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TENNESSEE
THE NEW LAND OF CANAAN

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TENNESSEE

The New Land of Canaan

Facts about Soil, Climate and Rainfall

PUBLISHED BY THE
**DEPARTMENT OF AGRICULTURE
STATE OF TENNESSEE**

H. K. BRYSON, Commissioner
NASHVILLE - - TENNESSEE

TENNESSEE

The Land of Great Farming Opportunities

Facts About Soil, Climate and Rainfall

Tennessee.

PUBLISHED BY THE
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NASHVILLE, TENNESSEE

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TENNESSEE

The Land of Great Farming Opportunities

Tennessee is one of the few states that contain within their own boundaries everything essential to the welfare and happiness of man. A wall could be erected on its boundary lines, and communication with the outside world cut off, yet the human family residing within its borders would find all essentials to livelihood within the valleys and hills of this bountiful State. It has minerals in abundance, and the soils will produce anything grown in these United States, except tropical fruits; and live stock thrives as in but few sections.

Great opportunities exist in this State for the farmer who is willing to work and who has some capital to start with.

SOILS

In order that one may intelligently consider the opportunities offered the new settler, we will try to state briefly and frankly the character and fertility of the various soils located in Tennessee.

For ready reference, a soil map of the State is inserted. The Tennessee River divides West Tennessee from Middle and the Cumberland Mountains Middle Tennessee from East Tennessee. Each area has different soils, and we will undertake briefly to outline these:

WEST TENNESSEE

The soils in this area were nearly all derived from geological deposits which were not consolidated into rock. The lands lie better as a whole for cultivation and can be more completely put under the plow than elsewhere in the State. The majority of the soils are silt loams, which are adapted not only to a great variety of general farm crops, including cotton and tobacco, but to trucking crops, and to the production of both large and small fruits. Over large areas they have become greatly impoverished by constant corn and cotton cropping. Although the country is only gently undulating, the soil is of

such a silty nature that it washes away easily and to a ruinous extent, unless carefully protected.

Along the Mississippi River are very rich alluvial lands, surpassing in durability and productiveness any others in the State. Tile drainage is often needed, and in at least one county, Obion, it has been found necessary and highly profitable over large areas.

Chemical Analyses of West Tennessee Soils

County	Phos. Acid %	Lime %	Potash %	Nitrogen %	Remarks
Carroll.....	.08	.17	.22	.101	Old land—Good.
Carroll.....	.05	.11	.33	.048	Subsoil to above.
Chester.....	.11	.19	.20	.087	Old land—Medium.
Dyer.....	.09	.17	.25	.059	Old land—Poor.
Gibson.....	.07	.16	.21	.099	Old land—Medium.
Gibson.....	.07	.11	.26		Subsoil to above.
Gibson.....	.09	.23	.23	.134	New land—Good.
Hardeman.....	.09	.23	.35	.09	Old land—Medium.
Henderson.....	.08	.17	.24	.091	Old land—Poor.
Henry.....	.08	.15	.23	.072	Old land—Poor.
McNairy.....	.06	.11	.21	.097	Old land—Poor.
Obion.....	.10	.40	.29	.132	Old land—Rich.
Weakley.....	.08	.21	.24	.120	Forest land—Good.
Weakley.....	.07	.11	.30	.047	Subsoil to above.
Weakley.....	.09	.16	.28	.093	Old land—Good.

General Conclusions from Analyses

Phosphoric Acid: The soils should be considered as liable to be deficient in this element.

Lime: Although not derived from limestone rock, the lime content of these soils is even superior to that from some of the limestone areas. They must be looked upon, however, as only moderately well supplied, so that liming would be expected to give beneficial results.

Nitrogen: Nitrogen percentages are medium for virgin soils, but the worn lands have as a rule become decidedly deficient. The Obion County soil, on account of its superior depth, is well supplied with this and the other important constituents.

Potash: Experiments in this section warrant the use of lime and nitrogen, but potash is much less required.

