2714 acres, or only one and one-half times as much. However

there has been a decrease in this crop since 1920. The percentage decrease has been greater in Overton County than in the average county. 29% decrease occurred in the former and only 9% in the latter. These legumes were mostly soy beans and cowpeas.

Besides the large acreage of forage crops and annual legumes produced to supplement the grasses, there is a considerable acreage of small grain used for hay. This amounted to 754 acres in 1925 as compared with the state average of 422 acres. This was in addition to 1024 acres of oats fed unthrashed in Overton County as compared with 1000 acres in the average county.

Silage, although of minor importance in the county, is increasing rapidly. There were only 29 tons reported in 1920 as compared with the state average of 322 acres. In 1925, however, there were 129 acres as compared with state average of 547. While the production in the average county was over four times as much as in Overton County the latter increased approximately three times as much as the former.

The following table based on survey data is a further indication of the relative importance of the hay and forage crops discussed above:

Table 35. Relative Importance of Hay and Forage Crops on 50 Farms in Overton County in 1925.

	Acres	% each crop is of the total
Red top	135.0	23.2
Clover and timothy	131.5	22.7
Millet	130.0	22.7
Oats cut for hay	96.0	16.2
Soy beans	38.5	6.3
Cowpeas	3.5	.5
Orchard	8.0	1.3
Alfalfa	3.0	.5
Mung beans	1.8	.3

(continued on next page)

(Table 35continued)

	Acres	% each crop is of the total.
Sorghum*	24.0	4.8
Corn silage	9.0	1.5
Timothy alone	0	0
Clover alone	0	0
Total	1883.0	100.0

The high rank of both red top and millet indicates that the grasses reported in the preceding table as "other tame or cultivated grasses" consists principally of these two grasses, with orchard grass of minor importance.

It is especially significant that no timothy or clover alone was reported, and that alfalfa and corn silage occupied a very small percentage of the hay and forage land.

Soy beans are the principal annual legumes cut for hay, as 6.3% of the hay land was occupied by this crop as compared with only .5% occupied by cowpeas.

2. Grasses.

Red top is adapted to a wider range of soil and climatic conditions than any other cultivated grass. It will grow well on wet and acid soils, hence land does not need to be limed to secure a good crop. It produces some better, however, on clay loams. It also has other advantages for this area as follows: (1) fairly drought resistant, (2) produces better on poor, sandy soils than do most grasses, (3) is a perennial having a good root system which helps in preventing soil from washing, (4) reproduces from seed and under ground root system, (5) equals, if not better than, timothy in food value, (6) forms a continuous and fairly even turf which makes it well adapted to pasture purposes. It ranks near blue grass for this purpose. On the other hand it has the disadvantage of being unpalatable for hay if not cut early.

Timothy is not adapted to as wide soil or climatic conditions as is red top. It is best adapted to a clay loam soil and a cool climate. It is not adapted to

* No data was secured for corn cut for forage.

sandy soils or hot climate. It produces best in combination with some other grass or clover. (See red clover)

Orchard and tall-oat grasses produce well in this section. They are adapted to somewhat warmer climate than timothy. Orchard grass has the following advantages: (1) yields as well as timothy, (2) good root system helps in preventing soil erosion on land subject to washing, (3) admirably adapted as a constituent of pasture mixtures, because of its early growth, ability for heavy grazing, and adaptability to shade.

Tall-oat grass is a heavy yielder. It is adapted to calcareous, sandy, and gravelly soils, if not too poor. It is not very palatable and should therefore be seeded with some other grass.

Millet makes fairly good yields on poor soils and is fairly drought resistant. It is usually referred to as a crop that is hard on land. There has been no evidence to show that it removes any more soil fertility than do other crops of equal yields. The chief disadvantage lies in the fact that it does not supply organic matter to the soil. Therefore it should not be substituted for grasses and clovers as a hay crop but should be used chiefly as a catch crop, in case of failure of the other hay crops.

Rescue grass is being grown in Tennessee in an experimental way. Results indicate, however, that it is one of the best winter pasture crops, as well as a good hay crop, if grown on good soil, but its successful growth on poor soil is doubtful. Further investigations will be necessary before final recommendations can be made as to its general use.

3. Clovers.

Red clover is one of the best legumes for hay and soil improvement. Although the soils of this region are not naturally adapted to this crop due to their acidity and to some extent low fertility. However these conditions can be remedied by the application of either or both lime and manure. Under favorable conditions this legume makes good yields in combination with timothy. The average yield of this combination in Overton County was 1.3 tons per acre in 1920.

White Clover is well adapted as a constituent of soil improvement and pasture mixtures. While not well adapted to acid or infertile soil it grows on most all soils, thus having a wider adaptation than either red or alsike clover. It is a good pasture for bees as well as all kinds of livestock.

Sweet Clover is a biennial legume. It has the following advantages: (1) adapted to a wide range of soil and climatic conditions, often making good growth under adverse conditions, (2) it seeds abundantly, (3) it adds the largest amount of organic matter to the soil, (4) by means of its extensive root system it supplies a large amount of nitrogen nodules as well as a large amount of humus, (5)its food value is almost equal to that of alfalfa. This clover will not grow successfully on acid soils. However, where the land can be limed or is alkaline it is well adapted for soil improvement, hay, and pasture. For this area it is of the greatest value as a soil improver.

Crimson Clover is a valuable green manure and cover crop, since it adds about 140 pounds of nitrogen per acre per year. However it does not grow well on infertile soils. It is also difficult to get a stand, unless seeded alone in late summer.*

Alsike Clover, although not successfully grown as far south as red clover, is better adapted to wet and acid soils, and is completely resistant to the common red clover diseases. It matures about two weeks earlier than red clover. For this reason it does not fit so well into a mixture with that crop. It makes a good combination with the earlier grasses, as orchard and red top. Red top and alsike are fairly well adapted to acid soils, so prevalent in this area.

Lespedeza or Japan Clover is a summer annual which reseeds itself each year in all parts of Tennessee under average conditions. It is adapted to a wide range of soil conditions but its production is confined to warm climates. No soil gets too poor for some growth. In fact the soil improves in fertility if occupied by this crop. While it responds to liming, it can be grown with fairly good results on acid soils. It is especially useful therefore for soil improvement where it is

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* Experiment Station Bulletin 102.

not possible to lime. It is also an important constituent of pasture mixtures. However, due to its late growth in the spring it is not advisable to seed alone for pasture. It is also an important hay crop when conditions are favorable for a good stand and a growth of at least 6 inches. An average of 2 tons per acre can be obtained on land that will produce 30 to 40 bushels corn per acre. On the other hand the crop is rather uncertain for hay on poor soils and during dry seasons. When sown with other grasses, as orchard, timothy, or red top, two crops can be obtained, one from the grasses in June, and the other from the Lespedeza, which is late maturing, in early fall. Due to its uncertainty it is the better practice to seed in mixtures.

Varieties, especially adapted for hay production on account of the larger growth, have been recently developed. The variety known as "#76", developed at Experiment Station of the University of Tennessee by Professor Essary, has given the best results. The hay from these varieties compare favorably with the clovers in food value and palatability.

4. Alfalfa.

Alfalfa, although adapted to a wide range of climatic conditions, is limited in successful production by a poorly drained, infertile, and acid soil. The soil fertility is especially essential in securing a rapid growth to the stage where the plant can gather its own nitrogen from the air. Alfalfa has especial advantages in (1) good yields, often producing 2 tons per acre, under favorable conditions, (2) as a soil improver, and (3) as a hay and pasture crop, since it ranks highest on all hay and forage crops in food value.

5. Annual legumes.

Soybeans contain more nitrogen in the stubble than do cowpeas. So, with the crop removed for hay the former would leave more of this plant food in the soil than would the latter.

Soybeans can be planted with corn for "hogging down". The decrease in the yield of corn will be offset by the yield of beans*. This practice will increase the fertility of the soil as well as aid in giving the hogs a better balanced ration.

*Tennessee Experiment Station Bulletin 102.

Soybeans are adapted to practically the same soil and climatic conditions as corn. They produce well on soils too poor for a good corn production. They yield well, and are fairly drought resistant, exceeding cowpeas in both characteristics. They are displacing cowpeas as a hay crop to a great extent for these reasons.*

Cowpeas are good soil improvers but the high price of seed has been a limiting factor in sowing for this purpose. They fruit extra well in this section, thus offering possibilities as a seed crop.

6. Kudzu.

Kudzu, a leguminous perennial vine, has possibilities as a soiling and hay crop, and in the prevention of erosion. It makes a very rapid growth in summer on fairly fertile soils. It is difficult however to get the plants started, and the growth is usually slow for the first two years.

Mr. E. A. Qualls, at Livingston, is growing one-fourth of an acre in an experimental way. He is very enthusiastic concerning its possibilities;and would very likely be glad to discuss this crop with anyone interested in its production.

Handicaps in Hay Production.

Overton County is greatly handicapped in the production of hay on a commercial scale, other than supplying local demand, by (1) Artificial conditions:

(a) The extremely low yields per acre which would make it impossible to successfully compete with the regions having a much higher yield.

(b) The high freight rates over the T. C. and T. K. & N. railroads. Their 34¢ rate per 100 pounds on car-lot shipments and 56¢ rate on small shipments is almost prohibitive.** Hay is a crop that has a low unit value and cannot therefore be shipped long distances with such high freight rates.

(2) Natural conditions:

(a) The warm climate which is a handicap in the production of such grass

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* Table 35, Hay and Forage.

** Transportation, Table 24, Page 33.

hays as timothy.

(b) The topography of the land, much of which is hilly and rocky.

(c) Large amount of rainfall during the curing season.*

In addition to these unfavorable local conditions there is a tendency toward a less favorable commercial hay market due to (1) an annual decrease of about 1,000,000 horses in the United States, (2) the fact that hay is not on an export basis, and therefore must be consumed in this country. To maintain a favorable market, then, there must be a decrease instead of an increase in the production of hay on a commercial scale in the United States.

Therefore, due to these handicaps it will probably be profitable to produce hay only for local demand, and to provide sufficient feed for all livestock kept.

Summary of Hay, Forage, and Pasture Crops.

To be valuable for conditions in Overton County a grass should have the following characteristics: (1) hardiness or ability to withstand adverse conditions, (2) easy to get a stand, (3) good feeding value and palatability, (4) capable of easy reproduction, (5) aggressiveness against weeds, (6) ability to return fair yields on soil of medium fertility.

The following are the hay crops that are best adapted to this area:

(1) For acid soils of low fertility.

(a) A mixture of red top, either orchard or tall-oat grass, and alsike clover (Japan Clover may be included for soil improvement)

(b) Soybeans.

(2) For non-acid soils of good fertility.

(a) Mixture of red clover, Japan Clover, and timothy.

(b) Alfalfa

(c) Soybeans and cowpeas.

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* Climatological data, Table 31, Page 52.

The following are crops adapted for pasture mixtures in this area:

(1) Pasture mixtures on the average farm.

(a) Orchard grass

(b) Red top

(c) White and Japan Clover

(2) Pasture mixtures on non-acid and fairly fertile soils. Sweet and red clover may be included in the above mixture, or they may be sown alone for temporary pasture.

(3) For winter pasture.

(a) Rye (See page 65 on rye)

(b) Other small grains.

(c) Rescue grass (possibility of its use on fertile soil)

Small Grains.

Wheat, oats, and rye are the principal small grains in this county. A few acres of barley and buckwheat have been grown but none were reported in 1925.

In comparison with corn and hay small grains are of minor importance. On 50 farms studied they occupied only 5.7% of the crop area as follows: wheat 4.3%, oats 1.1%, and rye for grain .3%. (See Chapter I, Page 22.)

The average yields per acre on these farms were: wheat 8.5 bushels, oats 7.5 bushels, and rye 7.5 bushels.

The small grains have the following advantages in the cropping system in this area: (1) provides a nurse crop for fall or spring sown grass seed, (2) reduces cost of seeding grass, (3) can be used for hay when necessary (See Page 55, this chapter), (4) gives a better distribution of labor, (5) provides straw for feed and bedding, (6) provides cover crop during winter, thus preventing leaching of soil fertility, (7) provides pasture and green manure.

Rye is especially well adapted to this area for the following reasons: (1) will make a good growth on poor soils, (2) is very hardy, withstanding extreme cold better than wheat, (3) has a wide range of seeding dates, varying from August to early December. For these reasons it is especially well adapted

as a (1) cover crop, (2) pasture crop, and (3) hay crop, when there is a shortage in grass or legumes hays.

Since wheat has greatly declined in acreage in recent years the question may be asked as to the advisability of growing more wheat. It fits well into the cropping system as noted above. However, it cannot compete on a commercial scale with wheat from the wheat growing states because of (1) low yields, (2) high freight rates, (3) the topography of the land which is not as well adapted to machine methods, and (4) a warmer climate, which is not conducive to the highest yields.

However, wheat could be grown profitably on the better soils in the county provided it could be marketed locally. That there is a possible local market was indicated by the quantity of wheat and flour that was shipped into the county in 1925.* On the other hand there are some handicaps to marketing through the local miller. First, the consumer is demanding flour from outside mills, which is due to (a) better advertising and selling practices of the larger milling companies, (b) a more uniform product. Second, the quality of the wheat is not uniform. Consequently a uniform product can not be manufactured.

There would be an advantage in growing for sale in this county even though the receipts only paid all operating and overhead expenses, in that these expenses would be lowered on the other products as the receipts increased.

For the farmer on the better land who owns, or can hire improved machinery and who performs most of the labor, wheat can be profitably grown for home consumption. With flour selling for $1.25 per 25 pounds, the flour in a bushel of average wheat would be worth $1.90. The actual cash outlay under the above conditions would be small. The overhead expenses would be raised very little, with the possible exception of machinery charges, if machinery is owned.

Oats is of very little importance in this area, as shown in Chapter I. First, low yields and a corresponding increase in cost per bushel, limits its value both as a feed and cash crop. For feed it must be grown in competition with corn which not only has a higher average yield per acre, but contains more food value per

* Chapter II, Page 39 .

bushel. As a cash crop it would be grown in competition with oats from the better grain producing areas. Second, rye makes a better cover or pasture crop on account of its ability to better withstand adverse soil and climatic conditions.

On the better soils that will produce 25 bushels or more per acre it can be profitably grown as a supplementary feed crop.

Barley is of very little importance as a crop in this county. It is not adapted to the average Rim soils because of the low yields. It is a heavy producer however on fertile soils, and responds well to the application of manure.

It is a valuable constituent of grain feeds for both cows and poultry; and is a fairly good feed for hogs — 4 bushels producing approximately as much pork as 5 bushels of corn.

Fruits and Vegetables.

Most of the fruits and vegetables grown on the 50 farms were used by the family. The total value of these products sold amounted to $626, as compared with a total value of $4317 for family use. In other words, approximately 7 times as much was used for the family as was sold. The garden products alone used by the family amounted to over 90% of the total value.

Every farmer reported a garden. However, only 36 or about 70% reported orchards. Of these orchards about one-half consisted of trees scattered over the farm. The remaining 30% of the farmers did not report orchard trees of any kind.

The gardens on 50 farms averaged approximately 1 acre in size. The orchards, including trees scattered over the farm, averaged about 2 acres for those farms reporting. However, on the average farm in the county the orchards averaged only approximately ¾ acres, as compared with the state average of approximately 1 acre.*

The orchards consisted mainly of apple and peach trees. Only 10% reported pear, cherry, and orchard trees other than apple and pear. About the same percentage reported small fruits, as strawberries and grapes. Only 4 farms reported a variety of products. They consisted of the following: apples, peaches, pears,

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* This acreage was calculated on the basis of 35 apple trees, 100 peach trees, 75 pear and cherry trees per acre.

plums, cherries, grapes, and strawberries.

Overton County ranked 14th in the state in the number of bearing apple trees and 16th in number of bushels harvested in 1925. She ranked 3rd in the number of apple trees among the Middle Tennessee counties. In the number of bearing peach trees and bushels harvested she ranked 36th and 63rd respectively.

With the relatively high rank in apple and peach production the question may be asked as to why Overton County has not produced apples on a commercial scale. Some of the reasons are as follows: (1) there were no readily accessible markets to absorb a large production, (2) the orchards, which average only about $\frac{5}{8}$ acres in size, consist largely of scattering trees, (3) the varieties were not the best for market demands, and (4) there has been a lack of knowledge on the care and management of an orchard.

Whether or not the farmers in this county should go in for orcharding on a commercial scale depends mainly on two things, first, market conditions, and second, sureness of a crop. The outlook for good prices is not very favorable. At present, with average yields, there will be an overproduction of peaches. While this is not true to such an extent in apple production there is very little room for further expansion. This condition will continue to exist until low prices force the older orchardman out of business. This would of course take several years, since their orchards are already developed.

This county has another handicap in the uncertainty of frost, which is a characteristic of the climate on the Highland Rim. On an average only one crop out of three years is obtained here as compared with two crops out of three years in the East Tennessee Valley.

Miscellaneous Crops.

Irish potatoes are produced mainly for family use. Of 50 farms studied only eight reported $\frac{1}{2}$ acres or above. Of these only four reported receipts from the sale of potatoes. However this may be below the number selling potatoes during the average year, since here was a crop shortage due to the drought during the year of the survey.

That this county could produce Irish potatoes on a commercial scale is

indicated by a comparison with the Plateau counties which are successfully producing this crop commercially.

Table 36. Overton County Compared with Plateau Counties in Acres and Yields (Irish Potatoes)

	Acres		Yield per Acre	
County	1920	1925	1920	1925
Fentress	613	566	58.0	82.5
Morgan	691	977	69.0	81.0
Cumberland	744	1105	70.0	81.0
Overton	423	509	70.0	79.0
State Average	314	340	70.0	69.0

It is noted that Overton County has 79 bushel yield as compared with 82.5 bushel yield in Fentress in 1925. In 1920, although the yields were lower in all of the counties Overton County ranked with Cumberland County which had the highest average yield for that year. It is also noted that the state average for 1925 was lower than these counties.

Overton at present has 509 acres as compared with the state average of 340. The acreage on the 3 Plateau Counties varied from 566 to 1105.

Although potatoes produce fairly well in other parts of the county, the eastern section, located on the Plateau is best adapted to this crop on account of the loose sandy loam soil. This is the same soil type that is found in the Plateau counties in the above table.

Potatoes grown to supply local demand will be the most profitable. That the farmers do not produce them in quantities to supply this demand is indicated by the fact that 10 car loads were shipped to Livingston in 1925, 50% of which were used in Overton County.*

This section should produce late crop potatoes for southern markets. The crop from this area will be ready to market at a time when the supply from other states are not on the market. This period varies from 3 - 4 weeks, from late August to late September.

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* Marketing, Page 39.

The following are some factors in the successful production and marketing of Irish potatoes:

(1) Select a standard variety, preferably Green Mountain.

(2) Plant only certified seed. This seed can be obtained from northern markets for planting the first year.

(3) Treat the seed for diseases before planting.

(4) Grow in a regular rotation in which the potatoes are preceded by either red clover or Japan Clover.

(5) There must be a sufficient production to ship in car-lots.

(6) There must be a spirit of cooperation in regard to marketing the product and in standardizing and maintaining the variety and grades.

(7) Ordinarily the potatoes should be marketed from the latter part of August to the latter part of September.

The farmers in the eastern part of the county will not be handicapped by the high freight rates on the T. K. & N. railroad, since their shipments will be made over the Tennessee Central.

The early crop potatoes for northern markets will not be profitable for this section. They cannot profitably compete with the growers both in the southern part of this state and in Kentucky.

Sweet potato production in Overton County is largely a matter of producing for home consumption, as indicated by the fact that in 1925 each farmer had less than 1/8 acre in cultivation, and a production of only 1.5 bushels per person.** Furthermore, of the 50 farms studied only 8 operators sold sweet potatoes; and their average quantity sold was only 9 bushels.

Consumption studies made in other southern states indicate that the rural population consumes about 3.2 bushels per person.** Since the production per person in Overton County was only 1.5 bushels in 1925 and 2.2 bushels over a 45-year period, a possible local demand is indicated.