In order that the reader may intelligently consider the above analyses, we give on page 6 average analyses of the soil classes from Rich to Poor.

SCENES AT WEST TENNESSEE EXPERIMENT STATION, JACKSON
A TENNESSEE HOLSTEIN

TABLE I—*A classification of soils based on chemical composition according to Wohltmann*

Constituents in air-dry fine earth (less than 2 mm.)

<i>Character of Soil</i>	<i>Lime (CaO)</i> <i>and</i> <i>Magnesia (MgO)</i> <i>Phos. Acid (P₂O₅)</i> <i>Potash (K₂O)</i>				
	<i>Nitrogen (N)</i>	<i>(Cold HCl)</i>	<i>(Cold HCl)</i>	<i>(Cold HCl)</i>	<i>(Hot HCl)</i>
	<i>%</i>	<i>%</i>	<i>%</i>	<i>%</i>	<i>%</i>
Very rich—may be cultivated without return of fertility removed..	Over 0.3	Over 3.0	Over 0.25	Over 0.2	Over 0.5
Rich—requires partial return of Phos. acid removed.....	0.2-0.3	1.5-3.0	.15-.25	.15-.2	.4-.5
Good—requires return of Phos. acid removed.....	.1-.2	.5-1.5	.10-.15	.10-.15	.2-.4
Medium—requires return of Phos. acid and potash removed.....	.06-.1	.25-.5	.07-.1	.06-.1	.12-.2
Poor—requires general increase in fertility.....	.03-.06	.1-.25	.04-.07	.03-.06	.08-.12
Very poor—very much in need of increase in fertility or periodical rest.....	.02-.03	.05-.10	.02-.04	.02-.03	.05-.08
Of little value for cultivation—best suited to meadows and pastures .	<.02	<.05	<.02	<.02	<.05

TABLE II—*A classification of Tennessee soils based on productiveness*

1. Very poor.....	Less than 15 bu. corn, or less than 6 bu. wheat.
2. Poor.....	15-25 bu. corn. or 6-10 bu. wheat.
3. Medium.....	25-35 bu. corn, or 10-18 bu. wheat.
4. Good.....	35-40 bu. corn, or 18-25 bu. wheat.
5. Rich.....	Over 50 bu. corn, or over 25 bu. wheat.

TABLE III—*Interpretation of the analyses of Tennessee Soils*

	<i>Phosphoric Acid (P₂O₅)</i>	<i>Lime (CaO)</i>	<i>Potash (K₂O)</i>	<i>Nitrogen (N)</i>
	<i>%</i>	<i>%</i>	<i>%</i>	<i>%</i>
1. Very poor ..	Less than 0.05	Less than 0.08	Less than 0.10	Less than 0.07
2. Poor.....	0.05-0.10	0.08-0.12	0.10-0.15	0.07-0.10
3. Medium....	0.10-0.15	0.12-0.20	0.15-0.25	0.10-0.14
4. Good.....	0.15-0.25	0.20-0.40	0.25-0.40	0.14-0.20
5. Rich.....	Over 0.25	Over 0.40	Over 0.40	Over 0.20

MIDDLE TENNESSEE

This geographical division of the State lies between the Tennessee River on the west and the Cumberland Mountains on the east. It has within its boundaries the Central Basin, the Highland Rim, and the Cumberland Plateau. The soils of these areas are entirely different, and will for that reason be discussed separately.

The "Highland Rim" is the name given to a portion of Middle Tennessee which surrounds in a wide circle the Central Basin, something like the rim of a dinner plate. It covers about 9,300 square miles, and may be divided into two sections: (1) an outer circle formed by limestone; (2) an inner and wider circle formed by the Tullahoma formation, chert, etc.

The Rim soils of limestone origin range in color from grey to dark red, and have red clay subsoils. Silt and clay loams predominate and are well suited to the production of grain and forage crops. The soils are quite well suited to fruit and dark-leaved tobacco. All of these soils are recognized as decidedly superior in both productiveness and durability to those of the Tullahoma formation.