** Trend of potato production, Page 25.

Growing this crop for local markets will be profitable but it must be remembered that the amount of produce these markets will absorb is very limited.

Sweet potatoes can be produced on a commercial basis in the county. The sandy loam soil is well adapted to high yields. This is indicated by the fact that the yields here were above both the state average over a 45-year period, and the average of the 7 highest producing counties in 1920 and 1925.

At present there are two serious handicaps for a further expansion of sweet potato production: (1) large acreage in the principal producing areas, and consequent overproduction, and (2) unorganized marketing.

The farmers of this county can profitably produce this crop on a commercial scale provided (1) satisfactory markets are available, which will depend largely on the volume of production in the future, (2) that cooperative marketing is practiced in which the competition and price cutting practices are eliminated, and (3) that the producers are educated in the modern methods of production and cooperation.

A potato storage house is now under construction at Livingston. It is financed largely by the business men of the town.

The advantages of a storage house to this section are: (1) loss from improper methods of storing are decreased, and (2) cost per bushel is less. Ordinarily the average farmer does not have the proper facilities for storing, nor is he always familiar with best methods. Furthermore the small production per farm will not warrant the construction of a storage house.

Crop Rotation.

By rotation of crops is meant the changing of the crops grown, from one field to another, or to different parts of the same field, in a fairly regular way. This should be distinguished from diversification, or the growing of several different crops, since one may follow diversification without much rotation of crops.

The following are reasons why crop rotation should be practiced: (1) crop rotations are essential in the control of weeds, diseases, and insects. Weeds

that accompany hay crops can be killed by following that crop with corn or some other crop requiring cultivation. Diseases and insects of crops can be prevented or controlled because they are not always harmful to the same crops.

(2) Rotation provides for maintaining the humus of the soil. Fields that are constantly in cultivated crops will have their humus supply decreased. Small grains have the same effect as cultivated crops, but less rapidly. On the other hand the humus content can be increased by growing clovers and grasses, for hay or green manure.

(3) By rotating other benefits of growing legumes and grasses such as supplying nitrogen and prevention of loss of plant food by leaching, can be secured.

(4) Rotation saves labor. Small grain usually can be seeded on the corn land without plowing, and grass seed can in turn be seeded with the small grains.**

(5) Rotation keeps land occupied more of the time, and often two crops can be grown on the same land in 1 year.

(6) Rotation, by alternating deep and shallow rooted crops will make possible the use of the deeper soils. For instance, alfalfa will utilize soil that cannot be reached by the shallow root system of the corn plant.

(7) Rotation puts farming on a more systematic basis. The farmer knows in advance what crops he is going to plant; where they are to be planted; and what the fertilizer and seed requirements will be.

(8) Soil fertility can be maintained under a tenant system of farming if crop rotations are required and practiced.

A crop rotation should provide the following things for Overton County:

(1) Sufficient roughage and pasture for the number of livestock kept.

(2) Crops that will increase the humus and nitrogen content of the soil, and prevent loss of plant-food by leaching.

(3) Crops that will utilize a large part of the crop area throughout the year.

(4) A profitable cash crop.

(5) Cultivated crops for the elimination of weeds.

(6) Distribution of labor throughout the year.

Table 37. Crop Rotations on 44 Farms in Overton County

Kind of Rotation.	Number Farms.
Corn 1 - Hay 2-4 *	4
Corn 1 - Wheat 1 - Hay 2	7
Corn 1 - Soybeans 1 - Hay 1	1
Corn 1 - Millet 1 - Hay 2	8
Corn 1 - Millet 1	4
Corn 1 - Millet 1 - Fallow 1	1
Corn 1 - Wheat 1 - Millet 1	3
Corn 1 - Wheat 1	2
Corn 1 - Soybeans 1 - Oats 1	6
Corn 1 - Oats 1 - Rye (turned under)	1
Corn 1 - Oats 1	4
Corn alone	3
Total	44

It is noted that millet for hay occupies a prominent place in these rotations. 16 farms or over 1/3 of the total number reported this crop either in combination with corn and grass hay, corn and wheat or corn alone.

On one-half of these 16 farms there were no sod crops, 5 having corn-millet, and 3 having corn-wheat-millet rotations. In the corn-millet-grass rotations millet has one-half as large acreage as the grass hays. While millet is a fairly good hay crop its use in the rotation is seriously handicapped by the fact that it does not supply humus to the soil.

It is significant that only 21 farms, scarcely one-half of the total number of farms, reported sod or green-manure crops —— 20 reporting hay and 1 reporting rye turned under. In other words over one-half of the farms had no sod or green-manure crop to turn under.

Corn, as it should, occurs in every rotation. However, on 3 farms it was the only field crop grown. 6 other farms reported corn and soybeans. Only 3

* The figures refer to the number of years the crop is in the rotation.

farms, however, reported corn and small grains alone.

The chief disadvantages to many of these rotations* are: (1) not conducive to either soil maintenance or improvement for (a) they do not add sufficient organic matter, (b) do not add plant food in the farm of nitrogen, and (c) allows leaching of plant food from the soil during the winter months; (2) poor distribution of labor; and (3) loss of the use of land.

Methods of Soil Improvement.

Since all crop yields are low in this area due to lack of soil fertility, the cropping system in relation to soil improvement should be recognized as one of the farmers' most important problems.

(1) The following crops can be most profitably used for soil improvement in this area: (a) lespedeza, because of its growth on acid soils, gradually improving the soil and reseeding itself each year, (b) sweet clover, which is one of the best crops for adding nitrogen to the soil, if land is limed, although it will give fairly good growth if only manure is applied, (c) white clover, as a constituent of the pasture mixture, which makes a fair growth on slightly acid soils, (d) crimson clover, which however needs a fertile soil and early fall or late summer seeding for successful germination and growth, and (e) rye, which makes a good growth under adverse climatic and soil conditions. (See small grains.)

(2) No farm would be well organized in this section that did not have some livestock to consume all roughages and to furnish manure for soil maintenance and improvement. There should be enough manure to manure approximately one-fifth of the land with 10 tons per acre per year.

In case no manure or green manure crops are available a complete fertilizer is necessary on poor soils.** In an experiment on the Highland Rim soil

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* This refers to the following rotations (1) Corn and millet, (2) Corn and small grains, (3) Corn alone, (4) Corn, millet, and fallow 1 year.

** A complete fertilizer contains the three elements of plant food, phosphorus, potash, and nitrogen.

the corn yield per acre was increased from 155 bushels to 27.6 bushels by the use of a complete fertilizer, which contained 10% phosphoric acid, 2½% nitrogen, and 3% potash. This increase was obtained at a cost of $2.59 per acre, or approximately 21¢ per bushel.*

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*Tennessee Experiment Bulletin #102, p. 22.

Chapter IV.

Livestock and Livestock Products.

The principal kinds of livestock in Overton County at present are: horses and mules, cattle, hogs, poultry, and sheep. (See Chapter I)

There were fewer total animal units in this county than in the average county in the state in 1925. There were approximately 16,038 animal units in the county as compared with the state average of approximately 18,000 animal units. However Overton County is as heavily stocked per acre of improved land as the average county, since each has 1 animal unit for every 7.2 acres of improved land.

This county as a whole is fairly well stocked. There is one animal unit for: each 3.8 acres of pasture*, and for each 4.3 crop acres, including idle or fallow land, 3.2 crop acres harvested, and 7.2 acres improved land.** A moderately stocked farm should have 1 animal unit for 5 to 6 acres of crops, 3 acres of pasture and 5 to 7 acres of improved land. There is not therefore much room for a large expansion of the livestock industry here.

Why Livestock Has an Important Place in the Agriculture of This County.

(1) Feed costs are less than in states further north because of longer pasture season.

(2) Costly barns and other shelters are unnecessary due to the temperate climate.

(3) Some classes of livestock consume rough feed that could not be profitably marketed, if possible to market at all.

(4) There is a better distribution of labor throughout the year. Some winter work is available in caring for and feeding stock.

(5) Livestock is an essential part of any soil improvement program, since manure is one of the best and cheapest sources of organic matter.

(6) Horses and mules will continue to be the principal source of power for farm work.

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* In calculating pasture acres per animal unit only cattle, sheep and 1/2 the number of horses and mules were considered.

** The following represents 1 animal unit: 1 horse, 1 cow, 2 young animals, 5 hogs, 10 pigs, 7 sheep, and 14 lambs.

(7) Livestock and livestock products have a high value per pound in comparison to most crops. This helps to overcome the high freight rates.

(8) Livestock furnishes meat and other products for family use, lessening cash outlay for family living.

(9) Livestock distributes the farm receipts throughout the year.

Handicaps.

At present there are some handicaps to livestock production in this county.

(1) Crop yields are so low that the cost per bushel of grain and per ton of hay is much higher than in other sections.

(2) Freight rates are higher than in most other counties.

(3) Nearby markets are not available.

(4) The average farmer is not familiar with the most modern methods of feeding and management of livestock.

(5) The average farmer is not familiar with the best places, time, and method of marketing livestock.

(6) There is no marketing organization for livestock among the farmers of the county.

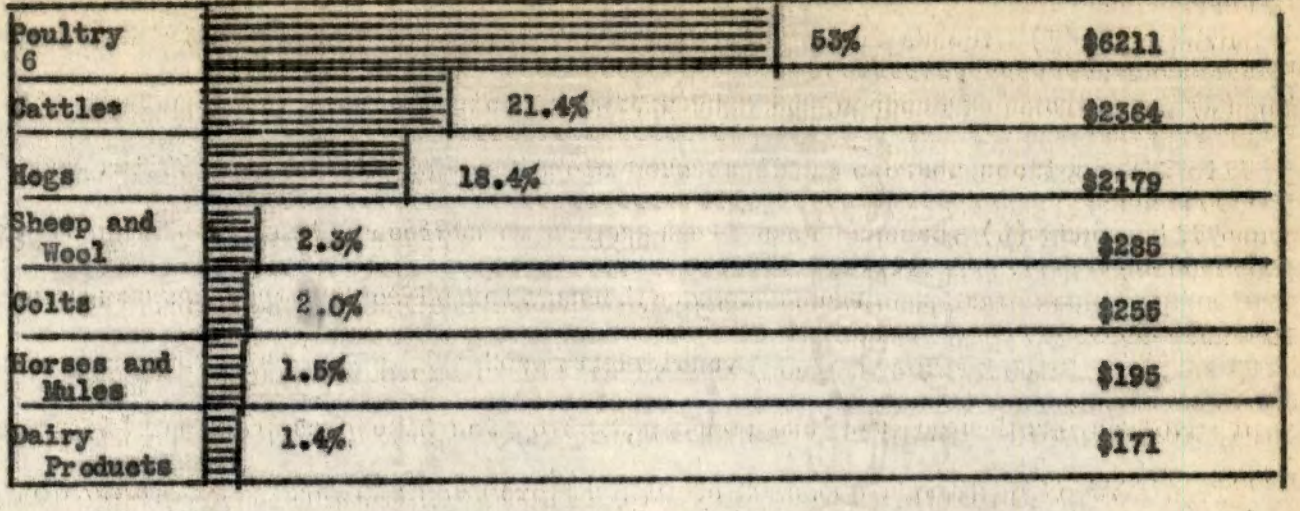
Receipts.

From the standpoint of gross receipts livestock is one of the most important phases of agriculture in this county. Of a total of $18,700 received from the sale of crops and livestock on 50 farms, $11,704 or 62% of the total was received from the latter source. In other words, for every $3 total receipts about $2 was received from livestock and livestock products, and $1 was received from crops.

The relative importance of each class of livestock as a source of farm receipts is shown in the following chart.

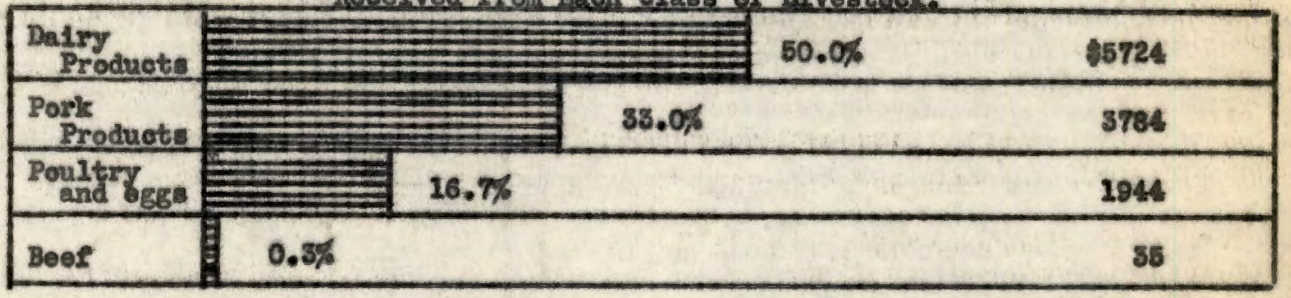
53% or over one-half of the gross receipts from these farms was from poultry. This is 2½ times the receipts from cattle and 3 times the receipts from hogs. They follow poultry in percentage of gross receipts with 21.4% and 18.4% respectively. Thus 92.8% of the total receipts from livestock are derived from these three sources.

Chart 4. Distribution of Livestock Receipts on 50 Farms.



Only 7.2% of the total receipts was received from the other livestock which included sheep and wool, horses and mules, colts, and dairy products.

Chart 5. Value and Percentage of Total Livestock Receipts Received from Each Class of Livestock.



One-half of the family living furnished by livestock from the farm was derived from dairy products, while beef cattle only furnished 0.3%. On the other hand, cash receipts from cattle are derived mainly from the sale of cattle. Thus dairy products are being used mostly for home consumption.

Hogs and poultry furnish the remaining 50% of the family living from livestock on the farm. Most of the pork raised was consumed by the farm families. On the other hand most of the poultry and poultry products are sold. The cash receipts from this source were $6211 as compared with receipts of $1944 for home consumption.

Selling Crops vs. Selling Livestock.

The farmer is often confronted with the problem of whether to feed all the feed crops to livestock, or to sell part of the feed. The following will show

* This includes the sale from dairy and beef cattle.

that on 50 farms the farmers who sold some feed made the most money.

Table 38. Ratio of Crop and Livestock Receipts Related to Labor Income.*

Receipts from Crops for Each Dollar Received from Livestock.	Number of Farms.	Average % from Crops.	Labor Income.
No crops sold	6	0	$ -280
20¢ and less	10	13	-190
21¢ to 60¢	15	31	-130
61¢ to 100¢	14	41	-123
101¢ and over	5	65	342

The farmers who fed all of their crops, and sold nothing but livestock and livestock products made the lowest labor income, averaging $-280. The farmers who sold 61¢ to 1 dollars worth of crops to each dollar of livestock made a labor income of $-123 or a little less than the average income of $-108 for all farms. The farmers receiving more from crops than from livestock made the highest labor income, averaging $342. Two farms in this group of 5 farms made an average income of $800 which accounts for the high average of this group.

Table 39. Labor Income Related to Crop and Livestock Receipts.

	Number Farms	Crop Receipts for Each Dollar Stock Receipts*
Farms with Labor Incomes above the average	21	$0.76
Farms with Labor Incomes below the average	29	0.57
Farms with plus Labor Incomes	13	1.04

When the farms are grouped by labor incomes approximately the same differences are shown. Farmers with labor incomes above the average sold $0.76 worth of crops for each dollar's worth of livestock as compared with $0.57 worth of crops for dach dollar's worth of livestock sold on the farms having labor incomes below the average

* Crop receipts includes sale of all crops, vegetables, fruits, and the increase in inventory. The livestock receipts includes the net increase from sale of livestock and livestock products.

The thirteen farmers that made an income above all expenses sold $1.04 worth of crops for each dollar received from livestock.

However this does not mean excessive crop receipts in proportion to stock receipts will always be profitable. One of the farms studied had crop receipts of $3.00 for each dollar received from livestock, but returned a labor income of $-144, as compared with the average income of $-108. Two other farms with $0.98 and $.90 receipts from crops for each dollar received from livestock, made labor incomes of $-332 and $-370 respectively. On the other hand, one farm with only one-sixth of its receipts from crops returned a labor income of $35 or $143 above the average income.

It must be remembered, however, that due to crop shortage the prices of feed crops were high. Corn sold for an average of $1.10 per bushel and hay for $30 per ton. These favorable prices could not be maintained in a year of a large production. Consequently to sell as much or more crops as livestock each year would not always pay.

On the other hand it is most profitable to sell some crops each year. For this particular year the farms that received equal amounts from each source made the most money. However in a year of less favorable prices for crops the receipts from this source should probably be near 1/2 that received from livestock.

Farmers who keep enough stock to consume all the feed raised in a year of good production will find that in a year of crop shortage feed will have to be bought; and it is usually bought at high prices during periods of this time. If livestock happens to be low in price at this time the situation is made more serious, since high priced feed will be bought for low priced cattle.

Poultry.

The poultry industry has developed rapidly in this county since 1910. From 1910 to 1920 the number of chickens had increased 133% as compared with the state average of 46.9%. From 1920 to 1925 the increase was 1.5% in this county, while the state average remained the same.

This does not mean however that the farmers in Overton County are developing the poultry industry rapidly because of unusual advantages for it. It is being developed largely because of the greater disadvantages of the county in most of the other enterprises. In other words, the people here are going into the poultry business more rapidly than in the average county, not because the profits are larger there than in other counties but because it is the most profitable enterprise under their conditions.

The following table will show the importance of poultry on 50 representative farms in the county in 1925.

Table 40. Summary of the Poultry Business.

Percentage of total receipts from poultry	33%
Percentage of livestock receipts from poultry	53%
Value of poultry and eggs sold per farm	$ 124
Value of poultry and eggs used by family per farm	$ 40
Number of hens per farm	65
Farms having over 100 hens	6
Number of eggs per hen per year	58
Number farms reporting	50

From this table it is seen that:

(1) poultry is one of the most important sources of income, since over 1/2 of the livestock receipts and 1/3 of the total receipts were from poultry,

(2) that most of the poultry and eggs are sold, since the average farm received $124 from sales as compared with $40 worth used by the family,

(3) that the average size of the flock is only 65, only 6 farmers reporting over 100 hens,

(4) that the average annual egg production per hen is 58 eggs, which is too low (See Table 9, Chapter I for county average),

(5) that all farms have some chickens.

Why Poultry is a Profitable Enterprise in This County.

(1) Temperate climate makes expensive poultry houses unnecessary and allows a longer period for foraging on the range.

(2) A large part of the county has a sandy loam soil. This type of soil not only drains well but can be made fairly productive.

(3) The rolling topography and abundance of trees act as windbreaks. There is also better drainage on rolling land; and trees provide shade and have a cooling effect in summer.

(4) Poultry and poultry products have a high value per pound which partly overcomes the high freight rates.

(5) Poultry are very efficient users of food. The dairy cow and the hen, which lead all livestock in efficient use of food, are about equally efficient. This is especially significant in this county since feed costs are relatively high.

(6) Poultry has less disadvantages than most of the other farm enterprises, which accounts for its rapid development since 1910.

On the other hand there are some handicaps to poultry production in this county.

(1) There is very little competition between the private produce dealers. There is a tendency for them to buy on a wider margin than is necessary to return a fair profit.

(2) Transportation costs, especially over the T. K. & N. are high. This cost is further increased by the long distance to central markets.

(3) Feeds are high whether shipped in or raised in the county, since freight rates are high and crop yields are low.

(4) Quality of the product is not up to the highest standard.

Handicaps 2 and 3 are partly overcome by the high unit value and efficiency in the use of feed.

The other handicaps can be overcome by better methods of poultry management and marketing.

Most of these handicaps are reflected in lower prices for both poultry and eggs. In 1923 the price of eggs in Tennessee was 23¢ per dozen as compared with an average in the United States of 32.3¢ per dozen. Only 5 states had lower prices than Tennessee. In the same year the price of chickens was 17.5¢ per pound as compared with a United States average of 20.2¢ per pound. There were 18 states that had lower prices on poultry than Tennessee.

The prices of these products in Overton County would probably compare favorably with the above prices for Tennessee since practically the same conditions affecting the price exist in both this county and the state.