Below we give some analyses of the limestone soils of the Highland Rim:

<i>County</i>	<i>Phos. Acid</i> %	<i>Lime</i> %	<i>Potash</i> %	<i>Nitrogen</i> %	<i>Remarks</i>
Coffee	.07	.23	.23	.115	Old land, color dark red—Good.
Franklin	.09	.21	.31	.125	Old land, dark red—Good (much modified by manuring, etc.).
Franklin	.10	.16	.27	.120	Old land, dark red—Medium.
Franklin	.05	.14	.34	.040	Subsoil to above.
Humphreys	.06	.13	.23	.120	Old land, red—Poor.
Lawrence	.08	.08	.16	.100	Forest land, red—Medium.
Lawrence	.06	.08	.28	.06	Subsoil to above.
Montgomery	.06	.15	.22	.074	Old land—grey.
Stewart	.05	.12	.15	.115	Forest land—Good.
Stewart	.05	.15	.17	.105	Forest land—Good.
White	.06	.14	.20	.085	Old land—Cragrock.
White	.07	.13	.22	.080	Old land—Cragrock.
White	.07	.09	.21	.09	Old land, sandy loam, grey—Poor.
White	.05	.14	.32	.057	Subsoil to above.

The above analyses should be considered in connection with relative analyses shown on page 6, Tables I, II and III.

Conclusions from the Above Analyses

Phosphoric Acid: The phosphoric acid percentages are poor, so that applications of this element would undoubtedly be of

value and should be considered necessary in at least some instances.

Lime: The lime content is as a rule only medium, and indicates that liming would be profitable.

Potash: The supply of potash is medium to good, requiring less attention than the other important elements of plant food.

Nitrogen: The supplies of nitrogen run from medium to poor, and require attention.

Fertilizer experiments have shown the importance of phosphate, lime, and nitrogen. Through the keeping of live stock, and by judicious management, aided only by moderate dressings of bone meal, the soil from which the second analysis was obtained, had in the course of a few years been brought up to a high state of fertility, although previously it had been greatly impoverished by grain farming and by erosion.

The Siliceous Soils of the Rim

These soils originated chiefly from the decomposition of shale and siliceous rock, which were poor in lime. They are generally either grey or yellow colored and are characterized by a high content of silt, the "crawfishy" soil being of occasional occurrence. The majority of the lands lie well for cultivation and are easily tilled, but are only moderately productive. However, under proper management, aided by liming and by liberal applications of commercial fertilizers, they are capable of the profitable production of a great variety of farm and garden crops.

Peanuts are grown extensively in some counties and trucking crops and tobacco are being raised in others.

Below we give some analyses of the soils from the Tullahoma formation, etc.

<i>County</i>	<i>Phos. Acid</i> %	<i>Lime</i> %	<i>Potash</i> %	<i>Nitrogen</i> %	<i>Remarks</i>
Coffee.....	.04	.15	.09	.077	Old land—Very poor.
Dickson.....	.04	.08	.16	.087	Forest land—Poor.
Dickson.....	.03	.10	.10	.090	Old land—Very poor.
Dickson.....	.03	.02	.31	.018	Subsoil—Dickson County, ¼ mile from above.
Lewis.....	.03	.06	.18	.050	Not cultivated—Very poor.
Lewis.....	.04	.03	.25	.04	Subsoil to above.
Warren.....	.04	.10	.14	.078	Old land—Poor.
Warren.....	.02	.07	.08	.070	Old land—Very poor.
Warren.....	.02	.07	.11	.016	Subsoil to above.

(Compare with relative Tables I, II and III, page 6.)

JERSEY HERD IN MIDDLE TENNESSEE

NASHVILLE, CHATTANOOGA & ST. LOUIS RAILWAY PERCHERON FOUNDATION
STUD, JACKSON

General Conclusions from the Above Analyses

Phosphoric Acid: The phosphoric acid percentages are decidedly poor, indicating that applications of this element should be looked upon as a necessity in any kind of farming.