The fact that only 5 states had lower prices than Tennessee on eggs as compared with 18 states having lower prices on poultry indicates a relatively better price situation in regard to chickens than for eggs. This indicates an advantage of the dual purpose breeds over the egg breeds for average farm conditions.

Cattle.

Overton County in 1925 compared favorably with the state average in both total number of cattle and value per head. There were 9,355 cattle valued at $21.00 per head in this county as compared with a state average of 10,380 cattle per county valued at $22.50 per head.

Of the 9355 cattle in the county there were 2614 dairy cows, 1851 beef cows, 715 dairy heifers, 601 beef heifers, 2104 calves under 1 year of age, 1336 steers over 1 year of age and 134 bulls. Almost 1/2 of the total number were cows, 2/3 were dairy cows kept mainly for milk production, and 1/3 were reported as beef cows kept mainly for beef production. Approximately the same ratio occurred on the 50 farms studied, since 30 out of the total of 101 cows were reported as beef cows. This number would very likely be increased by a part of the cows listed as common. It seems, therefore, that a large part of the cows here are dual purpose.

Table 41. Classification of Cows According to Breed and Use on 50 Farms.

	Number Farms	Number Cows	% of Total
Grade Beef*	12	26	25
Purebred Beef (Angus)	1	5	5
Grade Jersey	12	20	20
Grade Holstein	2	3	3
Purebred Jersey	4	5	5
Common**	19	42	42

Two out of every five cows on 50 representative farms were scrubs; 1 out of every 2 were grades, and only 1 out of every 10 were purebreds.

This shows a lack of cows with good breeding. This is reflected (1) in their milk production as shown by the fact that each cow produced only 87# butter and 244 gallons of milk per year; and (2) in low average value of $11 per calf under 1 year of age.

With the kind of bulls that were reported as being used in the county cattle of good quality cannot be expected. Of 6 bulls reported 1 was a scrub valued at $15, 3 were grades valued at $17 each, and only 2 were purebreds valued at $75 each. However more purebred bulls, mostly Angus, are being introduced into the county, due largely to the work of Dr. M. J. Qualls at Livingston, a breeder of purebred Angus cattle.

According to the survey the cattle receipts were largely from the sale of cattle. Of the total of $2535 received only $171 was received from the sale of animal products. This is indicated further by the census material of 1925. (See page 16). In other words most of the milk and butter is being consumed by the family, the cash receipts being derived largely from the sale of either calves, or steers and heifers from these cows.

However, this is no more than could be expected since there was an average of only 1.5 cows per farm in the county in 1925, and only 2 cows per farm on the

* A grade cow is one that has at least one purebred ancestor.

** A common cow is a poor individual that has no purebred parents.

50 representative farms studied. With an average family of 5 persons per farm, the milk from this number of cows could easily be consumed at home.

Recommendations.

(1) The farmers in this county probably cannot at present profitably to into the dairy business on an extensive scale. (a) They are too far from markets for whole milk. (b) Feed costs are high due to high freight rates and to low feed crop yields per acre. (c) Farms are too small, since they average only 38 acres of improved land, only 10 of which are in pasture. However, each farmer should keep one or more cows, that will give a fair production and raise a good calf.

(2) Farmers should continue with the cows they have now; and by the use of purebred bulls gradually grade them up. Especial attention should be given to the selection of heifers from high producing cows.

(3) Farmers accessible to the main improved roads should sell cream. This can be shipped by truck to the creamery at Cookeville.

(4) On the average farm it will be more profitable to sell the calves at about 6 to 8 months of age rather than keep them for stockers or feeders.

(5) Farmers with pasture above that needed for cows and workstock should keep some steers. They can be "roughed" through the winter and pastured the following summer, to be sold in the fall.

(6) Pastures should be improved by acid phosphate, liming, and reseeding. Lespedeza may be grown without liming. (See page 73).

(7) Feeding methods should be improved. Poor producing cows are often the result of poor feeding.

(8) A County Cooperative Bull Association should be formed whereby each community will be provided with a purebred bull. These bulls will be changed from one community to another at intervals of two years.

(9) The calves and steers should be shipped through a local livestock shipping association.

(10) Cooperative Cheese Factories can profitably be established at points in the county inaccessible to the creamery. A market for surplus milk is thereby provided

within a radius of about 5 miles of each factory.

(11) The farmers should decide on one breed that is adapted to both beef and milk production, choice to be made between Shorthorns, Angus, and Herefords.

Horses and Mules.

As shown in Chapter I, there has been a trend from horses to mules as work animals on farms in this county. The same trend occurred on 50 representative farms during 1925. (See page 10). The number of horses decreased from 40 to 31, and the number of mules increased from 100 to 105.

Since only 1/4 as many horse colts, and only 1/3 as many mule colts are being raised in the county as is necessary to maintain the present number, there will probably be a demand in the county both for horses and mules in the next few years. To maintain the supply of mules, 1 out of 8.5 farmers will have to raise a mule colt each year. On the other hand it will take 1 out of 27 farmers raising horse colts to maintain the supply of horses.

Mules are increasing in popularity because they are better adapted to this region than horses. (1) They usually require less careful attention. (2) They are better suited to hill land. (3) They are better suited to poor feeding methods. (4) There is not so much necessity for horses since the advent of the automobile. This popularity is reflected in the value of mules. On 50 farms the average value of mules was $79 as compared with an average of $66 for horses.

Because of the increasing popularity and higher average value per head it will be the most profitable to raise mule colts.

Tractors have not displaced horses and mules for farm work to any great extent in this county, because (1) the farms are too small, (2) the topography is too rugged, (3) horses and mules require no cash expenditure for feed. They consume large amounts of feed for which there is not always a good market.

Supplying the local demand for mule colts would in many cases be profitable. (1) The cost of horse labor would be decreased by the receipts from the sale of colts. (2) Very little cash expense will be incurred in raising colts.

There should be a few good jacks in the county. By using good sized jacks

an average size mule can be produced from the mares in the county. These mules are adapted to the average farm in the county.

There should be a few large mares for the production of large mules for use on the largest and more level farms.

Hogs.

The number of hogs in the county have decreased since 1850, notwithstanding an increase in population and number of farms. (See Chapter I, page 14). There were fewer hogs in 1925 than at any previous census period. This condition has been brought about largely by the change in the feeding methods. In the early days the hogs were fattened mostly on the mast. Now they are fattened on corn which has a low yield per acre and a relatively high cost per bushel. Consequently fattening hogs for the market has likely not proven profitable on the average farm.

At present hogs are raised largely for home consumption. Pork used by the farm families was valued at $3750 on the 50 farms studied, while the total receipts from sales amounted to only $2179.

This condition is further indicated by the fact that these farms had an average of only 2 fattening hogs each.

Table 42. Summary of Hog Enterprise on 50 Farms.

	Number per Farm.	Number Selling per Farm	Number Farms Selling	Total Receipts	Value for Family Use.
Sows	.6	none	none	no data	no data
Pigs	2.8	1.4	17	" "	" "
Other hogs	2.0	1.2	7	" "	" "
All hogs	no data	no data	no data	$2179	$3750

Very few fat hogs were sold. Seven farmers reported sale of only 64 hogs, 38 of which were sold by 1 farmer. However 17 farmers sold pigs. This indicates that fattening hogs on the average farm is not considered profitable, due to the low corn yields and corresponding high cost of production.

There was only .6 of a brood sow on each farm.

There were 5 farmers that reported no hogs at either the beginning or the end

of the year. They bought all of their meat.

On the average the quality of the hogs is fairly good. Although 5 reported purebreds - Durocs and Poland Chinas - the majority were good grades of these two breeds. On the other hand there were some scrub hogs.

Recommendations.

(1) There should be a brood sow on each farm, with the possible exception of the renter who cannot secure pasture.

(2) Pigs should be sold as feeders at a weight of 75# to 100#, instead of being finished as high priced corn.

(3) A Shipping Association should be formed for marketing these pigs in carlots.

(4) The quality and quantity should be such as to attract and hold buyers from year to year.

(5) At least two litters of pigs should be raised from each sow per year.

(6) Pork for family use should be produced on each farm.

(7) Improved feeding practices should be followed; such as supplementing corn with tankage and pasture. Very little tankage would be needed if there is legume pastures, as sweet or red clover, soy beans, etc.

(8) Hogs may be fattened if land is adapted to high corn yields.

(9) There should be a community purebred boar.

(10) The sows now on the farms can be used in grading up the herd if a purebred boar is used.

(11) Each sow and pig should have about 1 acre of pasture.

Sheep.

The rapid decrease in the number of sheep in this county, as shown in Chapter I, is further shown by a study of 50 farms. At the beginning of the year 1925 there was a total of 53 ewes on these farms. By the end of the year there were only 35 ewes, a decrease of about 30%. This indicates a continuation of the decline in the number of sheep since the 1925 census figures were taken on January 1st, 1925. (See Chapter I).

Can the farmers afford to go out of the sheep business entirely? There are some conditions favorable to many farmers raising a few sheep. (1) They have hill land pasture, some of which is better adapted to sheep than cattle. (2) While sheep raising may not be as profitable here as in some other sections, it will increase the farmer's receipts at a very small cash expense. (3) Sheep will consume many products that cannot be well used by other stock.

Recommendations.

(1) The farmers should not go in the sheep business on a large scale. On the average farm probably not more than 10 to 20 sheep should be kept.

(2) Rye should be used for both a cover crop and winter pasture for sheep. It can either be turned under in the spring or cut for grain.

(3) Other small grains, that can be grown on the best soil, should be used for pasture.

(4) Sheep should be marketed as breeders or feeders.

Bees.

Overton County ranks high in the state as a honey producing county. In 1920 she ranked as follows: 4th in total number of pounds of honey, 5th in the number of pounds per hive, and 12th in the total number of hives. There was $13,137 worth of honey and wax produced that year. This is 2½% of the total value of the state production, or nearly 3 times the state average value of these products per county.

On the whole conditions are favorable to beekeeping in this county, for the following reasons:

(1) The climate of this area is well adapted to beekeeping. Ordinarily the winters are relatively short and mild in comparison with the winters in the states farther north. The growing seasons are longer. Thus fruit and other blossoms are available for bees several weeks longer.

(2) This county, as well as the entire state, ranks high in the variety and abundance of nectar and pollen bearing flora. This is due largely to the mild climate, great diversity of soils, and wide range of altitudes. Among the most

important trees that are sources of honey are: sourwood, basswood, poplar, black locust, fruit, and redbud. Besides these a number of farm crops are good sources as follows: sweet clover, crimson clover, Alsike clover, and red clover. There are also some weeds that are excellent for nectar. Among these are: motherwort, boneset, catnip, asters or stickweed, and smartweed. There are other trees, crops, and weeds of minor importance too numerous to mention here. It is important to note, however, that the blooming time of these flora varies from early spring to late fall, thus practically insuring a continued honey flow.

(3) There is and will likely continue to be a good demand for Tennessee honey at prices above Western honey. At the present the apiaries of this state do not produce one-half of the amount of honey that is consumed in the state. In the Overton County area local markets absorbed all the honey reported sold. Consumers prefer the native honey to western honey, and will pay a higher price for it. Local dealers in February, 1927, were selling at retail Montana honey at 20¢ per pound and Tennessee honey at 35¢ per pound. The average price received by the farmers of this region was 21¢ per pound in 1926.

(4) Twenty out of twenty-three or 87% of the farmers stated that they were planning to enlarge their business, which is a further indication of conditions favorable to honey production.

There are several reasons why the farmers of this county should keep bees.

(1) Many fruits and vegetables are dependent upon insects for cross-fertilization. Honey bees, in searching for pollen and nectar, are one of the most valuable agents for carrying pollen from one blossom to another. They perform a function here that is of more value to the farmers than all the honey or wax produced.

(2) When properly cared for bees are profitable sources of income. This is especially important in a region of this kind where cash receipts are small. This income is obtained with very little labor and expenditures in comparison with many other farm enterprises. This is shown on 26 farms in this section. The total expense, including depreciation on equipment, interest on investment,

operator's labor, etc. was $23 per farm, while the average cash receipt per farm from bees was $75. In other words the receipts were over 3 times the expenditures. Stating it another way, the farmer received in cash approximately $2 from bees from each hour's labor.

(3) Beekeeping provides profitable labor for the farmer's family as well as for himself. The bees on 23 farms in this region were cared for as follows: 11 by the husband, 9 by both husband and wife, and 3 by the wife alone.

(4) While bees need intelligent care at the proper time very little work is required. Most of it can often be done during the farmer's spare time. Even swarming can be anticipated and controlled to some extent.

(5) Honey is an important food for home consumption. It is not only valuable from a food value standpoint but it decreases the expenditure for foods of that nature. It is largely produced for home use in this county as was indicated by the fact that 14 out of 26 farmers consumed the entire production. However no definite data were collected as to the amount consumed at home.

(6) Besides being remunerative, beekeeping provides a most pleasant recreation. Many of the farmers stated that they intended to continue to keep bees because the work was pleasant, as well as profitable. One often becomes very much interested in bees by observing their marvelous efficiency and industry.

There are two difficulties, both of which may be overcome, to beekeeping in this area as follows:

(1) The average farmer is not familiar with the modern methods of bee management. However, he is not to be blamed altogether for this. The few previous county agents have not given very much attention to beekeeping. On the other hand the farmers have been without the services of these agents most of the time.

(2) Possibly a few who would like to go into the business or expand the present business do not have sufficient capital to buy the necessary bees and equipment.

A Successful Farm Apiary.

That bees, as a side line to farming can be profitable is well illustrated

by a study of a particular farm in this section. With 60 hives of bees the operator received $571 for his labor alone, above all expenses, and interest on his money. In other words, his work with these bees returned $5.71 for each hour's labor, or a total of $57.10 per 10-hour day. Only 100 hours or 10 days time were required in the care and management of the apiary.

This farmer started into beekeeping in 1920 with only a few hives of bees, but reported a total of 64 hives on January 1, 1927, an increase of 4 hives over the number on hand January 1, 1926. By studying and putting into practice the most modern methods of beekeeping, he has succeeded in profitably operating and increasing his business. Beside this he takes much pride and interest in his bees. Because of both the profits and the pleasure he derives from this work, he considers it one of the most valuable enterprises on his farm.

He is using the most modern hives. They were valued at $12.50 each as compared with a value of $5.40 per hive on 26 farms in this region. The average value of both bees and hives was $16 as compared with an average of $9.40 for the average farm. Italian bees are used exclusively by this farmer. Their vitality is maintained by the addition of a few queens purchased each year.

His use of the best variety of bees, modern equipment, good care, etc. is reflected in the honey yields. In 1926 there was a production of 50 pounds of honey per hive. This was over 3 times the average yield for the county as a whole in 1920.*

His total expense was low in proportion to the receipts. The expense, including interest on investment, personal labor, and new equipment, amounted to only $100 as compared with receipts of $656. In other words he received $6.56 for each dollar of total expenditure. His cash expense amounted to only $35, of which was spent $5.00 for queen bees and $30 for new equipment.

He has a sufficient number of hives to insure a large production in an average year. On account of his ability, interest in beekeeping, and to the fact that he has gradually grown into the business, he is justified in keeping a large number of hives.

* No data were reported on bees in 1925; and only the amount sold was reported on 25 of the farms surveyed.

Table 42B. Summary of a Successful Farm Apiary.

Investment:		
60 hives of bees @ $3.33	$200.00	
60 Gums @ $12.50	750.00	
Other equipment	50.00	
Total		$1000.00
Receipts:		
3000# honey @ 21.7¢	$650.00	
20# wax @ 30¢	6.00	
Increase in inventory	0	
Total		656.00
Expense:		
Queens	5.00	
New equipment	30.00	
Total		35.00
Receipts Minus Expenses		621.00
Interest on investment		50.00
Amount received for labor on bees		571.00
% made on money invested		60.0%
Return per hour of labor		$5.71
Return per dollar expense		6.56
Honey yield per hive in pounds		50
Value per hive of bees and gums		$16.00

Recommendations.

(1) Each farmer should keep some bees, at least two or three hives for the production of honey for home consumption, if not more hives for the production of honey for both home consumption and for sale.

(2) Beginners should begin with only a few hives of bees, gradually expanding the business as they become more experienced in the technique of bee-keeping.

(3) They should continue, of course, with the bees they now have, but use Italian queens.

(4) Many of those who now have bees, and know how to properly care for them, should expand their business.

(5) Others who have bees but are not properly caring for them should be encouraged to use better methods of care and management, such as : (a) winter feeding, (b) swarm control, (c) disease control, (d) modern equipment.

(6) There should be a county Bee Association formed that would have for its purpose (1) education of farmers in modern methods of caring for bees, kind of equipment to use, etc., (2) to possibly aid in securing outside markets when the production of honey exceeds local demand, and (3) to aid in the purchase of supplies.

(7) Probably each farmer should keep the Italian bees. They are (a) more energetic workers, (b) more gentle, and (c) more prolific.

(8) The services of the State Bee Association, located at the University of Tennessee at Knoxville, are available to all the beekeepers in the state. Problems in beekeeping should be taken up with them.

Chapter V.

The Place of Tree Crops in Agriculture.

Too often the woodland is considered as being a unit of the farm entirely separated from the farm business. Instead, it should be thought of and handled as any other farm crop.

This crop fits especially well into the average farm plan in this county. First, it affords a better distribution of both man labor and horse labor. Second, it increases the volume of receipts.

At the present both man labor and horse labor are being used inefficiently in the county. On the average farm only 128 days of productive man labor and 62.5 days of productive horse labor are performed annually. Labor in improving the woodlot, in cutting and marketing the timber, and in gathering and shelling the nuts, etc. will furnish productive labor during the late fall and winter months when no other farm work is available. This work can be performed by the operator, and his family and team, without any cash expense.

Since the average gross receipts on the average farm was only $369 from farm products, there is a great need for an increase in these receipts, in order that an income may be received above all current expenses and overhead expenses such as interest and depreciation. Tree crops will furnish these receipts from four different sources: (1) from the sale of timber, (2) from lumber and wood for home consumption, (3) nuts for human consumption, and (4) pasture for hogs.

(1) The principal source of income is from the sale of lumber, staves, poles, ties, acid wood, etc. The average timber receipt on the 50 farms studied was $2.25 per acre of woodland. In 1920 the average value of material bought for manufacturing in the county of which the majority was timber, was $1.68 per acre of woodland. Since this does not include such timber products as acid wood, poles, etc., it is likely that the average of $2.25 is about the average for the entire county.

(2) Some of the uses of wood for home consumption are: fuel, fence posts,

building or repairing buildings. On 50 farms the average family was using approximately 11 cords of wood per year for fuel. At $2 per cord each farm was receiving $22 worth of fuel from the woodland. No data were secured for the quantity of timber used for other purposes. While wood for home use is not a cash receipt, it aids in lowering the cash expenses.

(3) The principal nut crops for human consumption are black walnuts, white walnuts, hickory nuts, and chestnuts. These are important sources of income because (1) gathering and preparing for market provides profitable employment for the farmer and his family at a time when they would in many cases be otherwise unemployed, (2) the volume of receipts are increased, thus reducing overhead expenses on the general farm business, and (3) the receipts can be considered as a net income since the trees from which they are produced are ultimately sold.

(4) Oak, beech, hickory, walnut, and chestnut forests are valuable as pasture for hogs. Pasturing of woodland with cattle is not to be recommended since too great a loss will result from damage to young trees in proportion to the gain. On the other hand the benefits of pasturing hogs on the mast are by far greater than any slight injury to young trees that may result.

The fixed charges on woodland are low. Since the average assessed valuation is estimated at only $5.50 per acre, the interest at 6% would be 33¢ and taxes at $2.80 rate would be 15¢, making a total of 48¢ per acre per year. Under the present method of management this represents practically the total charge with the exception of marketing the products. It can be safely assumed that the annual receipts per acre, if properly handled, from the timber and nuts will be greater than the fixed charges mentioned above, thus insuring a profit. In fact the estimated average annual receipt of $2.25 per acre is $1.77 above these fixed charges. However this amount could be increased by better care and management of the woodland.

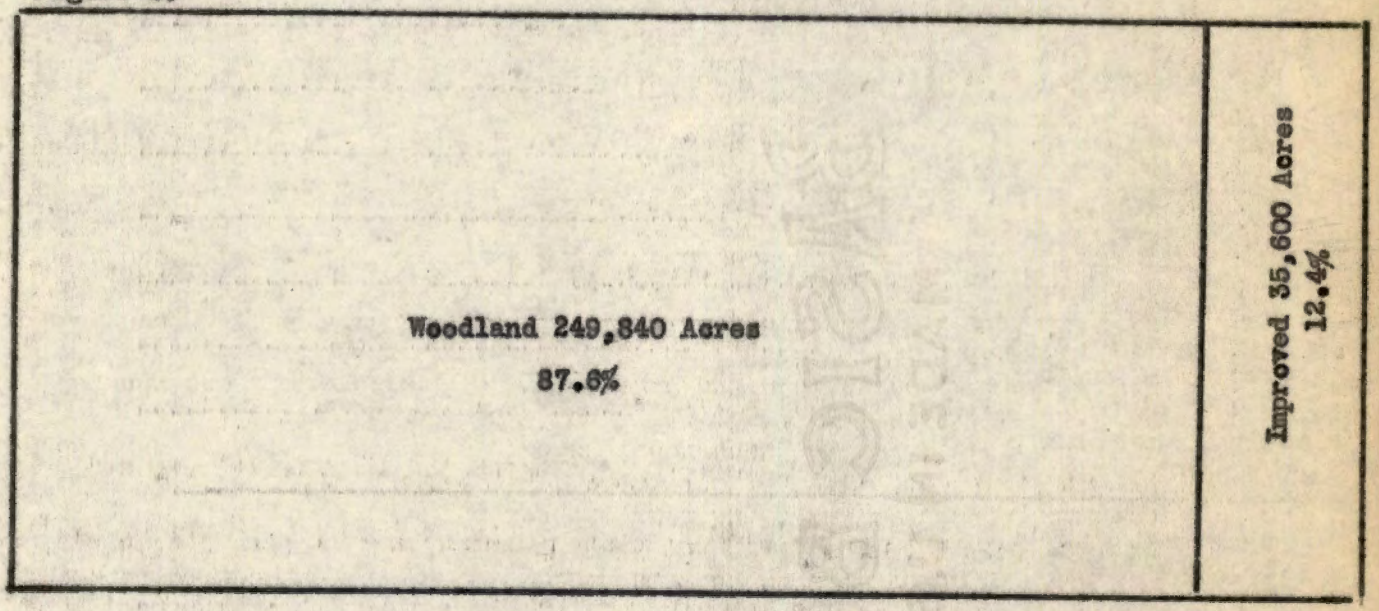
Distribution of Woodland and Improved Land.

The following chart will show the relative importance of woodland and improved land at different census periods.

Chart 5. TREND OF WOODLAND AREA FROM 1850 TO 1925.

1850
Total Area of County 285,440 Acres

Figure 1.



1880
Total Area of County 285,440 Acres

Figure 2.

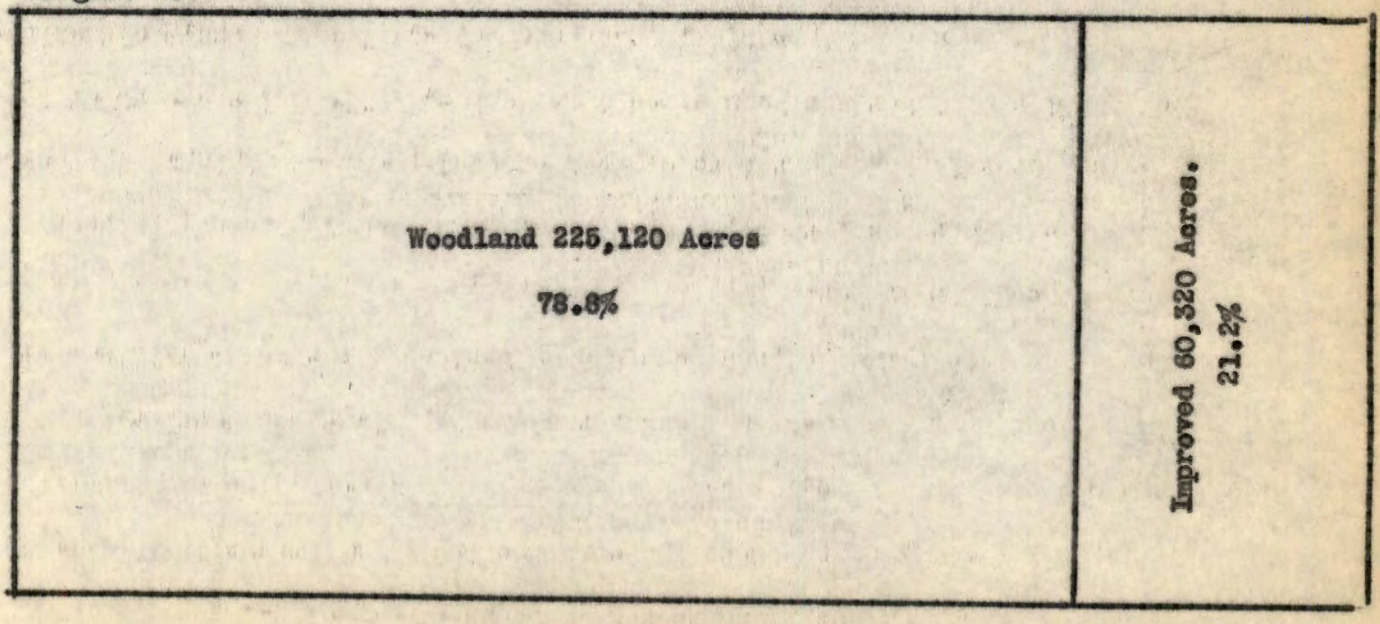
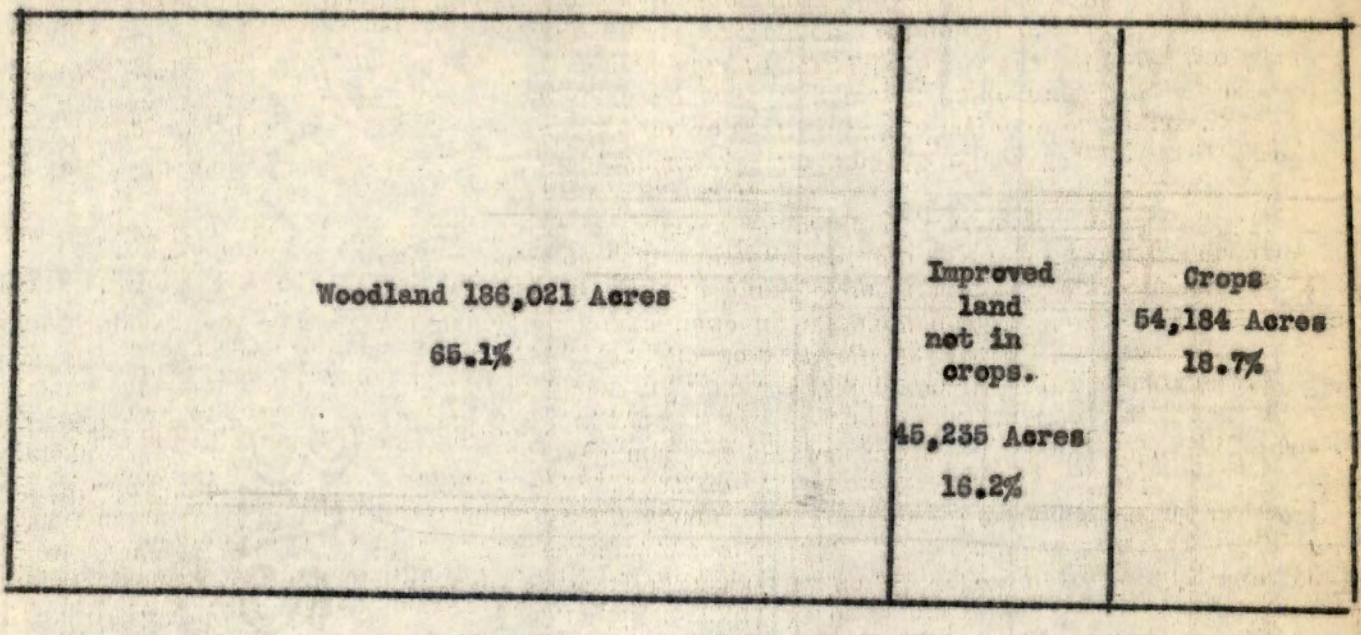


Chart 5 (continued)

1900

Total Area of County 285,440 Acres.

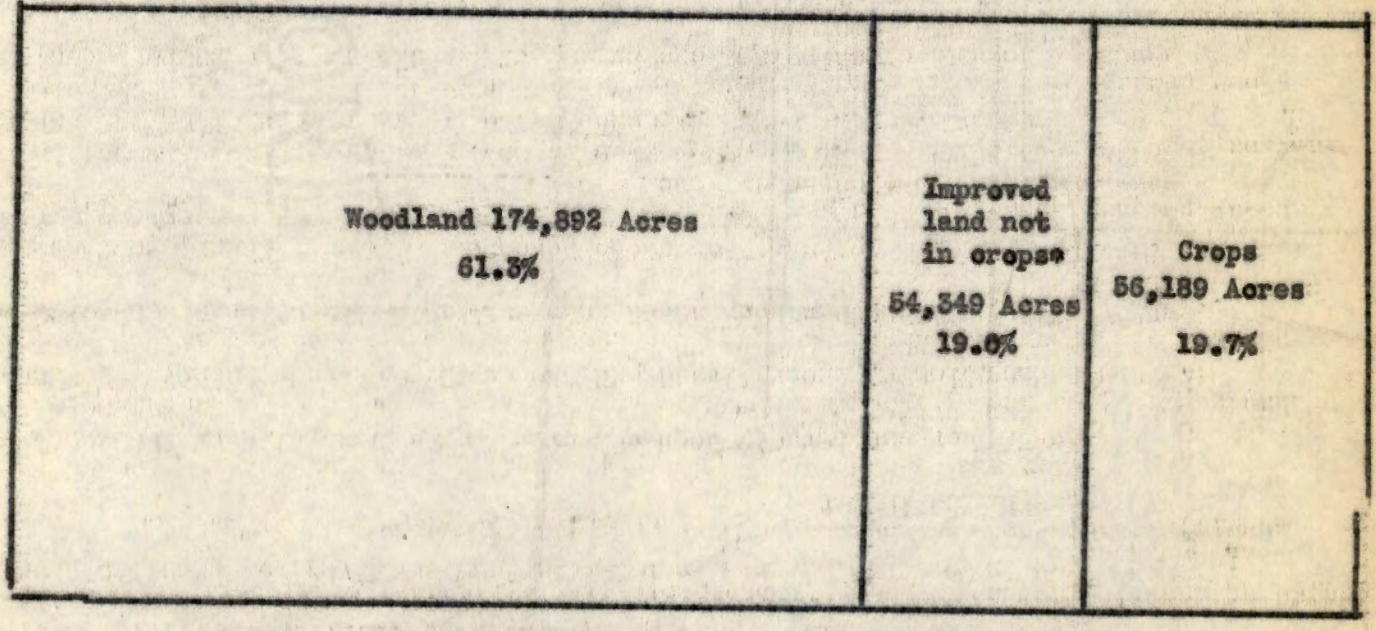
Figure 3.



1925

Total Area of County 285,440 Acres.

Figure 4.



* Includes crop land idle. The crop land includes only acres harvested.

In 1850 forests occupied 249,840 acres, or 87.6%, of the total area of 285,440 acres, as contrasted with an area of only 35,600 acres, or 12.4%, of the total area occupied by improved land. In other words, 7 acres out of every 8 acres in the county were in forests at that time.

Although the total forest area has gradually decreased since that period it still occupied the larger part of the total land area in 1925. There were 174,892 acres, or 61.3%, of the total area in forests as compared with 110,538 acres, or 38.7%, of the total area in improved land. Thus almost 2/3 of the entire land area is in forests and is not devoted to agriculture.

From 1900 to 1925 woodland decreased 6% in area. By 1950, at this same rate of decrease, there would be 164,399 acres of woodland and 121,041 acres of improved land. The percentage the woodland is of the total area would decrease from 61.4 to 58.0 and the percentage of improved land would increase from 38.7 to 42.0.

The distribution of the land in farms in the county in 1925 was as follows: woodland 105,769 acres, crops harvested 56,189 acres, and improved land not in crops 54,349 acres*. This leaves 69,123 acres of woodland in the county which is not in farms.

From this it is observed that:

(1) Woodland not in farms is more than equal to either the crop land harvested or to the improved land not in crops,

(2) there are nearly twice as many acres of woodland in farms as in either all crops or in other improved land,

(3) the area of the farm woodland is almost equal to the areas of both crop land and other improved land,

(4) crop acres and other improved acres are about equal,

(5) the average farm in the county has 3.8 acres woodland and 40 acres of improved land.

The distribution of the farm area of the 50 farms surveyed was as follows: woodland 2,297 acres, crop land 1883 acres, and other improved land 1483 acres.

* Includes 16,885 acres listed as "all other land in farms".

From this it will be seen that on these representative farms:

(1) the area in woodland was approximately 2/3 the area of crop and other improved land,

(2) the area in woodland was approximately 1½ times that of crops alone,

(3) the average of these farms was 46 acres of woodland and 67 acres of improved land.

The larger acreage and the higher percentage of farm land in improved land on the farms surveyed than on the average farm in the county is due to the fact that no farm records were taken of the farms located in the more mountainous sections.

The acreage of woodland in the county both in farms and not in farms is 4.4 times that of corn; 174 times that of wheat; 174 times that of oats; 15 times that of hay; 37 times that of forage; 63 times that of all fruits and vegetables; and 3.2 times that of pasture.

The acreage of woodland in farms alone in the county is 2½ times that of corn, 100 times that of wheat, 100 times that of oats, 10 times that of hay, 25 times that of forage, 36 times that of all fruits and vegetables, and 2 times that of pasture.

Viewing this on an individual farm we have approximately the following distribution of the acreage: woodland 47.0% corn 19% wheat 0.5% oats 0.5% hay 5.0% forage 2.0% fruits and vegetables 3% and pasture 23%. This high percentage of both total area and farm area in woodland, and the large woodland acreage in comparison to the acreage in each crop and pasture reflects the importance of tree crops to the county as a whole and to each farmer.

Supply and Demand of Forest Products.

The forest lands are not only being gradually cleared for cultivation or pasture, but the virgin forests are being rapidly depleted. In the United States approximately 53 billion board feet of lumber are being consumed annually, while replacement by second growth is being accomplished at a very much less rapid rate. Eight times as much soft wood saw-timber and three times as much hardwood saw-

timber is being consumed annually than is being replaced.

The demand for timber products does not seem to have been decreased to any great extent by the use of substitutes. With this practially stable demand, and with a decreasing supply, one may expect higher prices for timber products in the future.

Soil Types in Relation to Woodland.

Of the total area of the county only 9.7% is not very well adapted to the growth of timber. This consists of two soil types, DeKalb sandy loam located in the extreme eastern and southeastern part of the county, and "Rough stony land" in small areas in all parts of the county. This leaves 90.3% of the county that is well adapted to timber production. Of this area 49.3% is now producing most of the timber, the remainder being largely cleared. It consists of the following soil types: Clarksville stony loam, mainly in the north; DeKalb stony loam in the east and south-east; and Decatur stony loam in the north, central, and south-central parts of the county. The latter soil type consists of only small areas in each of the above sections.

Almost the entire western half of the county, in which the Clarksville silt loam and the DeKalb silt loam are found, has a large acreage in woods. However, this section has a smaller percentage of total area in woodland than have the sections in the northern and eastern parts of the county. The soils, however, produce as good timber as the soils in the latter sections.

There are three soil types, representing only 2.3% of the total area, that are nearly all occupied by improved land. They occur in small areas around Livingston, and along the creeks and rivers in all parts of the county.

Advantages of this County as a Timber Growing Area.

On the whole, natural conditions are favorable for the production of forests in Overton County. (1) The longer growing season is conducive to a considerably more rapid annual growth than in the northern states. (2) Most of the soil types are well adapted to the growth of oak, chestnut, walnut, hickory, poplar, etc. (3) The heavy average annual rainfall of 54.8 inches supplies sufficient moisture

for good growth.

Large areas of land in this county are not adapted to the profitable production of cultivated crops, due to the low fertility, the rugged topography of the land, and high freight rates. With the exception of a few areas this sub-marginal land can be made productive by growing forest crops. As shown in the previous chart, almost 2/3 of the land area is at present in forests. On the other hand there are areas not now in forests that would probably be more profitable if allowed to grow up in trees.

Handicaps to Timber Production.

This region is in a small measure handicapped by high freight rates and lack of a good system of improved roads. Shipments are made in car-lots but the products are sold at wholesale price which would tend to make the rates higher per unit value. The handicap of lack of good roads is being removed gradually now by the construction of hard-surfaced roads in the county.

Importance of Lumber Manufacturing in the County.

That manufacturing of lumber is an important industry is indicated by the following summary of all kinds of manufacturing in Overton County in 1920:

Number of establishments	41
Wage earners	344
Wages paid	$246,470
Rent and taxes paid	$11,212
Cost of material bought	$283,344
Value of finished products	$777,995
Value added by manufacturing	$494,651

While these figures include manufacturing it can be safely assumed that they apply largely to the manufacture of forest products. The other manufacturing establishments consist principally of a few small grist and roller mills.

From the above it is observed that (1) the wages paid in 1920 amounted to almost 1/4 of a million dollars, (2) that almost 1/2 million dollars was added to the wealth of the county by manufacturing the products there instead of ship-

ping the timber out as raw material, and (3) that $11,212 was paid as rent and taxes, of which practically all was taxes.

In other words, had the timber been manufactured outside of the county there would have been about 1/4 of a million dollars less paid the laborers, many of whom were farmers working at the saw mills during their spare time. There would also have been a decrease in county revenue of about $11,000. This decrease would have to be supplied of course by an increase in taxes. This extra tax would fall largely on the farmers, since they pay approximately 80% of all taxes paid in the county.

This extra wealth brought into the county helps the business and professional men as well as the farmer. A large amount of it is spent in the county for all kinds of merchandise, professional services, etc.

Taxation of Timber Land.

61.3% of the total acreage in the county is in woodland. It is obvious, therefore, that a considerable part of the county taxes are paid on this class of land. Under the present system of taxation timber land must pay taxes annually on full value, just as does crop land that yields an annual income. This requires taxes to be paid on timber crops many times before any returns whatever are received.

This system is objectionable for two reasons: (1) it encourages selling of immature timber so that the assessed value of the land will be lowered; (2) it discourages timber production, since there is not so much incentive for one to invest in "cut-over" land with the prospect of returns 20 years in the future.

Some adjustment of the general property tax to meet this situation has been widely recognized by tax authorities as legitimate and desirable. Any change in time, however, would necessitate the revision of the Constitution in regard to classification of property for taxation.

The adjustment often proposed and which is in use in 10 or more states, provides that growing timber shall not be taxes until cut, and only the land and the mature timber be taxed annually. This removes the objection of paying an

tax on growing timber, and thus encourages its production to maturity.

Early and Present Methods of Marketing.

In the early days before the construction of railroads in the county timber was marketed in the log. It was customary in the east side of the county to run these logs down the East and West Forks of Obey River to Spurrier. Here they were made into rafts and run down the Cumberland River to Nashville where they were sawed into lumber.

The timber has largely been cut over in the east side of the county since the construction of the railroad and the development of mining. The best part of the large timber has been sawed into lumber, while a large part of the smaller timber has been made into ties, telephone poles, mine timbers, golf sticks, wagon and automobile spokes, etc.