Lime: The lime poverty is very marked in some cases, indicating that liming would be required in addition to the phosphoric acid in order to get the best results.

Potash: The potash supplies are poor, so that at least the return of the potash removed by the crops would be required.

Nitrogen: The nitrogen contents are either poor or very poor in all cases.

Below, in series one, are given the results obtained by W. N. Rudd in field experiments on a very poor soil on his farm near McMinnville, in Warren County. In series two, same farm, but from another field which had been somewhat improved by previous fertilizing, etc. (the analysis of this soil is shown as first under Warren County, in preceding table).

Fertilizer Experiments on Fort Payne Chert Soil

		Yields per Acre	
Plot	Fertilizers per Acre	Stover Tons	Grain Bu.
CORN			
1	No fertilizers.	.31	3.9
2	{ 640 lbs. Acid Phosphate. 128 lbs. Muriate Potash. }	.61	18.3
3	{ 640 lbs. Acid Phosphate. 240 lbs. Nitrate Soda. }	.70	23.5
4	{ 640 lbs. Acid Phosphate. 240 lbs. Nitrate Soda. 128 lbs. Muriate Potash. }	.91	24.9
5	{ 240 lbs. Nitrate Soda. 128 lbs. Muriate Potash. }	.37	4.3
6	{ 640 lbs. Acid Phosphate. 240 lbs. Nitrate Soda. 256 lbs. Muriate Potash. }	1.01	29.3
COW-PEAS			
1	No fertilizers.		13.0
2	300 lbs. Acid Phosphate.		19.0
3	{ 300 lbs. Acid Phosphate. 50 lbs. Muriate Potash. }		22.0

TOMATOES IN MIDDLE TENNESSEE

BEANS IN MIDDLE TENNESSEE

Conclusions for the Siliceous Soils of the Rim

The results of the chemical analyses and the fertilizer experiments agree in demonstrating that the soils of the Tullahoma formation are poor in the fundamentally important mineral elements of plant food. Phosphoric acid and lime are indicated as the foremost essentials. The nitrogen supplies are also low, so that for cereal and other crops not legumes, this element should be used along with the minerals.

CENTRAL BASIN

The Central Basin covers approximately 5,500 square miles and has an average elevation above sea level of about 550 feet. The major part of this section is covered by the Chickamauga limestone, which is locally known as "blue limestone." Phosphate beds are found in numerous localities. The soils as a whole are noted for their superior fertility and durability under cropping, as compared with those from other parts of the State. Continued cropping in corn and wheat has, however, greatly reduced the natural productiveness of the majority of the uplands, but the quickness with which they recover under proper management is almost remarkable. The bottom lands are exceptionally fertile. The uplands generally lie well for cultivation, but steep and isolated hills 200 to 300 feet high are not uncommon. They are, however, nearly always fertile. Scattered throughout this Basin are "cedar glades," where the soil is not deep enough for cultivation, but furnishes pasturage and is the natural habitat of the red cedar. The prevailing soils are brown-colored silt loams, adapted to a wide range of crops, but especially well suited to the production of corn, wheat, grass and forage crops. Potatoes are also grown extensively in some of the counties. Kentucky blue grass thrives as nowhere else in the State and is the common permanent pasture grass.

Below we give some analyses of Central Basin Soils.

No.	County	Phos. Acid	Lime	Potash	Nitrogen	Remarks
		%	%	%	%	
1	Bedford.....	.15	.10	.29	.122	Old land—Good.
2	Bedford.....	.09	.28	.17	.112	Old land—Good (bottom second bench).
3	Bedford.....	.08	.26	.15	.117	Old land—Good (bottom grey soil).
4	Bedford.....	.12	.24	.33	.130	Old land—Good.
5	Bedford.....	.05	.31	.49	.04	Subsoil to 4.