This has brought about a change in the method of marketing the forest products. Instead of shipping logs by way of the rivers, the lumber, etc. which are sawed near the place of production, are shipped by railroad. There is an advantage in shipping the manufactured product rather than the logs, since the former has a higher unit value or a higher value per 1000 feet.

Timber Supply as Affecting Railroad Operations.

The railroad to Livingston depends largely on shipments of timber products for its business. With these products largely exhausted this road would probably have to discontinue operation. This would handicap car-lot shipments into and out of the county. It is true that improved roads partly remove this handicap of no railroad, but not entirely. On the other hand, if the railroad were discontinued it would handicap both car-lot shipment of wheat, fertilizer, etc. into the county, and car-lot shipments of livestock, etc. out of the county.*

With the timber supply exhausted the railroad could probably not afford to continue operations until a new supply was produced. It is necessary therefore to improve forest production immediately.

* The branch of the T. C. in the eastern part of the county is dependent largely on mining for its business and would therefore not be affected by an exhaustion of the timber supply as would the T. K. & N.

The Waste of Wood.

Wasteful methods of cutting and logging timber were practiced in the early days. Very little thought was given to the protection of young trees when cutting the necessary logging roads, or in felling trees. Trees were cut high, leaving on the average a 3-foot to 4-foot stump. When clearing land for crops, logs were often burned in order to get them out of the way. The best trees were often cut for fuel, when diseased and deformed trees and those of little commercial value would have served the purpose.

However one should not blame these owners and operators too severely for this, because at that time timber was abundant. There was very little market demand for it. Consequently it was often much cheaper to waste timber than to save it.

However these conditions do not exist at present. With a good demand for timber and a rapidly decreasing supply it is very necessary at present that these wasteful methods be discontinued.

Nevertheless many of these wasteful methods are practiced at present by both owners and contractors. Stumps are often cut high, very little care is taken in protecting the young timber, and often good marketable timber is cut for fuel.

Furthermore there is a great damage to the forests by fire which burns over large areas annually. The entire young growth is often killed and the mature timber injured in this way.

Care and Protection of the Woodland.

What can the farmer do to improve the productivity of his woodland? It is a problem that confronts each individual farmer, for he is not only in direct charge of the woodland but is the one to profit directly by the increased receipts. The following are some things he can do to accomplish this:

(1) Encourage the growth of the best trees by cutting all deformed and diseased trees, and otherwise thinning out where too thick. Use them for fuel instead of the best timber.

(2) Protect the young timber when logging, and refrain from cutting this young growth.

(3) Lessen the danger from fire by carefully piling all brush.

(4) Discontinue pasturing woodland with livestock that will injure the young growth. The damage is usually greater than the benefit derived therefrom.

(5) Leave good seed trees for reseeding.

(6) Some seed of trees of commercial value may be scattered over deforested areas.

The natural reseeding is a very important phase of forestry improvement. Under present conditions artificial reforestation, to any great extent, will probably not be profitable on account of the expense incurred. Reseeding by natural means must be depended upon largely to maintain the forests. It is very important then that every means be used that will protect and encourage the growth of these seedlings.

The state can aid in this work of increasing timber production by (1) passing laws that will exempt growing timber from taxation until marketed, and (2) by aiding the county in establishing and maintaining patrols as a protection against forest fires, and (3) passing more stringent laws against persons who willfully set fire to forest lands, and (4) establishing a state cooperatire nursery for the production of tree seedlings at a price at which deforested areas can be reforested profitably.

The county can help in this work by (1) hiring a county agent who has had training or experience in forestry problems, and (2) by a more rapid and thorough prosecution of persons guilty of setting fire to forest areas.

With 61.3% of the total area in timber, climatic and economic conditions favorable for timber production, the supply rapidly being exhausted, and the price of timber products likely to increase in the future, the farmers of this area, as well as the state and county officials, cannot well afford to neglect the problem of the proper care and protection of the young timber as well as decreasing waste in marketing mature timber.

Chapter VI.

Factors Affecting Farm Profits.

The farms in this county differed greatly in their efficiency in the use of capital, as in the form of labor and machinery; in crop yields; production of poultry and cows; the value of family living from the farm; and receipts from timber and outside labor. These factors have been analyzed, and their consequent effect on farm profits are shown in this chapter.

Quality of Business.

1. Crop Yields.

Table 43. Relation of Labor Income to Crop Yields.

	Corn	Hay	Wheat
Labor Income with yields above the average	$ -77	$ -132	$ -232
Labor Income with yields below the average	$ -244	$ -208	$ -246

Farmers with yields of both corn and hay above the average made a labor income of $-77 and $-132 respectively. On the other hand the farmers with yields of corn and hay below the average made $-244 and $-208 respectively. While farmers of both groups did not make enough to pay their current expenses (including taxes), interest, and unpaid family labor, those with the higher yields lacked less of paying these expenses than did those making yields below the average.

The labor income on farms with wheat yields per acre above the average was less than on those farms with wheat yields below the average. Since only 12 farms reported wheat, and since they had an average production of less than 60 bushels per farm, the relation between yields and labor income can not be indicated as correctly as it can be when there are a larger number of farms and a greater production.

It is evident that good crop yields is one of the factors that effect profits in this county, in that the largest labor incomes are made on farms with yields above the average. Good yields increase profits by (1) increasing the efficiency of man and horse labor, and machine work, and (2) decreasing the overhead expenses, such as interest, depreciation, etc. per unit by increasing the volume of business.

It is not necessarily true that all farmers who have large crop yields make the highest labor incomes. On two farms with corn yields of 30 bushels and 36 bushels respectively, as compared with an average of all farms of 14 bushels, the labor incomes were $-177 and $-670 respectively. Therefore excessive yields are not always the most profitable unless produced economically.

Since farms of both groups have both minus labor incomes and crop yields below the state average, they can profitably increase their yields at least to the average for the state.

2. Egg Production.

Table 44. Relation of Quality of Hens to Egg Production.

	Number hens.	Eggs per hen.	% increase.
Purebred	201	76	33
Mixed	2854	57	-
All hens	3055	58	-

The farmers who kept purebred chickens got an average of 76 eggs per hen per year, while those who kept mixed chickens got an average of only 57 eggs per hen per year. In other words, the egg production of the purebred flocks was 33% greater than that of the mongrel flocks.

3. Milk Production.

Table 45. Relation of Quality of Dairy Cows to Production.

	Number Cows	Lbs. butter per cow.	% Increase	Gals. milk per cow	% Increase
Purebred	5	171	94.5	334	33.0
Grades and scrubs	91	88		250	
All cows	96	91	3.2	257	2.7

The purebred cows produced both more pounds of butter and gallons of milk per cow per year than did the grades and scrubs. The production of butter and milk increased 94.5% and 33% respectively.

Table 46. Quality of Cows and Poultry Related to Labor Income.

Labor income of farmers having purebred cows	$ -31
Labor income of farmers having grade or scrub cows	-118
Labor income of farmers having purebred poultry	-134
Labor income of farmers having mongrel poultry	-111

It is noted that the labor income of farms having purebred cows was greater than that of farms having grades or scrub cows. On the other hand the labor incomes are just the reverse in the case of poultry, the farms with purebred poultry returning $23 less than those with mongrel flocks.

There is no correlation between quality of cows and poultry and labor income because of the small number of purebreds in comparison with the number of grades and scrubs.

Capital.

Table 47. Relation of Size of Capital to Labor Income.

	28 Farms above the average efficiency in the use of capital*		22 Farms below the average in efficiency in the use of capital*	
	12 Farms of this group with largest capital.	16 farms of this group with smallest capital	9 farms of this group with largest capital	13 farms of this group with smallest capital
Average capital per farm	$5435	$1900	$6521	$2040
Labor income per farm	$-31	$-80	$-222	$-146

The farms, above the average in efficiency in the use of capital, that had the largest capital for that group made $-31 labor income as compared with a labor income of $-80 on the farms in the same group that had the smallest capital.

On the other hand the farms below the average in efficiency that had the largest capital made a labor income of $-220 compared with $-146 labor income of the farms in the same group that had the smallest capital.

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* The use of capital was measured by the use of man labor, horse labor, and machinery.

In other words the largest capital is not the only prerequisite to successful farming. It must be used to the best advantage. If capital is used inefficiently on farms with a large capital there are more chances for a greater loss than on inefficient farms with small capital. On the other hand, if capital is used efficiently the farms with large capital will return a greater profit than will farms with a small capital.

Utilization of Labor.

In determining the efficiency in the use of both man and horse labor it was necessary to determine for each farm the number of acres in the various crops, the number of the different classes of livestock kept, the number of laborers, including the operator, hired labor, and the members of the family. The total number of months of labor divided by twelve will give the number of years or fraction of a year it would have taken one man to perform that work alone. This is often referred to as the "man equivalent" or the "man years".

The efficiency of both man and horse labor was determined by the number of "productive work units" required for the various farm enterprises.* The total units needed per farm were based on the following table.**

Table 48. Approximate Work Units Needed for Various Farm Enterprises.***

Enterprise	Man labor units	Horse labor units
Production of Crops	per acre	per acre
Corn (Shocked and put in crib)	4.6	4.4
" (Husked from stalk)	3.0	5.0
" Hogged down	2.4	3.8
" Silage	6.0	7.0
Wheat and oats (thrashed)	1.2	1.6
Rye (pastured or turned under)	.2	.6
Hay	1.1	.7
Cow peas and soybeans	1.8	3.0
Apples (little care)	3.0	1.0
Garden	12.0	6.0

(continued on next page)

* A work unit is the time required to raise an acre of hay cut once representing approximately 10 hours work. Productive work unit is the term used to designate work spent in the production of crops or the production of livestock or livestock products. Does not include work in caring for work horses, repair on machinery, etc.

**An animal unit is the equivalent of a 1000 pound animal. It is represented by 1 horse or cow, 2 colts, 5 hogs, 7 sheep, or 100 hens.

***Kentucky Agricultural Experiment Station Bulletin No. 253.

(Table 48 continued)

	Per animal unit.	Per animal unit.
Ordinary milk cow on the farm	12.3	1.5
Beef cattle	1.0	.9
Horses	8.0	3.0
Sheep	2.3	.05
Swine	1.1	.02
Poultry	15.0	2.00

The total work units required on each farm divided by the "man equivalent" or by the number of horses for a particular farm showed the number of productive work units accomplished per man or per horse respectively.

1. Horse Labor.

Table. 49. Relation of Productive Work Units per Horse to Labor Income on 50 Farms.

	Average number of work units.	% available days spent in prod. work*	Average labor income.
25 farms having the largest number of work units per horse.	82	34	$1
25 farms having the fewest number of work units per horse.	43	16	$-215

The operators on the farms with the largest number of work units per horse made a labor income of $1, while those on farms with the fewest number of work units per horse lacked $215 paying all farm expenses and interest on the investment.

The horses on the most efficient farms worked only 1 day out of 3 days available for productive work. On the other hand the horses on the least efficient farms worked only 1 day out of 6 days available for productive work.

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* The total number of days available for productive farm labor is approximately 230. This number was found by deducting the number of Sundays and rainy days from the total number of days in the year.

Table 50. Relation of Crop Acres per Horse to Labor Income.

	Crop acres per horse	Labor income.
10 most efficient farms in the use of horse labor	25	$ 30
10 least efficient farms in the use of horse labor	8	$-187
25 most efficient farms in the use of horse labor	18	$ -7
25 least efficient farms in the use of horse labor	10	$-210

Taking the number of crop acres as a standard for measuring the efficiency of horse labor, it is seen that there is a direct correlation between acreage and labor income. When 10 most efficient and 10 least efficient farms were taken it was found that the former, with 25 crop acres per horse, returned $30 labor income while the latter with only 8 crop acres per horse lacked $187 paying farm expenses, interest, and depreciation.

Although both the 25 most efficient farms and the 25 least efficient farms returned a minus labor income, the labor income of the farmer was $203 in excess of the labor income of the latter. In other words, the labor income decreases as the number of crop acres decrease and vice versa.

Table 51. Tabulated Annual Cost of Keeping a Horse in Overton County.

Interest on investment $75 @ 6%	$4.50
Food	
Hay 1.8 Tons @ $27.50	49.50
Grain 45 bu. corn @ $1.10	49.50
Pasture 4 mo. @ $1.50	6.00
Depreciation @ 8%	6.00
Harness and miscellaneous	1.50
Shoeing	4.00
Depreciation on barn 4%	3.00
Interest on barn 6%	4.00
Total	$128.00

The following method was used in the above calculations.

(1) The horse was valued at $75 which was the average value per horse on

50 farms in the county.

(2) The time which the horse would be on pasture was estimated at 4 months. This is probably not too high since the average horse worked approximately only 65 days.*

(3) The time which the horse was fed was then placed at 8 months. Corn and hay was fed at the approximate rate of 10 pounds and 15 pounds per day respectively. These feeds constituted the main ration of the work stock in this county.

(4) The depreciation was figures at 8%.**

(5) The harness, depreciation, miscellaneous expenses as medicine, and shoeing were estimated.

(6) The interest and depreciation was calculated on the basis of the average value of barns on 50 farms, which was $250. There was a total of 3½ animal units per barn. The above charges were therefore prorated equally to the different animal units, about 30% being charges to each.

While this tabulation may not be accurate in every detail it is accurate enough to show the approximate cost of keeping a work horse under the averaged conditions in this county.

While the total cost per day is only about 30¢, the cost per day of productive work is approximately $3.00 on the farms having the least efficient use of horse labor. On the other hand it is only $1.50 per day on farms that used horse labor most efficiently. In other words, horse labor on the least efficient farms costs twice as much as on the most efficient farms.

The use of horse labor is a factor that affects the profits of farmers in this area in that the largest labor incomes were made on the farms having both

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* This does not include non-productive work which however would probably not amount to over 20 days.

** G. F. Warren - Farm Management, p. 234.

the largest number of productive work units and the most crop acres per horse per year. However the farmers in general, even the most efficient, are not using horse labor to the greatest advantage. This is shown by the fact that only one farmer used horse labor 50% of the time and only 3 used it over 40% of the time.

Efficient use of horse labor increases profits by decreasing the cost of horse labor per day of productive work. While it is true that the cost of feeding a horse working every day is some greater than the cost of feeding a horse working only part of the time, there are overhead expenses, as interest, depreciation, barn room, etc, that remain the same. Besides, the horse that is not working must continue to eat. The cost of the feed consumed during the idle days, although less than during the work period, will be charged against the days on which the horse does work.

The cost of horse labor can be decreased by (1) having a sufficient crop acreage to keep the horses busy a greater part of the year. For Overton County there should not be less than 25 crop acres per horse. 30 acres per horse would be preferable. It is necessary in this connection to have (a) a cropping system that provides an even distribution of horse labor throughout the year, (b) a careful plan and schedule of all farm work so that odd jobs will not interfere with field work, (c) a convenient layout of the farm and fields. (2) The cost of keeping a horse can be decreased further by the use of pasture, feeding lightly when not at hard work, and utilizing roughages with some grain during the winter months.

Few farmers realize the importance of the proper use of horse labor. In Overton County at present it is just as important as the proper use of man labor. On the farms using horse labor the most efficiently the cost per day of productive work of man and horse is about the same, while on farms of the least efficiency in the use of horse labor the cost of man labor is only about ½ that of horse labor per day of productive labor.*

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* Cost per day of man labor varies from $1.00 to $1.50.

It is not necessarily true that all farmers who use horse labor most efficiently make the largest labor incomes. Of two farms studied with the highest percentage of days spent in productive work, they made a labor income of $ -145 and $ -370 respectively. But this does not mean that the most efficient use of horse labor is not desired on all farms. Other factors, as volume, and quality of business, etc., are sometimes of greater importance in determining profits.

2. Man Labor

The average farmer in this county does not use man labor very efficiently as shown below:

(1) Average productive work units per man on all farms	165
(2) Average productive work units on 25 farms having more than the average number of units	202
(3) Average productive work units per man on 25 farms having less than the average number of units	128
(4) Average productive work units per man on 10 farms having the fewest number of units	100

Assuming that there are 313 days available for all work, approximately only 50% are used in productive labor on the average farm; 65% on 25 farms that are using the labor most efficiently; 40% on 25 farms that are using labor least efficiently; and 32% on the 10 least efficient farms in use of man labor.

It is obvious therefore that the average farmer needs to do more productive work. To accomplish this there must be a better distribution of labor throughout the year.

The present cropping system of corn and hay requires that most of the work be done during the spring, summer, and early fall months.* It is very essential that these two crops be grown, but since they do not furnish work at certain times of the year it is necessary to devise other means of profitable employment during those times.

The following are ways by which labor can be better distributed in Overton

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* See page 72 - Crops and Cropping Systems.

County:

(1) Grow more wheat for grain. Seeding and harvesting does not seriously conflict with corn gathering or cultivation.

(2) Grow annual legumes as soy beans and cowpeas for seed or hay. They are usually seeded in the latter part of May, after the peak of early spring planting, and are mature for cutting in late summer.

(3) Grow some Japan Clover for hay. It matures in late summer and early fall, previous to corn harvesting.

(4) Grow a small acreage of Irish or sweet potatoes.

(5) Have an all year garden.

(6) Grow some nuts, especially walnuts. This furnishes labor for all of the family on days not available for field work.

(7) Take better care of the farm woodland. Thinning and cutting out deformed and diseased trees, piling brush to prevent the rapid spread of forest fires, etc, will furnish labor on days when the ground is too wet to cultivate the soil or do other productive work.

(8) Cut and market timber from the woodland.

(9) Plan work so that all repairing, pruning orchard, cleaning barns and poultry houses, and other odd jobs will be done on days that will not conflict with field work.

It is not always possible to place a system of farming in which there will not be a conflict in labor between the different enterprises. The conflict between the enterprises mentioned above will not be sufficiently objectionable to prevent including them in the farm plan. The advantage of having an increase in receipts, which tends to decrease the overhead charges, will outweigh the disadvantage of the conflict in labor.

3. Machine Labor.

Table 52. Efficiency in the Use of Machinery Related to Labor Income.* 50 farms in Overton County.

	Average Cost per Acre	Average acres per $100 worth machinery.	Labor Income.
Farms having number of acres per $100 worth of machinery above the average	$4.40	22	$ -96
Farms having the number of acres per $100 worth of machinery below the average	$5.00	20	$-120

The operators on the farms with the largest number of crop acres per $100 worth machinery made a labor income of $-96, as compared with a labor income of $ -120 returned by the farms with the fewest acres per $100 worth of machinery. There is a difference of $24 in favor of the most efficient farms. The investment in machinery per acre is only 60¢ greater on the least efficient farms than on the most efficient farms.

The efficient use of machinery, although affecting the profits of farms of this area as indicated by the slightly larger incomes on farms having the larger number of acres per $100 worth of machinery, is a minor factor. This is indicated by the fact that there was a difference of only $24 in labor income between the most efficient and the least efficient farms. Besides, the average investment in machinery per farm is only $179. Machinery can be used more efficiently on a relatively large acreage. The same machinery that would be necessary in operating a farm of 30 crop acres could as well be used in operating a farm with double that acreage. The total cost would be approximately the same but the cost per acre would be lowered in the case of the larger acreage, because such fixed charges as depreciation and interest on the investment would be prorated to a greater number of acres.

To illustrate: on 2 farms studied in this area there were 10 acres and 29

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* Crop acres was taken as a basis for measuring the efficiency of machinery since the same type of farming prevailed on these farms.

acres of hay respectively. Both had a mower and a hay rake. It is obvious that the farmer with 29 acres of hay can use this equipment more efficiently than can the farmer with only 1/3 as many acres.

It can not be concluded that all farmers who have the highest acreage per $100 worth of machinery will have the highest labor income. One farmer in this area who was cultivating at the rate of 70 acres per $100 worth of machinery lost $116 on the year's business. His total acreage was only 26 with an investment of $38 in machinery. This indicates a lack of a sufficient size of business to warrant a larger investment in improved equipment.

Table 53. Volume of Business.

Relation of Gross Receipts to Labor Income on 50 Farms in Overton County.

	Average Receipts	Labor Income
25 farms having largest average receipts	$565	$ -74
25 farms having smallest average receipts	174	-143
Average receipts for all farms	369	-108

The 25 farms that had the largest total receipts per farm made an average labor income of $ -74, while the 25 farms that had the smallest total receipts per farm made an average income of $ -143. In other words the latter group of farms lost almost twice as much as did the former group.

It is significant to note that the gross receipts in both groups of farms are very low. A reasonable labor income can not be expected on farms with such low receipts, for out of these receipts all of the operating expenses of the farm, taxes, depreciation, interest on the investments*, etc. must be paid. It is no wonder, then, that there is a loss on the average farm.

To return a reasonable net income the receipts on the average farm should be at least 4 times as great as those of the best 25 farms or approximately $2000.

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* The interest and depreciation, while not always direct expenses are expenses that must be considered.

The farmer that made the highest labor income, $1047, had total receipts of $2045. In other words, his receipts were about 3½ times those of the best 24 farmers, 6 times those of the average farmer, and 12 times those of the poorest 24 farmers.

It cannot be assumed, however, that high receipts means a corresponding high labor income. A farm may have the highest total receipts but yet make the least profit. This is illustrated by farm No. 78. It ranked third in receipts with a total of $805, but returned a labor income of $ -612. There are other important factors besides volume of business that affected the profits in this area.

The relation of expenses to receipts and its consequent results on labor income is an important factor affecting profits. This relation is shown by the following table.

Table 54. Relation of Receipts* and Expenses** to Labor Income.

Expenses per $100 Receipts.	Number Farms	Average Expenses per $100 Receipts.	Labor Income.
$1 - $100	25	$ 80	$ 34
$101 and over	25	110	-260
All Farms	50	85	108
Best 10 Farms	10	55	183

The 25 farms which averaged $80 expenses per $100 receipts made a net profit of $34, while the remaining 25 farms which averaged $110 expenses per $100 received made a net loss of $260.

The average farmer had a total expenditure of $85 per $100 receipts and made an average loss of $108. On the other hand the best 10 farmers who paid out only $55 for each $100 received made a labor income of $183.

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* Receipts includes the amount received from crops, livestock, and livestock products.

** Expenses includes all current expenses, unpaid family labor, decrease in inventory, of both feed and livestock, and depreciation on buildings, machinery, and fences. Interest on the investment and costs of marketing were not included.

The farmers of this county can increase their size of business as follows:

(1) Rent or purchase additional land.

(2) Increase the size of the poultry flock.

(3) Grow a more intensive crop as Irish or sweet potatoes.

(4) Increase the number of livestock.

(5) Perform some outside work.

(6) Plow up some of the best permanent pasture tillable.

(7) Improve the brush pasture by clearing and re-seeding with some Japan and sweet clover if necessary.

(8) Increase crop yields if below the average.

(9) Increase egg production per hen.

This does not mean that all farmers in this area will be able to use all of these methods. For instance, more land may not be available. Therefore the farmer with a small acreage would have to increase his business by other methods, such as increasing the number of chickens and egg production per hen, growing a more intensive crop as Irish potatoes or sweet potatoes, or performing some outside labor. On the other hand the farmer with a large acreage and small amount of receipts may not be using all of the land. Pasture land may be cleaned up and made more productive in order to pasture more livestock. A part of the rolling and more fertile pasture land can be brought into cultivation, provided the pasture land provides pasture for more livestock than can be fed. On all farms, however, the egg production per hen and crop yields per acre are important methods of increasing the volume of business, provided the increase is produced economically.

Outside labor may not always be profitable on a farm of sufficient size to furnish labor for the operator and his family throughout the year. His spare time can be profitably spent in planning his work and general farm organization, and with a view to improving them. (See Chapter VI, Page 121).

Receipts from Outside Sources.

A majority of the farmers in Overton County receive a part of their income either from labor in some other occupation or from sales of timber. The average farm business is so small that profitable employment cannot be obtained on the farm the year around. Those who have been so fortunately situated as to obtain outside work have increased their labor incomes.

That receipts from these sources have an important place in the agriculture of this section surveyed is indicated by the fact that 29% of all receipts are derived from them and that 75% of all farmers receive a part of their income from them. However this area does not have as high percentage as other areas in the county as will be shown.

Table 55. Distribution of Receipts from Outside Sources.

	No. farms. reporting	Total	Average per farm.	Percentage of total.
Forest Products*	17	5139	302	53.3
Man labor	21	2948	140	30.7
Man and team labor	11	1473	134	15.3
Machine labor	2	31	16	.3
Cash rent	1	46	46	.5
Total	37**	9635	260	100.0

37 farmers out of 50, or 74% of the total number, reported receipts from sources other than the farm. In other words, 3 out of every 4 farmers were deriving a part of their income from these outside sources.

The receipts from the sale of forest products which was $302 per farm represented 53.3% or over one-half of the total receipts from other sources.

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*Two farms reported $3760 of the total receipts from forest products. If these farms were only credited with $200 each and the remainder deducted from the total of $5139, there would be only $1779 total receipts from wood.

**This is not a total of this column, since some farmers reported receipts from more than one source.

Receipts from man labor was the next in importance with an average of $140 per farm or 30.7% of the total receipts. 21 farms reported receipts from this source, which is a further indication of its importance as a supplement to the farm receipts.

11 farmers reported team labor. This averaged $134 per farm or 15.3% of the total receipts.

Machine labor and cash rent were minor sources of receipts, bringing in a total of only $52 or less than 1% of the total receipts.

A total of 34 farmers performed some outside work (including team work) for which they received a total of $4550.

1. Outside Labor.

Table 56. Size of Farm and Receipts from Outside Labor Related to Labor Income.

	Number of Farms.	Labor Income.
Farms above the average in size without receipts from outside labor	15	$47
Farms above the average in size with receipts from outside labor	9	-101
Farms below the average in size without receipts from outside labor	9	-101
Farms below the average in size with receipts from outside labor	18	-35

The operators on the larger farms who did not work out made a labor income of $47, while those on the larger farms who did work out made a labor income of $-101, or $148 less.

On the other hand the operators on the smaller farms who had no receipts from outside labor made a labor income of $-101, as compared with $-35 labor income of the operators on the smaller farms who did work out.

Farmers on the smaller farms with outside labor receipts were making more

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Adjusted labor incomes used - except where outside labor was noted.

money or rather losing less than were those with no outside labor receipts. On the other hand the farmers on the larger farms, with no receipts from outside labor were making more money than those with receipts from outside labor.

However this does not mean that all farmers on the larger farms should not do some outside work when possible. Of the 12 large farms that returned a labor income of $47, with no outside labor, 7 had an average loss of $72. The other 5 large farms with no outside labor made an average labor income of $400 by a more efficient planning and operation of their business. This is indicated by their average receipts of $920 as compared with the average for all farms of $374, (2) by a greater value of family living from the farm of $510 as compared with $453 for the average, and (3) lower ratio of expense to receipts.

Definite information was not collected on all farms as to the kind of occupations in which these farmers were engaged. The following is a list of the occupations as reported: merchant, butcher and packer, lawyer, doctor, timber contractor, day laborer on farms, carpenter, saw milling, timber cutting, laborer on public roads.

That this area is not representative of all sections in the county in that some communities have almost 100% of the farmers engaged in other occupations, is shown in the following table:

Table 57. Financial History of Farmers in a Community in Eastern Part of Overton County.

Farm No.	Age	Inheritance	Owner or Tenant.	Other occupations	Present Worth
1.	35	0	T	Day laborer and moonshining.	$100
2.	73	0	T	Day laborer	300
3.	42	$20,000	O	Logging and sawmilling	17,000
4.	43	0	T	Day laborer and clerk	300
5.	45	0	T	Day laborer and coal miner	500
6.	55	25,000	O	Mail carrier and teamster	25,000
7.	28	1,000	T	Mail carrier, merchant, teamster	1,000
8.	50	2,000	O	Day laborer and teamster	2,000
9.	53	0	O	Day laborer, coal miner, teamster	2,000
10.	55	2,000	O	Day laborer and teamster	2,000
11.	55	500	O	Teaming and logging	1,500
12.	56	0	O	Teaming, mining, day laborer	1,500
13.	60	2,000	O	Day laborer	2,000
14.	30	0	T	Day laborer	200

(continued on next page)

(Table 57 continued)

Farm No.	Age	Inheritance	Owner or Tenant	Other Occupations	Present Worth
15.	30	$0	T	Day laborer	$ 200
16.	65	0	T	Day laborer	400
17.	50	0	O	Logging, saw milling, merchant	10,000
18.	50	0	T	Day laborer	200
19.	80	0	O	Too old	5,000
20.	60	8,000	O	Merchant and teaming	4,000
21.	75	10,000	O	Trade in timber and operates coal mine	100,000
22.	33	0	T	Day laborer and grist miller	600
23.	70	0	T	Minister, blacksmith, and carpenter	300
24.	62	0	T	Merchant, day laborer, teamster	2,000
25.	35	0	T	Day laborer	200
26.	35	0	T	Day laborer, blacksmith, saw mill operator	800
27.	75	0	T	Day laborer	600
28.	35	0	T	Day laborer	300
29.	42	0	T	Day laborer and saw mill operator	800
30.	48	0	T	Day laborer	600
31.	80	2,000	O	Day laborer	2,000
32.	50	0	T	Day laborer, coal miner, teamster	500
33.	45	0	O	Day laborer, teamster	2,500
34.	45	0	T	Day laborer, teamster	600
35.	47	500	T	Day laborer, teamster, moonshiner	1,000
36.	68	1,000	O	Teamster	1,000
37.	25	0	T	Day laborer, teamster,	300
38.	65	0	O	Day laborer, timber sales, family out	3,000
39.	40	1,000	O	Day laborer, teamster, timber sales	2,000
40.	30	200	T	Day laborer, teamster	500
41.	53	0	T	Day laborer, and family labor	600
42.	53	200	O	Day laborer, family labor	1,000
43.	68	6,000	O	Money lender	8,000
44.	32	800	T	Teamster	1,000
45.	46	800	O	Day laborer, teamster	2,000
46.	50	1,000	O	Day laborer, teamster, family labor	2,000
47.	42	1,000	O	Teamster, saw mill operator	4,000
48.	60	0	T	Day laborer, family labor	200
49.	55	1,000	O	Teamster, merchant	8,000
50.	46	1,000	T	Teamster, miller	1,500
51.	75	1,000	O	Miller, increase in value timber land	10,000
52.	75	500	O	Stock buyer, timber sales	5,000
53.	45	200	T	Teamster	1,000
54.	40	200	T	Teamster	1,000

It is noted that every man, with the exception of one man who was too old to work, engaged in some outside work. Unfortunately the exact amount received per year from these outside occupations is not available but they gave part time employment to man and team during times when not busy with farm work.

This community has an advantage over other areas in that it is near the coal mines which furnishes employment for several men of this community.

It is noted that no man has accumulated money by farming. Those who have

accumulated $1000 and over have done so by working at the following occupations: (1) day laborer and teamster, (2) day labor and family labor, (3) trading in timber, (4) mine operator, (5) merchant, (6) stock buyer, (7) teamster, (8) increase in value of land, (9) increase in value of timber, (10) lending money, (11) and inheritance. The less important of these are the day laborer and teamster who accumulated only about $1000.

Although the majority of these farmers have not accumulated much money, with the exception of the cases noted above, there has not been a case of bankruptcy.

Many of the occupations in the two sections of the county noted above are based on the timber industry which may greatly diminish in importance in the future.* Road construction which has furnished many with labor is not only confined to small areas but cannot furnish labor indefinitely, except for maintenance purposes.

So one cannot expect every farmer to be able to get employment in other occupations. If their farms are too small to return a reasonable income they will either have to move to industrial sections, rent or buy more land, or be contented with a low standard of living.

However, employment secured nearby, when possible, fits especially well into the scheme of farming on small farms. This employment furnishes a large part of the cash receipts while the farm furnishes a place to live and the greater part of the family living.

2. Family Living from the Farm.

The early history of Overton County indicates that the farmers were largely self sufficing.** This is true to almost as great extent at the present time. On the average farm the farming business is mainly a family proposition. The labor is performed in most part by members of the family in return for which they get the greater part of their necessities in the way of food, fuel, and shelter.

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* Chapter II, Transportation, Page 37.

**Chapter I, Page 2.

The importance of this source of income is indicated by a comparison between the average value of the family living from the farm and the average gross receipts per farm.

Table 58. Total Receipts from Farm Compared with Value of Family Living.

	Total	Livestock and Products	Crops	Rent and Fuel
Average receipts per farm	$374	$234	$140	-
Average value family living per farm	453	228	135	90

The average family receives a total of $453 family living from the farm as compared with $374 received from the sale of crops, livestock, and livestock products. In other words the actual cash receipts are about 17% less than the total value of all family living from the farm, including house rent and wood for fuel.

On the other hand the value of family living received from crops, livestock, and livestock products, alone, is $361, which is $13 less than the cash receipts from these sources. However the average farm family uses approximately as much produce from the farm as is sold.

The following table will show the value of all farm products used by the family, as compared with the total receipts from the sale of these products.

Table 59. Value of Farm Products Used by the Family Compared with Total Receipts.

Kind of product.	Value of Products Used by Family	Total Receipts.
Milk and butter	$6,724	$171
Pork	3,784	2,179
Poultry and eggs	1,944	6,211
Beef	36	2,635
Truck Crops - including orchard	4,317	612
Corn	1,006	2,247
Wheat	289	377

* Includes sale of both beef and dairy cattle.

Such products as milk, butter, garden and orchard products are almost exclusively used by the farm families. Only $171 was received from the sale of milk and butter, which was only 1/30 as much as was used by the family. $612 was received from truck and orchard crops as compared with $4317 used by the families.

More grain crops were sold than used by the families. Approximately one-half as much corn and two-thirds as much wheat was used as was sold.

Almost twice as much pork was used by the families as was sold. On the other hand only $35 worth of beef produced on the farm was consumed by the farm families as compared with $2535 received from the sale of cattle.

Table 60. Relation of Family Living from the Farm to Labor Income.

	Number Farms	Value per Farm	Labor Income
Farms having highest value	25	$582	$ -177
Farms having lowest value	25	323	-99
Farms having highest value	10	705	-198
Farms having lowest value	10	268	-58
All farms	50	453	-108

The 25 farms that received the highest value of family living from the farm made $-117 labor income, or $18 less than the farms that received the lowest value.

When the 10 highest farms and the 10 lowest farms were taken a greater difference was shown. The former received $705 family living, returning $-198 labor income, while the latter received only $268 but returned a labor income of $-58 of $140 more.

Table 61. Labor Income Related to Value of Family Living from the Farm

	Number Farms	Family Living
Farms having highest labor income	25	$421
Farms having lowest labor income	25	486
Farms having highest labor income	10	417
Farms having lowest labor income	10	584

When the farms were divided according to labor incomes, as in the above table, approximately the same results were noted. The farms having labor income above

the average received $421 worth of products from the farm for family use, which was $65 less than was received by the farms that had labor incomes below the average. The 10 farms having the highest income received $417 as compared with $584 received by the 10 farms having the lowest income.

Table 62. Size of Family Related to Value of Family Living.

	Number Farms	Size per Farm.	Total Value per Farm.	Total Value per Person.
All Farms	50	5.7	$453	$80
Farms with largest families	25	7.2	475	66
Farms with smallest families	25	4.2	432	103

The average size of families living on the 50 farms, exclusive of hired help, is 5.7 persons. Each family received a total of $453 family living from the farm, including wood for fuel and house rent, or an average of $80 per person per year.

When the farms were divided into two groups of 25 farms each, the group with the largest families received $475 living from the farm, or an average of $66 per person. On the other hand the group of farms with the smallest families received $432 living from the farm, or an average of $103 per person.

The higher family living per capita for the smaller families is partly due to the larger amount received from rent and fuel per capita. This is shown in the following table.

Table 63. Family Living from Food and Rent, etc., in Different Size Families.

	Food.		Rent and Fuel.	
	Total Value	Value per Capita.	Total Value	Value per Capita.
Farms with largest families	$366	$54	$92	$12
Farms with smallest families	345	82	84	20

The smallest families received $20 from house rent and wood for fuel, as compared with $12 received from the same sources by the larger families. It is noted on the other hand that the total values of the two groups is approximately

the same. It is obvious that in the smaller families the rent will be distributed over a fewer number, thus lowering the amount per capita.

The smallest families received $82 per capita from the farm from crops, livestock, and livestock products, as compared with only $54 received by the largest families. In other words, the smaller families are consuming more food from the farm per person than are the larger ones.

Table 64. Per Capita Consumption of Products Raised on the Farm.

Kind of Product.	Quantity per year.	Quantity per day.
Pork - pounds	90	.25
Milk - quarts	332	.90
Butter - pounds	30	.08
Eggs - number	166	.40
Poultry - number	4	-
Beef - pounds	1.5	-
Corn meal - bushels	3.5	-
Potatoes - bushels	1.8	-
Wheat - bushels	.7	-

Each person consumes on an average of 1 pound of pork every 4 days; approximately 1 quart of milk per day; 1 pound of butter every 12 days; 1 egg every 2½ days; approximately 1 pound of meal every 2 days; and 1 pound of potatoes every 3 days. 0.7 bushels of wheat, or approximately 28 pounds flour was consumed per capita from wheat raised on the farm.

The fact that the value of family living from the farm exceeds the total receipts from the farm is sufficient evidence of its importance in the scheme of farming in this area.

Farmers that received less family living from the farm than the average farmer made a higher income than did those who received more family living than the family living should be limited in order to make a better labor income. It does mean that some families are limiting the amount of produce consumed from the farm

in order to increase their receipts. Even then the receipts on some of these farms is not sufficient to pay all expenses, including interest on investment, as was shown by their income of $-58.

That farmers may have a large labor income and yet be above the average in the value of family living from the farm is shown by a study of two farms in this area. One farmer received $857 family living and made a labor income of $1047. The other farmer received $555 family living and made a labor income of $567. These farmers are above the average in both family living from the farm and labor income.

That the amount of produce the family receives from the farm for food should be increased is indicated by the fact that one-sixth of the farmers received less than $300 each and that one-half of the total number received an average of only $323 from this source, or less than $1 per day. Furthermore, the average farmer had only $245 with which to pay taxes, interest, clothing, and other family necessities.

For these reasons every farmer should (1) have at least one good producing cow, (2) raise enough hogs to supply the family with meat, (3) have a garden that will supply an abundance and variety of vegetables throughout the year, (4)have a small orchard of apples, peaches, pears, cherries, strawberries, grapes, and any other fruits the family may desire, (5) have a flock of chickens of sufficient size to supply the needs of the family for eggs and meat.

Chapter VII.

Examples of Successful and Unsuccessful Farms.

Labor incomes varied widely on the farms studied in Overton County, Operators on a few farms made from $500 to $1000 labor income while many others failed to make a profit, some losing as much as $400 to $500.*

The question may arise as to why a few farms were more successful than others since they were being operated in the same general section, on similar soil type, and had the same transportation and marketing facilities available. The purpose of this chapter is to analyze the situation as it exists on each farm, and to point out the reasons for the success or failure in each case.

A total of six farms are analyzed. Four of these are farms on which general farming is practiced, and are representative of the large majority of farms in the county. The other two farms are examples of specialized farming.

Successful General Farm Number 63.

That some farmers doing general farming are making money in Overton County is shown by the analysis of the farm business of farm No. 63 in the accompanying table.

This farmer operated a farm of 100 acres, 48 acres of which are in cultivation and 21 acres in tillable pasture which is supplemented by 15 acres of woodland pasture. There are no acres lying idle. All of the pasture land is being utilized by 10 animal units, which is about 1 animal unit to each 3 acres of pasture, considering the woods pasture as being one-half as valuable as the permanent pasture tillable.

He has a good volume of business as indicated by the gross receipts of $2045, from which he received $1047 as a return on labor. The receipts were as

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*Labor Income is the amount left for the operators labor after all expenses and interest on the investment is paid.

follows: hay $840, or 42% of the total; poultry $417, or 20%; corn $250, or 12%; increase in feed and supplies $245, or 12%; hogs $149, or 7%; cattle $140, or 7%; and sheep $4, or less than 0.1%.