A SECTION OF 70-ACRE APPLE ORCHARD, COLUMBIA, TENN.

SILAGE CROPS, EXPERIMENT STATION, KNOXVILLE

No.	County	Phos. Acid	Lime	Potash	Nitrogen	Remarks
6	Bedford.....	.19	.57	.46	.15	Creek bottom land—Rich.
7	Bedford.....	.05	.05	.19	.09	Old land—Very poor.
8	Bedford.....	.17	.14	.26	.148	Old land—Good.
9	Bedford.....	.11	.11	.31	.068	Subsoil to 8.
10	Bedford.....	.26	.20	.32	.112	Old land—Good.
11	Bedford.....	.18	.19	.43	.077	Subsoil to 10.
12	Bedford.....	.15	.57	.43	.212	Old meadow bottom land —Rich.
13	Bedford.....	.15	.61	.43	.212	Subsoil to 12.
14	Davidson.....	.07	.46	.71	.190	New land—Rich.
15	Lincoln.....	.31	.32	.45	.128	Old land—Good.
16	Marshall.....	.32	.20	.19	.102	Old land—Medium.
17	Marshall.....	.26	.18	.25	.116	Old land—Good.
18	Marshall.....	.27	.27	.33	.065	Subsoil to 17.
19	Rutherford....	.08	.22	.29	.116	Old land—Medium.
20	Smith.....	.22	.13	.22	.076	Old land—Poor.

Compare the above with relative analyses shown on page 6. Tables I, II and III.

General Conclusions from the Analyses

Phosphoric Acid: The majority of the analyses show the presence of unusually large amounts of phosphoric acid, so that many of the soils would be called rich in this element. A few, however, Nos. 2, 3, 7, 14, and 19, are only moderately supplied.

Lime: The lime contents of these soils are as a rule good, but by no means sufficiently high to warrant the neglect of liming. Nos. 12, 13, 6, and 14 would be classed as rich in this element, and only one, No. 7, is very poor.

Potash: The potash supplies are good on the average, but Nos. 2, 3, 7, and 16 rank only as medium, so that at least moderate applications of this element might be used to advantage in grain growing and the like, where the crops are sold off the farm.

Nitrogen: The nitrogen percentages are medium on the average uplands, and good on the bottom lands. The uplands have lost much of this element under cultivation, and its return to the soil should be a matter of concern. In fact, it is decidedly the most important element of plant food needed by the average upland of this section.

No. 20 is an interesting example of a soil which, when judged by actual production, would be classed as "poor" for crops like corn or wheat, but "good," or even "rich," for clover. The low nitrogen content, due to long continued grain farming, would account for the small crops of the cereals, but did not inter-

A TENNESSEE FARM HOME

RESULTS OF CANNING CLUB WORK IN TENNESSEE

(This young lady purchased mule and sow out of money received for canned goods)

ferre with the growth of a legume like clover, the soil supply of the minerals being "good."

THE CUMBERLAND PLATEAU

This section covers about 5,000 square miles and has an average elevation above sea level of about 1,800 feet. The soils are principally sandy loams, which support a fair forest growth, but which are decidedly lacking in fertility under cropping. On account of their loamy nature, they are easily tilled and are well suited to the production of trucking and forage crops and to both large and small fruits. The cultivated soils are shallow, the depth of the underlying sandstone generally ranging from one to four feet. They seldom suffer from dry weather, however, and there is no reason why, under judicious management, which would include the liberal use of fertilizers and lime, much of this section should not become highly productive.

Below we give some chemical analyses of these soils.

No.	County	Phos. Acid %	Lime %	Potash %	Nitrogen %	Remarks.
1	Cumberland....	.06	.07	.19	.161	Uncleared pasture—Best type plateau soils.
2	Cumberland....	.03	.10	.07	.279	A sandy loam.
3	Cumberland....	.03	.05	.08	.085	A creek bottom soil—Very acid.
4	Cumberland....	.03	.05	.06	.069	Forest land—Average very poor.