This large volume of business was made possible largely by good crop yields of both hay and corn. The former yielded 1¼ tons per acre, and the latter 33 bushels per acre, which was from two to two and one-half times the average yields in the county. In addition to the larger yields this farmer was cultivating 47 acres in these two crops, 18 of which was in corn and 29 in hay. This was 12 acres above the average acreage in cultivation on the other farms studied.

Table 65. Summary of the Business on a Profitable Farm. No. 63

Total acreage	100	
Crops		48
Tillable pasture		21
Woods pastured		15
Woods not pastured (includes waste 1 acre)		16
Capital (dollars)	7091	
Real estate		6000
Livestock		528
Feed inventory and cash		320
Machinery		243
Crops	48	
Corn (acres)		18
Hay (acres)		29
Garden (acres)		1
Receipts (dollars)	2045	
Corn		250
Hay		840
Poultry		417
Hogs		149

Table 65 (continued)

Summary of the Business on a Profitable Farm. No. 63 (continued)

Receipts (dollars) continued		
Sheep		4
Cattle		140
Feed increase		245
Expenses (dollars)	668	
Labor		300
Feed and fertilizer		46
Miscellaneous		46
Decrease on horses		5
Auto		50
Taxes		45
Depreciation and repairs		176
Farm Income (dollars)	1377	
Interest on investment (dollars)	355	
Labor Income (dollars)	1022	
Credit by adjustment of tax and investment on woods*	25	
Total net labor income	1047	
Family living from the farm		657

That these yields were secured economically is indicated by the ratio of the expense to receipts. For every $100 of receipts there was only $33 paid out for expense. In other words, only one-third of the receipts were spent for actual cash items, family labor, and depreciation on buildings and equipment. This is quite a contrast to the average farm which spent $101 for every $100 received.

These receipts were obtained with a capital of $7091. This is quite a contrast to the unsuccessful large farm which had receipts of only $805 with an in-

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*Since no receipts were received from sale of timber for that year the farm was credited with the tax and interest charge on the woodland area.

vestment of over $9000. In other words, the profitable farmer received approximately $300 for each $1000 invested as compared with a receipt of less than $100 for each $1000 invested on the unprofitable farm. It is obvious then that the overhead expense, on taxes and interest, per unit is less on the more profitable farm than on the unprofitable farm.

The profitable farmer further controlled his expense by the efficient use of horse labor. Two horses cultivated 48 acres, or one horse was used for each 24 acres. There would of course be an advantage in having three horses in such work as discing, and at the time when hay needed to be cut and corn to be cultivated but the acreage would need to be larger to warrant keeping a horse for that extra work.

It is significant to note that this farmer was not dependent on one source of receipt for his income. Instead he had five sources, not including sheep, which returned only $4, and the increase in inventory. While hay and corn were the major sources, livestock returned a little over one-third of the receipts. Had feed crops been low that year he would have been able to make a reasonable income from the sale of livestock and livestock products, especially from poultry. For that year, however, feed crops were unusually high. Corn sold for $1.25 per bushel and hay $30 to $35 per ton. This farmer was in position to take advantage of this favorable local market situation. On the other hand these favorable prices will not only likely be lowered but the local demand for feed is rather limited. (See page 40)

The land is being kept in a fair state of fertility as indicated by the higher average crop yields. This is being done without a large expenditure for fertilizer, since only $25 was spent for this purpose.

The system of crop rotation and the use of manure from 14 animal units is maintaining this fertility. His system of rotation, hay 3 years and corn 1 year, furnishes a sod to be turned under for corn each year. Some lespedeza is grown as a hay crop. This legume is not only a good hay crop but is one of the best soil improving crops for this area. (See page 73 on crops)

In addition to the income of $1047 this farmer received for his labor $657 in family living from the farm. This was distributed as follows: garden $75, fruits and berries $19, pork $64, chickens $15, butter $62, whole milk $90, eggs $30, or a total of $367 for food, wood for fuel $40, and house rent $250. With the family of four persons this was an average per person for food of $92, for fuel $10, and for house rent $62.

Successful General Farm No. 76.

This farmer operated a farm of 115 acres, of which 50 acres were in cultivation, 7 acres lying out, and 36 acres in pasture of which 26 acres were in woods pasture. 20 acres was rented out which was not included in the total acres operated.

The total receipts on this farm amounted to $1193, of which $618 was from crops, $542 from livestock, and $33 from increase in feed inventory. This was a sufficient volume of business to return a labor income of 56.7, since the ratio of expense to the receipts was relatively low. For every $100 received there was only $32 paid out.

His business was diversified as is shown by the following sources of receipts: corn $125, hay $395, apples $100, poultry and eggs $290, colts $75, cattle $55 (including breeding fees from bull), hogs $152. He was getting receipts from three different crops and four different classes of livestock.

His capital of $5230 was sufficient for the economical operation of this farm. The interest on the investment was only about one-fifth of the gross receipts as compared with farm No. 79, which had an investment charge equal to more than one-half of the receipts.

He was able to control his household expense by having a living from the farm far above the average farm. This was derived from the following sources: milk and butter $240, eggs $13, pork $75, chickens $12, meal $18, and garden $120, making a total of $488.

Table 66. Summary of General Farm No. 76

Acreage, total	135	
Rented out for corn 1/3 share		20
Crops		50
Tillable land lying out		7
Pasture tillable		12
Woods pastured		26
Woods not pastured		20
Capital (dollars)	5232	
Real estate		4000
Livestock		681
Machinery and equipment		396
Feed and supplies		55
Cash to run the farm		100
Crops: acres	70	
Corn (acres)		39
Hay (acres)		29
Orchard (acres)		1
Garden (acres)		1
Receipts (dollars)	1193	
Crops		618
Livestock		542
Increase in feed and supplies		33
Expense: (dollars)	383	
Labor (dollars)		145
Depreciation and repairs (dollars)		62
Feed (dollars)		12
Seeds and fertilizer (dollars)		68
Taxes (dollars)		48

Table 66 (continued)

Summary of General Farm No. 76 (continued)

Expense: (dollars) continued-		
Auto for farm use (dollars)		20
Miscellaneous (dollars)		28
Farm income (dollars)	810	
Interest on investment (dollars)	261	
Labor income (dollars)	549	
Credit by adjustment on tax and interest (dollars)	18	
Total net labor income	567	
Family living from the farm (dollars)	555	

Unsuccessful Large General Farm No. 79

The operator of this 160 acre farm was not using his land very efficiently. 10 acres were lying idle. 90 acres were in pasture, on which there were only 15 animal units during all the pasturing season. In addition, however, four work horses had the run of this pasture approximately one-fourth the time. In other words, there was approximately 6 acres of pasture per animal unit, whereas about 3 acres of average pasture is sufficient per animal unit*. This does not mean however that the animal units should be doubled. Some of the better part of the pasture may be needed to grow more crops.

The volume of business is too small to return a profit with such a large investment of over $9000. The total receipts of $805 is more than used up by the labor expense of $385 and interest on investment of $451. Expenses other than interest on investmentment amounted to $120 for each $100 of receipts. This is of course too high. The expenses should not be over $40 per $100 of receipts. On the other hand, there is not much chance to decrease these expenses. It is mostly a matter of increasing the size of business in order to lower the overhead cost per unit. This can be done by (1) increasing the number of animal units, preferably steers, to better utilize the pasture, (2) cultivating idle land and

* Farm Management - by G. F. Warren.

possibly the better part of the tillable pasture land, (3) addition of a cash crop, (4) increasing number of poultry.

Both man and horse labor was used inefficiently. Four horses were used to cultivate 50 acres, while 2 horses could have done the work. Approximately $200 was lost from this source*. Also there were only 112 productive work units per man per year, which is much too low. There should be at least 125 productive work units per man.

The cropping system of corn and hay which requires most of the work to be done within a period of about three months, is mainly responsible for this inefficiency in the use of labor.

Table 67. Summary of the Business on an Unsuccesful Farm No. 79.

Total acreage	160	
Crops		50
Idle land tillable		10
Pasture tillable		78
Pasture not tillable		12
Waste		10
Capital	$9037	
Livestock 20.5 units		$1482
Machinery and equipment		330
Feed and supplies (inventory)		375
Cash to run the farm		100
Real estate**		6750
Crops	50	
Corn		16
Hay		33
Garden		1
Receipts	805	
Cattle		313
Colts		40

* Cost of keeping a horse per year. Chapter V, I p 115

** Woodland was not considered in these calculations. Adjustments were made for taxes and interest as shown in Appendix, P

Table 67 (continued)

Summary of the Business on an Unsuccessful Farm No. 79 (continued)

Receipts (continued)		
Hogs		$ 190
Poultry		112
Increase in feed		150
Expenses:	$ 966	
Labor 9½ months		$ 385
Fertilizer and seeds		86
Insurance		38
Tax		180
Depreciation and repairs		158
Miscellaneous		59
Decrease on livestock		60
Farm income	$ — 161	
Interest on investment	451	
Labor income	— $12	
Family living from the farm	582	

During 1925 the most profitable farms, as a whole, sold some crops. This farm had no receipts from crops, except from increase in inventory at the end of the year. It is usually better to have some crops for sale. If only enough feed is grown for the livestock in an ordinary crop year, it would probably be necessary to purchase feed at high prices in a year of a crop shortage.

Approximately 400 bushels of corn and 23 tons of hay were fed to livestock. At the market price of $1.10 per bushel for corn and $30 per ton for hay their value was $1130 for which only $865 was received from sales and family living.

This does not mean that livestock is always unprofitable. It does mean that on an average the farmer that has some crops to sell will profit more than those feeding all their feed crops to livestock, especially in a year of unusually high prices for feed.

The profits were affected to a small extent by the quality of the business. The egg production was only 40 per hen, as compared with a state average of 66. While the flock on this farm is small, there is a loss from this source. The production could at least be doubled with very little added expense. Two cows produced 300 pounds butter and 500 gallons of milk. While this is about the average for the county, one good cow well fed and cared for would produce this quantity of both products with little more expense than is necessary to maintain one cow. On the other hand the crop yields are above the average. Corn produced 30 bushels per acre and hay approximately one ton.

This farm ranked higher than the average in family living from the farm, which amounted to $582, or about $145 per person. This amount lacks about $30, however, of being equal to the amount lost during the year.

Unsuccessful Small General Farm No. 64.

This small farm returned only $25 for the operator's labor. Should the farm have been credited with interest and taxes on the woodland from which no receipts were reported the labor income would have been only $35, or only about $3 per month.

Small size of the business is the principal factor affecting profits on this farm. Both the acreage in cultivation and the gross receipts are small. With receipts of only $154 for the year, a reasonable income could not be expected even though there were no expenses.

Associated with the small volume of business is the small capital invested. This capital of $720 is probably as large as it should be under the circumstances. On the other hand no farmer could make a reasonable income with a capital of this size. But with an increase in the amount of capital there must be an increase in the volume of business.

Neither man labor, horse labor, or machinery can be used efficiently on a farm with only 19 acres in cultivation, most of which is in corn, a crop requiring labor during only a few months of the year. Only 8.5 acres were cultivated per horse. Although the entire time of the operator was spent on the farm, only

120 productive man work units were required to grow the crops and care for the livestock. In other words, since no outside labor was performed the operator was engaged in productive work approximately only 2/5 of the time. With such a small acreage it would not be profitable to invest money in modern machinery, which is necessary for efficient and economical work. The cost per acre would be too great to warrant such an investment.

There was 11 acres or approximately one-fifth of the tillable land lying out. The size of his business could have been increased to some extent by either cultivating this acreage or using it for pasture. Probably using it for pasture would be profitable since no pasture was reported for the use of his livestock.

Crop yields are extremely low. Corn produced 11.5 bushels per acre; Irish potatoes 16 bushels per acre; and sweet potatoes 54 bushels per acre. This is due to low soil fertility caused by the one crop system.

The family living from the farm amounted to $323, or about $55 per person. This is about $20 per person less than was received by the average farmer. On farms with such small gross receipts as on this farm this part of the farm business should be especially emphasized. Since this farmer had only $61 left for paying interest on investment and buying household necessities he is more than ever dependent on farm products to furnish a living for the family.

The business was diversified, but the receipts from the five different sources were too small to return a reasonable income. It is significant, however, that $96, or 63% of the total receipts was obtained from poultry.

Table 68. Summary of Business on Unsuccessful Farm No. 64.

Acreage:	57	
Crops		19
Tillable land lying idle		11
Woods and waste		27
Capital	$720	
Farm		600
Machinery		25

Table 68 (continued)

Summary of Business on Unsuccessful Farm No. 64 (continued)

Capital (continued)		
2 Horses		50
1 Cow		25
1 Calf		10
5 Hogs		49
20 Chickens		9
Crops		
Corn		17
Potatoes		1
Garden		1
Receipts	$154	
Corn		$20
Livestock		134
Expenses	$93	
Farm income	61	
Interest on capital	36	
Labor income	25	
Family living from the farm	323	

Specialized Purebred Livestock Farm

One of the most successful farmers in this area was deriving the largest part of his income from the sale of purebred beef cattle. He was one of the two farmers that made a labor income of over $1000 during 1925. This income is all the more remarkable since the average farmer lacked $108 paying all expenses, including depreciation and interest on investment.

This farmer began breeding purebred livestock about 10 years ago. This was during the World War period which was characterized by inflated prices of all farm products, especially the prices of purebred livestock. This was a time when the majority of the older breeders were greatly increasing their herds

and many others were going into the business on a large scale due to the impetus of high prices. In contrast to this the operator of this farm began his purebred business with only a few head of cattle. Consequently he was not affected by the depression immediately following the war, which caused bankruptcy of many purebred breeders.

From this modest beginning the herd has been gradually increased until at the end of the year 1925 it consisted of 33 head of purebred cattle as follows: 13 cows, 9 heifers, 10 calves, and 1 bull.

The high quality of the cattle has been a factor in the success of this breeder. A bull, valued at $1000, which has won first prize at the State Fair at Nashville over bulls from much larger herds, heads his herd. He received an average of $100 for young bulls, $110 for heifers and as high as $250 for cows, during 1925. While these prices are not high in comparison with pre-war prices they are relatively high for conditions at that time, and further indicates the quality of the cattle.

The receipts on this farm are over 10 times as great as on the average farm. On the other hand, this type of farming requires a larger expenditure than the average farm. However, the expense per $100 of receipts is only $41 on this first farm as compared with $101 expenses per $100 receipts on the average farm.

He has had sufficient capital to remain in the business and continue its development. This was an important factor in his success since an ordinary farmer with small capital would very likely have had to quit the business during the period of the depression.

Although livestock is the main source of the farm receipts, there are other receipts which add to his income. They are divided as follows: poultry 1%, sheep 1%, hogs 1%, crops 3%, and increase in feed and supplies 6%. This leaves 88% of the total receipts from purebred cattle.

The following crops were grown: corn for grain 21 acres, corn for silage 30 acres, soybeans and cowpeas 10 acres, alfalfa 5 acres, oats hay 8½ acres, and orchard grass 5 acres. These crops furnished most of the feed consumed by the livestock. Some concentrates, as cotton seed meal, bran, and corn, and small quantities

of roughages, as corn stover and straw were purchased. This expense was only about 5% of the total receipts, and was balanced by a sale of approximately the same amount of feed.

He has no expenditures for advertising. He advertises his cattle by showing them at fairs and at the county seat on court days, etc. This requires no outlay for expenses since his winnings at the fairs pays all expenses. His farm is ideally located near town for showing the cattle either to individuals or to crowds that come to town on these special occasions.

A market for most of his cattle is found in Overton County and nearby counties. Occasionally an animal is shipped longer distances.

Records were kept of all receipts and expenses. This was a practice not followed by any other farmer, except in a few instances in which records were kept of eggs sold.

Specialized Fruit Farm.

This is another example of a specialized farm which made an income for above the average of the other farms studied. This was accomplished by having orchard products, as well as other products, to supply local demands. This is also another example of a farmer who has planned for the future and has been rewarded, even in the early stage of the development of those plans.

This farm of over 200 acres is fairly well adapted to fruit growing. It is located on a table land of the Plateau at an elevation of about 1300 feet. The soil is a sandy loam with a clay subsoil.

At present only 30 acres is occupied by fruit crops, most of which are apples and peaches, with a few cherry trees. One acre is occupied by strawberries and approximately another acre by grapes, currants, gooseberries, and raspberries. The other cultivated land is occupied as follows: corn 25 acres, hay crops 19, potatoes ½, and garden 1¼. The remainder of the land is in permanent pasture tillable and woods. This woodland could be converted into land for growing fruit crops should market conditions justify an expansion of the business.

While fruit is the principal source of income, the operator of this farm is following a system of diversification, as is shown by the percentage each receipt

is of the total receipts: fruits 55%, livestock 39%, and increase in investory 6%. This does not include $331 received from the sale of lumber and wood.

During 1925, strawberries and cherries were the principal source of receipts from fruits, since apples and peaches were almost a failure. There were 10 different sources of income from fruits as follows: strawberries, cherries, peaches, apples, plums, pears, raspberries, gooseberries, currants, and grapes. At no time, therefore, would there likely be an absolute failure of fruit crops, thus almost insuring the operator some income from the orchard crops. However, had there been a fair crop of apples and peaches that year the operator estimated that his income would have been increased at least $800. This would be $400 each year considering a good crop every two years.

Should there be a total failure of fruit crops there will be some income from the livestock as shown above. The principal source of income is from the sale of dairy products and poultry. From 5 cows over 2000 quarts of milk and 200 pounds of butter were sold. The poultry products were consumed at home. However, approximately 40 hens and 35 turkeys were sold, which amounted to about 20% of the total livestock receipts.

Another factor in the success of this farm was the control of expenses. Approximately only 40% of the receipts was used for expenses, which included depreciation and unpaid family labor. While this is not as low as the expense on the two successful general farms it is far below the average of $101 expense per $100 receipts.

The labor efficiency on this farm was above that of the average farm. There were 325 productive work units per man as compared with 173 on the average farm, and 100 productive work units per horse as compared with 62 on the average farm.

Family living from the farm and receipts from timber sales, which were both above the average farms, were other factors in controlling expenses. The total value of the family living from the farm was $517, of which almost $400 was obtained from the garden, livestock, and livestock products.

To date no fruit has been shipped out of the county in car-lots. There has not been a sufficient quantity to warrant such shipments. This farmer has been

able to sell all of his products locally and in nearby towns. However, with more trees coming into bearing, together with a good crop year, the local markets would be taxed to absorb the total production at a reasonable price. He is especially interested in interesting other farmers in fruit growing so that outside markets can be made available through cooperative car-lot shipments.

This orchard has been, in a way, an experiment in fruit growing in this section. Some mistakes have been made as was suggested by the operator himself. There are probably too many varieties of apples and peaches. The production of each variety will be too small for the best marketing in outside markets. However, this is no serious difficulty, since the products are now sold locally.

Chapter VIII.

Summary and Conclusions - Being an Agricultural Program for Overton County.

Efficiency Factors.

1. Size of farms.

(a) The number of improved acres per farm is too small for the best use of either man labor, horse labor, or machine labor. In 1925, according to the Census data, there were only 40 acres of improved land per farm on the average, 1/2 of which were in crops, and 1/2 in pasture and idle crop land.

(b) On a general farm, for 1 man and 1 team there should be at least 40 acres in crops and 25 acres in pasture. Farming this number of acres will supply productive labor for both man and team the greater part of the year, thus decreasing the overhead charges. Also better machinery can be used, and at a lower cost per acre.

(c) The number of crop acres can be increased by:

(1) utilizing idle crop acres,

(2) cultivating the most fertile and level pasture land,

(3) buying more land,

(4) renting more land,

(5) clearing some fertile, level land where available.

2. Volume of receipts.

(a) There is a great need for an increase in the cash receipts on the average farm. On the 50 representative farms analyzed it was found that the receipts from the sale of farm products amounted to only $374. However this was supplemented by $126 from the sale of timber and from outside labor, making a total gross income of $500. To return a net income above all cash expenses, interest, taxes, and depreciation the receipts per farm should be from 3 to 4 times as great as it is.