Comparison of these analyses is invited to those appearing on page 6, Tables I, II and III.

General Conclusions

These soils can be classed in plant-food supply with those of the Tullahoma formation, and must be considered very poor in all mineral elements of plant food, so that it would not be advisable to attempt any kind of farming without the aid of commercial fertilizers, phosphate in particular. Lime in addition is indicated as necessary, not only for plant-food purposes, but also to correct acidity. Some of the average soil is poor in these constituents. Fertilizer experiments bear out the results of the chemical analyses in showing the great demand for increased supplies of phosphoric acid, nitrogen and lime, but potash seems to be of uncertain value.

DISKING PEAS FOR WINTER GRAIN, HIGHLAND RIM

EAST TENNESSEE HAY CROP

EAST TENNESSEE

This section, which lies between the Unaka or Great Smoky Mountains on the east and the Cumberland Plateau on the west, has an elevation of about 1,000 feet. The geological formations, including ridges, etc., have northeast and southwest courses parallel with the mountains on either side, and occur repeatedly in long belts or strips.

The most important soils of this section may be placed under the following heads:

1. Knox dolomite.
2. Shale.
3. Chickamauga limestone.
4. Miscellaneous marbles and limestones.
5. Tellico sandstone.
6. Alluvial.

THE DOLOMITE SOILS

The prevailing soils are loams and silt loams containing more or less chert. The color of the soils ranges from gray to dark red. All have retentive red clay subsoils. Valley lands of this type are considered to be of good natural fertility, and under judicious management are highly productive, but under continued grain growing they soon become impoverished. The soils of the rounded ridges which characterize this formation contain as a rule much more chert and are recognized as naturally much poorer and less durable than the valley lands.

The valley lands are well adapted to general farm crops, such as corn, wheat, grass, etc., but when favorably located are used for market garden and fruit growing purposes. The ridges are adapted to the production of small fruits, grapes and general orcharding; peaches and cherries in particular.

Below we give some chemical analyses of the Dolomite Soils—Valley type:

No.	County	Phos. Acid	Lime	Potash	Nitrogen	Remarks
		%	%	%	%	
1	Hamilton.....	.05	.16	.23	.095	Old land—Medium.
2	Knox.....	.09	.17	.28	.111	Old land—Good.
3	Knox.....	.06	.13	.38	.079	Old land—Poor.
4	Knox.....	.05	.12	.43	.051	Subsoil to 3.

The analyses of the valley soils show larger amounts of all the mineral elements of plant food, potash and lime in particular, than the ridge type. The phosphoric acid contents, however,

A HIGHLAND RIM TOBACCO FIELD, N., C. & ST. L. RY., DEMONSTRATION FARM, TULLAHOMA
(The man standing is six feet tall)

JUDGING FAT STOCK, EXPERIMENT STATION FARM, KNOXVILLE

are poor, and this may account for the lack of durability under grain farming. The supplies of lime are medium. The percentages of potash are good, probably ample under stock farming, but would not endure the constant drain of grain and hay farming. In three out of four soils the nitrogen contents are poor, and along with phosphoric acid should receive much attention.

SHALE SOILS

Next to the Knox Dolomite, shale from various formations covers the largest area in the East Tennessee Valley. These soils are often shallow and have the general reputation of being leachy and hard to handle. This type occurs frequently as low lands, which when of sufficient depth, are well suited to the production of both grain and grass.

Below we give a few analyses of the shale soils:

No.	County	Phos. Acid	Lime	Potash	Nitrogen	Remarks
		%	%	%	%	
1	Hamblen..... (Nolichucky shale)	.11	.05	.28	.208	Old land—Good.
2	Hamblen..... (Athens shale)	.02	.10	.08	.072	Old land—Crawfishy, very poor.
3	Knox.....	.09	.11	.29	.09	Old land—Poor.
4	Knox..... (Sevier shale)	.09	.12	.27	.10	New land—Medium.
5	Knox..... (Sevier shale)	.03	.08	.09		Forest—Crawfishy, very poor.

General Conclusion

Phosphoric Acid: Nearly medium except for the "crawfishy" sorts, which are very deficient. The best of these soils would be expected to require at least the return of this element removed by the crops.

Lime: Must be considered poor—in particular, liming would be required to bring soil No. 1 to a high state of productiveness.

Potash: Except in Nos. 2 and 5, the potash percentages are good, but not sufficient to warrant the constant removal of this element without any return, as in grain or hay farming.

Nitrogen: No. 1 is rich in nitrogen, but the others would be considered poor.

Fertilizer experiments made on soils long under cultivation have indicated a decided need of both phosphoric acid and nitrogen.

EAST TENNESSEE CATTLE SCENE

SHEEP IN EAST TENNESSEE

A TENNESSEE SHEEP

A TENNESSEE DUROC HOG

CHICKAMAUGA LIMESTONE

This formation covers probably less than one-twelfth of the East Tennessee Valley, and is found in narrow belts. The rock is easily recognized on account of its blue color, and its structure, which is of such a nature that it is often spoken of as rotten limestone.

The soils are high in both silt and clay, so that in working, care is required to prevent the formation of clods. The subsoils are heavy yellow-colored clays. General farm crops, especially wheat and grass, thrive on this type.

Below we give you a few analyses of the Chickamauga limestone soils:

No.	County	Phos. Acid	Lime	Potash	Nitrogen	Remarks
		%	%	%	%	
1	Hamblen.....	.10	.82	.86	.308	Forest—Very rich.
2	Hamblen.....	.07	.18	.37	.097	Old land—Poor.
3	Knox.....	.08	.22	.43	.120	Creek bottom—Good.
4	Knox.....	.09	.10	.27	.094	Old land—Poor.
5	McMinn.....	.07	.31	.68	.183	Fertile pasture.
6	Roane.....	.07	.06	.18	.087	Old land—Poor.
7	Washington....	.07	.10	.18	.100	Old land—Poor.

General Conclusions

Phosphoric Acid: Phosphoric acid contents of these soils are poor, requiring at least the return of the phosphoric acid removed by crops. The uniformity in the percentages of this element in soils from different localities is noteworthy.

Lime: The percentages of lime are variable to an unusual extent. The virgin soils are well supplied, but those which have been long cultivated are often deficient, so that liming would be advisable.

Potash: In no instance is the potash content poor. Nos. 1, 3 and 5 are rich; No. 4 is good; and Nos. 6 and 7 are medium.

Nitrogen: The nitrogen contents of the long cultivated soils are a low medium, but at least one of the virgin soils, No. 1, would be considered very rich in this element.

Fertilizer experiments show these soils to be only moderately well supplied with phosphoric acid, so that applications of this element are recommended, especially in grain farming. Long-cultivated soils need in addition both nitrogen and lime. Liming is advised not only on account of its value as a plant food, but especially as a corrective for acidity and for its favorable action

TYPES OF TENNESSEE JERSEYS

A TENNESSEE JACK

on those soils which are heavy and troublesome to handle. Little attention appears to be required for potash fertilization.

MARBLE AND MISCELLANEOUS LIMESTONE SOILS

All these limestones form red or chocolate colored loams and clay loams, which are recognized as naturally very fertile and much more durable under cropping than the dolomite and shale soils. They are especially well adapted to general farm crops, but may be used to advantage for gardening, orcharding, and the like. Their area is small.

Below we give some chemical analyses of these soils:

No.	County	Phos. Acid	Lime	Potash	Nitrogen	Remarks
		%	%	%	%	
1	Anderson.....	.17	.12	.21	.123	Old land—Good.
2	Hamblen.....	.08	.12	.24	.079	Old land—Poor.
3	Knox.....	.16	.30	.36	.143	New land—Rich.
4	Knox.....	.19	.38	.42	.190	New land—Rich.
5	Knox.....	.10	.20	.34	.100	Old land—Medium.