(b) These receipts might well come largely from poultry and eggs, cream, and sale of calves, and stocker cattle. This should be supplemented by the sale of some of the following products: hay, tree crops, potatoes, strawberries, a few pigs, sheep, some wool, and honey. (See Crops and Livestock in this chapter).

3. Distribution of labor.

(a) Largely because of a cropping system consisting of corn and millet, most of the labor is performed during a few months of the year.

(b) This can be partly remedied by:

(1) growing more small grains for hay or grain,

(2) taking better care of the farm woodland,

(3) marketing timber and nuts,

(4) keeping a few dairy cows where conditions are favorable,

(5) performing more outside labor.

4. Quality of the business.

(a) Crop yields are much too low, in most cases. This is shown by the following yields per acre in 1925: corn 14.8 bus., wheat 7.6 bus., oats 11.0 bus., rye 5.7 bus., and hay 0.6 tons.

(b) Since the farmers with crop yields per acre above the average received the largest incomes it is very important that these yields be increased. (See method of soil improvement in this chapter).

(c) The production per cow and per hen with 318 gallons and 32 eggs respectively is too low.

(d) While it will be profitable to increase crop yields per acre and production per cow and hen, extremely high yields or production would not be most profitable on the average farm.

Family Living from the Farm.

1. With money scarce, each farmer should be as near self sufficing as pos-

sible, producing most of the food used by the family.

(2) There should be an all-year around garden. In addition to early and successive plantings in spring and summer respectively, many products should be grown for late fall and winter use. Approximate planting dates of some of these plants are as follows: late potatoes and corn, July 15; celery transplanted in late July; wrinkled peas, August 1; turnips and late bush beans, August 15; mustard, September 1; radishes and lettuce in cold frames, September 1; and mustard, September 30.*

(3) Each farmer should have an orchard of at least 1 acre. It should contain a few peach, apple, pear, cherry, and plum trees, as well as a variety of small fruits, as grapes, strawberries, raspberries, etc. As far as possible there should be early, medium, and late maturing varieties of each of these fruits. The orchard should be properly sprayed and pruned to increase the production and quality of the fruit.

(4) Each farmer should continue to grow his own fuel supplies.

(5) In addition, each farmer should keep 1 or more good producing milk cows, some chickens for eggs and meat, and 1 or more hogs for pork.

(6) Sorghum should be grown, and some bees kept to supply the family with sorghum and honey and reduce expenditures for sugar.

Crops.

1. Grains.

(a) Approximately 2/3 of the crop area was occupied by corn while small grain occupied less than 3% of the crop area.

(b) The percentage of the area in corn should be decreased to at least 50%. Small grains and vetch for hay should be substituted for part of the decrease.

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*Two Farm Gardens, Agricultural Extension Service Publication Number 145 (Number 11 revised), or Rates and Dates of Planting for Tennessee Farm and Garden Crops, Agricultural Experiment Station Circular Number 11. These may be obtained from the University of Tennessee Agricultural Experiment Station.

(c) Corn should be grown on each farm as the principal grain feed for livestock.

(d) On many of the farms small grains should be grown largely for hay and pasture. Their production for grain is limited in many cases by low yields per acre, limited local markets, and high machinery cost per acre.

(e) On the best land wheat can be produced to supply local markets and for home consumption. (See page 65)

(f) Barley can be grown for feed on fertile land.

(g) Rye should be used largely as a pasture and cover crop, especially on the poorer soils.

(h) Winter oats will be best small grain for hay if seeded early.

2. Hay and forage.

(a) The hay grown at present consists largely of millet, red top, clover, and timothy and oats cut for hay.

(b) There will be a local demand for hay since 15 cars of hay were shipped to Livingston and sold in the county besides what was sold by the farmers in the county.

(c) Enough hay should be produced to supply local market demands and to provide feed for the livestock on the farm. In addition the corn stover should be utilized for "roughing" stocker cattle and idle work stock through the winter.

(d) Legumes for hay, such as lespedeza, alfalfa, sweet clover, and red clover, should be grown on every farm. These crops rank high in feed value for livestock.

(e) Lespedeza should be a constituent of meadow mixtures on all farms, since it will grow fairly well without liming the soil, reseeds itself annually, and gradually improves the soil. However in most cases it should not be sown alone for hay, since unfavorable weather conditions affect it more than other hay crops.

(f) Where possible, a few acres should be limed and seeded to alfalfa or sweet clover. It is very important that the farmer start with only a few acres, possibly 1 to 5 would be sufficient for the first year.*

(g) Red clover, seeded alone or in combination with timothy, can be grown profitably on soils that have been limed. Tennessee seed, of the wilt resistant strain, will give best results. Seed imported from foreign countries is not desirable.

(h) Red top and orchard grass seeded with lespedeza will produce a fairly good crop even where the land has not been limed.

(i) On some farms small grains are found to be very desirable as a hay crop.

(j) Cowpeas and soybeans should be used to supplement the hay crop, or in other words, they should be used largely as a "catch" crop. They may also be planted with corn and "hogged off".

(k) Millet should be eliminated from the cropping system in this county. It is not only a poor feed in comparison to the legumes, but it is also detrimental to soil fertility.

3. Miscellaneous crops.

(a) There is a possibility of growing strawberries for the fountain trade. They would be purchased from the growers and "sugared down". Companies engaged in this work ordinarily pay about $2 per crate. This should be a profitable side line to the farm business, provided arrangements are made in advance to sell them. Klondike variety is best for this purpose.

(b) Irish potatoes may be grown on a commercial scale on the sandy soils in the Plateau section of the county. To be successful farmers should produce the late crop, have a well graded and standardized product, and ship in carlots through a cooperative association. (See page 69)

(c) Sweet potatoes should be grown to supply the local market demands. This

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* Agricultural Experiment Station Circular No. 12, Alfalfa and Sweet Clover Culture, may be obtained from the University of Tennessee Experiment Station, Knoxville, Tennessee.

county ranks high in yields per acre, and this crop could probably be produced on a commercial scale, provided the general price level for sweet potatoes is favorable. At present, however, there is an overproduction of this crop, and prices are low. However, they make good feed for dairy cattle.

(d) In most cases there should be not more than about one acre of each of these miscellaneous crops per farm. In other words, they should be grown only as side lines to the farm business.

Soil Improvement.

1. Since crop yields are very low on most farms in the county there is a great need for improving soil fertility.

2. Lime, legumes, and livestock should be the basis for any soil improvement program. Lime is essential to growing legumes. Legumes increase soil fertility directly by supplying both organic matter and nitrogen.

3. The most important legumes for soil improvement are: lespedeza, sweet clover, alfalfa, and red clover. Lespedeza is of great importance, since it can be grown fairly successfully on acid soils, although succeeding best on soil that has been limed. Soil must be limed for the successful growth of sweet clover, red clover, and alfalfa.

4. There is a great need for cover crops during the winter to add organic matter to the soil, to prevent leaching out of plant food by the winter rains, and to prevent erosion.

5. The hay crops, including small grains and vetch for hay, may very well serve as winter cover crops. Rye should be grown on the infertile soils and crimson clover on the fertile soils when a cover crop is desired for land that is not occupied by any hay crop.

6. There is a possibility of growing rescue grass as a combination cover and pasture crop, on fertile land.

7. It is not desirable, from a labor standpoint, to have all the land in

cover crops, as it prevents fall and winter plowing.

8. Permanent pasture land should be improved by clearing brush, and applying about 200# acid phosphate per acre. If reseeding is necessary a mixture of lespedeza, red top, orchard grass, and white clover should be used. Bluegrass should be added to the misture, if the land can be limed where this is needed.

9. Conservation of barnyard manure is badly needed. The average farmer is getting only 2 to 3 loads per animal unit, whereas one of the most successful farmers gets 5 loads per animal unit. Manure adds both plant food and organic matter to the soil.

10. The infertile places in the fields should receive special attention. They should be made equally as fertile as other parts of the field by a more liberal application of manure and other material that add organic matter to the soil.

11. If land is limed and legumes grown, only 16% acid phosphate fertilizer is needed for grain and hay crops. Not less than 200 pounds per acre should be applied.

12. On many poor soils it will be profitable to use a complete fertilizer. (See page 73)

13. Lime can be obtained either by crushing the limestone rock, or by burning lime kilns. Farmers can obtain it cheaper by either of these methods than they could by shipping it in. In other words, the least cash expense method should be used.

Crop Rotations.

1. There is a great need for better crop rotations, since approximately one-half of the farms studied reported rotations without either any perennial hay crop or any cover crop. Furthermore, 4% of the farmers reported corn alone and 8% reported only corn and small grain. This, of course, is neither conducive to soil improvement, soil maintenance, or the best livestock feeding.

2. The following rotation is one especially adapted to a general farm that in unlimed:

1st year - corn

2nd year - vetch and small grains for hay (preferably oats or wheat).

3rd and 4th years - hay (red top, orchard grass, and lespedeza).

The corn should be cut and shocked. This land should then be disced and seeded to small grains and vetch for hay. Orchard grass and red top should be seeded with the small grain, while the lespedeza should be seeded in the early spring.

3. This rotation is also adapted to limed land. However, either alfalfa, sweet clover, or red clover should be grown on such land, rather than following the rotation mentioned above.

4. If the small grains are to be used for grain alone the vetch should be omitted in the above rotation.

Livestock and Livestock Products.

1. Since livestock consumes large amounts of feed that could not otherwise be marketed, produce manure for soil improvement, distribute the cash receipts and man labor more equally throughout the year, they have an important place in the agriculture of this county.

2. Ordinarily it will be more profitable to sell some feed than to feed it all to livestock. The most successful farmers were following this practice.

3. The number of livestock cannot be increased extensively since the farms are already moderately stocked. Special attention should therefore be given to increasing the production per unit by better feeding and breeding methods.

4. Where possible, either community or county cooperative purebred breeding associations should be organized. If this is not possible at least a purebred boar and a purebred bull should be owned by individual farmers in each community.

5. (a) Livestock in this county is now marketed mainly through local buyers. The method could very likely be improved by the organization of a Cooperative Livestock Shipping Association.

(b) The success of such an organization would depend largely on (1) producing livestock of good quality, (2) producing in sufficient quantities to ship in car-load lots, and (3) whether or not the local buyers are now paying a fair price.

6.(a) Poultry should receive especial attention on each farm, since they now provide 1/3 of the total farm receipts; have a very high efficiency in the use of feed; have a high price per pound in comparison with other farm products; and distribute the farm receipts more equally throughout the year.

(b) There should be at least 100 hens on the average farm.

(c) A standard breed should be selected for the county, preferably one of the American breeds.

(d) The poultry should be comfortably housed, and well fed.

(e) The following ration will be relatively cheap and give good results:

(1) Corn, or corn and wheat in equal parts, for grain.

(2) A mash mixture of 300 pounds bran and shorts, 100 pounds yellow corn meal, 100 pounds meat scrap, 3 pounds fine salt and 6 pounds fine charcoal.

The grain and mash should be fed in about equal parts. Skim milk should be fed when it is available.

(f) Especial attention should be given to marketing well graded eggs. They may well be marketed through the Livestock Shipping Association, or shipped direct to commission men in the large cities, or sold to hotels, restaurants, etc.

7.(a) Dairying cannot be engaged in on an extensive scale in this county, largely because of small farms, but every farmer should have one or more good cows, each of which will produce at least 4000 pounds of milk, and raise a good calf for sale.

(b) Farmers near the improved roads should sell cream. It can be hauled to the creamery or to the shipping point by trucks that operate on the main highways.

(c) Farmers operating small farms with limited pasture will often find it more profitable to sell the calves at 6 to 8 months of age. Others will sometimes find it more profitable to keep them until 1 to 2 years old in order to utilize rough feed and pasture.

(d) A farmer with as many as 5 cows can afford to sell one and buy a cream separator. He will get as much cream from the four cows by using the separator as he did from the five cows, without the separator.

(e) Ordinarily it will be more profitable to feed calves skim milk rather than whole milk.

(f) Farmers should continue with the grade cows they now have. A purebred bull should be used in grading them up. Good milk producing cows can soon be developed by this method, if especial attention is given to selection of heifers from high producing cows, and if the producing cows are fed legume hays, with a liberal amount of concentrates, consisting of corn and cob meal, bran and shorts, and cotton seed meal.

8.(a) According to the survey only 1 out of 2 farmers had a brood sow in 1925, and a few did not fatten any hogs.

(b) Each farmer who can have some pasture should keep at least one brood sow, from which two litters of pigs should be raised annually.

(c) Each farmer should fatten enough hogs for his home use. In most cases the surplus pigs should be sold when they weigh about 75 pounds. There should be no difficulty in obtaining a market for these pigs in the counties where corn is produced more economically.

(d) Farmers should continue to use the sows they have. These should be graded up by the use of purebred boars.

(e) There should be 1 acre of pasture for each sow and litter of pigs.

This may well consist of either rape and oats, rape alone, or a mixture of rape, red clover, alfalfa, and sweet clover.

9.(a) A few farmers that have good brood mares should raise some good mule colts. They will be in demand because (1) there are not enough colts being produced at present to maintain the supply of mules, (2) apparently mules will not be very extensively displaced by the tractor for farm work in this area, and (3) mules are gradually displacing horses for farm work in Overton County now.

(b) There should be one or more good jacks owned cooperatively or by some individual farmers, centrally located in the county so that they will be available to farmers in all parts of the county.

10.(a) Although sheep raising has rapidly decreased since 1890 due largely to disease, and to sheep killing dogs, farmers with plenty of pasture should keep from 6 to 12 sheep each. They should guard especially against overstocking.

(b) Small grains and vetch should be utilized as winter pasture. This can then be cut for hay. On the average there should be 1 sheep for each acre of small grains.

(c) Sheep probably should be marketed as feeders or breeders to the richer agricultural counties, instead of being finished in the county as spring lambs or fat sheep.

(d) Each farmer with 6 to 12 ewes should have a purebred ram. However the ram could as well serve 20 to 25 ewes. There is a possibility of having a cooperative arrangement whereby 2 or more farmers may use the same ram.

(e) The wool should be sold through a cooperative wool pool.

11.(a) Bees should be one of the most profitable and pleasurable side lines on farms in this area. Such factors as climate, abundance and variety of pollen and nectar producing flowers, and an under-production of honey in the state, are favorable to beekeeping in this area. Furthermore bees provide a source of cash receipts; and also honey for home consumption at a very little expenditure of either money or labor.

(b) There should be a few hives of bees on every farm.

(c) There is room for further expansion of beekeeping for those farmers who already have bees, and who know how to properly care for them.

(d) Each beekeeper should have modern hives, and the Italian variety of bees. He should also be familiar with the modern methods of winter feeding, swarm control, disease control, etc.

(e) This information may be secured from the State Apiarist, University of Tennessee, Knoxville.

(f) A county Bee Association should be organized mainly for educational purposes; but it may also serve as an agency for selling honey and buying supplies cooperatively.

Tree Crops.

1.(a) Tree crops should be considered as one of the most important farm crops in Overton County because:

(1) They provide an income from the sale of timber, nuts, etc., and furnish mast for hogs and timber for home use.

(2) They distribute both man and horse labor more equally throughout the year.

(3) They occupy more than one-half of the total area of the county.

(4) Regular farm crop area is equal to only about one-half the woodland area of the county.

(5) Timber is being used more rapidly than it is being produced.

(b) Each farmer should take especial care in improving and protecting his woodland. This may be accomplished by:

(1) Careful logging methods,

(2) Discontinuing the use of woodland for pasture by kinds of livestock that will injure the young growth of timber.

(3) Decreasing the damage from fire.

(4) Thinning out trees when too thick for the most rapid growth.

(5) Cutting deformed and diseased trees, using them for fuel.

(c) The state can aid in increasing and protecting timber by:

(1) passing tax laws exempting growing timber from taxation until it is marketed,

(2) establishing forest patrols for protection against forest fires.

(3) passing more stringent laws in regard to prosecution of persons causing forest fires,

(4) establishing a state cooperative nursery for the production of tree seedlings.

(d) The county should (1) hire a county agent with training and experience in forest problems; and (2) prosecute persons causing forest fires more rapidly and thoroughly.

(e) The practice of clearing up steep, infertile lands should be discontinued. These lands should be left in forests.

Miscellaneous.

1. The County Court should obtain the services of both a good county agent and a good home demonstration agent.

2. If a county agent cannot be employed there should be formed a committee of the leading farmers in the county to work in cooperation with the Division of Agricultural Extension at the University of Tennessee and the Smith-Hughes teachers in the county in formulating and carrying out an adequate program for the improvement of agricultural conditions in that region.

3. Industrial development should be encouraged. Such a development would be beneficial to the farmers of this county in many ways, a few of which are:

(a) A larger market for agricultural products would be available locally.

(b) It would provide more outside labor for farmers and their families.

(c) A part of the tax burden would be shifted from farm lands to the industries.

4.(a) The value of supplies purchased cooperatively in the county by farmers amounted to only $489 in 1925. There is a possibility of increasing this amount profitably through the cooperative purchase of such supplies as fertilizer, salt, fencing wire, feed, etc., provided the local dealers are operating on too wide a margin of profit.

(b) The purchase of these supplies should be handled by one of the leading farmers. However, due to the difficulty of getting one to serve in this capacity year after year, it will probably be more satisfactory in many cases to make the purchases through the local dealer, who would be paid a commission on all supplies bought. In most cases this arrangement would be satisfactory to the dealer, since he would get cash and a small profit for a quick turnover.

5. County taxes should be kept as low as possible and still have adequate county services.

Appendix A.

This appendix was added to show some improvements that could be made in the method of making a farm management survey.

(1) The average annual receipts per farm from the sale of timber should be obtained instead of the total receipts. This is necessary in order to put all the farms on a comparable basis. It would be unfair to the farmer that sold no timber the year of the survey not to credit him with some timber receipts, since he probably sold some timber the previous year. On the other hand it is equally unfair to credit the farmer with the total amount received from timber sales for that year since that might represent the production of the timber over a period of years.

(2) In a few instances receipts from outside labor was not credited to the farm. Consequently no accurate comparisons could be made between the labor incomes of these farms and those of farms on which that item had been secured. To put all the farms on a comparable basis the receipts from outside sources would either have to be omitted, or complete data gotten for each farm.

Appendix B.

In order to put all the farms on a comparable basis all receipts from timber sales and outside labor were deducted from the total receipts. It was necessary then to credit each farm with the following:

(1) interest and taxes paid on timber land,

(2) horse labor used in outside work,

(3) man labor used in outside work in case the operator had hired labor or reported unpaid family labor.

The interest and tax charges on the timber land were obtained by (1) finding the percentage the timber land was of the total farm area, (2) multiplying that percentage by the total land investment charges and total taxes paid, and (3) dividing the sum of their products by 1/2, since the woodland was

considered as being approximately one-half as valuable as the improved land.

The charges for horse labor included feed, barn room, interest on investment, and miscellaneous charges as shoeing, use of harness, etc. The feed for each day of outside work was figured at 60¢. The charges for interest, etc. were based on the percentage of the total number of work days actually spent in outside work.

The farms with outside man labor were not credited with man labor in case no hired or unpaid family labor were reported. The operators' labor was not used in calculating the labor income and could therefore not be used in making the adjustments.

Appendix C.

This shows the adjustment of the Census material of Overton County from 1850 to 1890 to the present area of the county. The following method was used in calculating the adjustments that were necessary in order to put the livestock and crops of the various census period on a comparable basis:

(1) The number of improved acres annexed at the different census periods was obtained by first assuming that the land annexed had the same percentage of improved land as the land that remained. The total number of acres annexed multiplied by this percentage gave the number of improved acres that were annexed. This was calculated for each period of annexation.

(2) Then, in order to get a farm area at each period of annexation equal to the present farm area of the county, the present acreage was represented as 100; the sum of the present acreage and the acreage annexed at each period was divided by the present acreage. The dividend multiplied by 100 was used in making the adjustments by dividing the number of animal units, etc. for each period to be adjusted by this dividend for each corresponding census period.

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