General Conclusions

Phosphoric Acid: In three out of five soils the phosphoric acid content is good. In fact, they are the highest found in any of the East Tennessee types. In strictly grain farming, however, the phosphoric acid removed by the crops should be returned, especially for Nos. 2 and 5.

Lime: The lime contents are better than the average, running from medium to good, but beneficial results would be expected to follow its application to Nos. 1 and 2.

Potash: The supplies of potash are good in three out of the five soils, but analyses Nos. 1 and 2 show only medium amounts of this element.

Nitrogen: The nitrogen supplies of the new lands are good, but the long-cultivated soils have been heavy losers of this element.

The fertilizer experiments which have been made on these soils have shown that they do not respond readily to phosphoric acid like the other types described, but indicate that attention should be given to this element in grain farming. Nitrogen has been found to be needed after a few years of cropping in corn and wheat, as is the custom.

TELLICO SANDSTONE SOILS

These soils are especially desirable for market garden purposes, being sandy loams of good natural fertility. The area covered by this formation is small, but long, narrow strips are found scattered throughout the East Tennessee Valley. On account of the hardness of the parent rock, they are found on the slopes and tops of high hills and sometimes on small elevated plateaus which are excellently situated for the production of early vegetables. On hillsides these soils wash ruinously, with rapid deterioration in fertility, unless wisely handled.

Below we give some chemical analyses of these soils:

No.	County	Phos. Acid	Lime	Potash	Nitrogen	Remarks
		%	%	%	%	
1	Knox.....	.17	.19	.18	.106	New land—Good.
2	Knox.....	.11	.16	.18	.120	Old land—Good.
3	Roane.....	.10	.26	.30	.152	New land—Rich.

General Conclusions

Taking the texture into consideration, the percentages of all the elements of plant food are good and justify the reputation of these soils for being naturally fertile.

For market garden crops, the old lands need especially both phosphoric acid and nitrogen, and to a less extent potash.

ALLUVIAL SOILS

These do not cover large areas, but are noted for their fertility and durability under cropping. They are best adapted to corn, grass and forage crops, and are decidedly the most productive soils in the East Tennessee Valley. Their superior depth adds greatly to the plant-food supplies indicated in the chemical analyses, of which we give a few as follows:

No.	County	Phos. Acid	Lime	Potash	Nitrogen	Remarks
		%	%	%	%	
1	Blount.....	.18	.18	.53	.131	Old land—Good, occasionally overflowed.
2	Hamilton.....	.09	.73	.91	.121	Old land—Medium. Texture bad.
3	Knox.....	.12	.43	.45	.145	Old land—Rich, overflows.
4	Knox.....	.09	.42	.42	.131	Old land—Rich, overflows.
5	Knox.....	.05	.41	.32	.073	Old land—Rich, overflows.

General Conclusions

Phosphoric Acid: The per cent of phosphoric acid runs from poor in the sandy soils to good, but the depth and texture of these soils make them well supplied, though not rich in this element.

Lime: With the exception of No. 1, these soils are rich in lime, at least so far as plant-food requirements are concerned.

Potash: These lands are rich in potash.

Nitrogen: The nitrogen percentages are for the most part only medium, but, as in the case of phosphoric acid, the depth of the soil makes the supplies good.

Fertilizer Experiments

At the Tennessee Experiment Station farm, on soil No. 4 no profitable returns have been obtained from the use of fertilizer mixtures for either corn or wheat; the wheat generally growing too rank, so that it lodges. Alfalfa and clover, however, respond to applications of both phosphoric acid and lime, but the effects of the latter must be attributed to the slight acidity of the soil. Grass responds to nitrogen in addition to the other two elements.

TENNESSEE FARM POULTRY

CLIMATIC CONDITIONS

In the discussion of the soils, we have dealt frankly with the conditions, giving the facts. Properly to understand the great possibilities of improving these soils, and at the same time produce fair crops on these lands, it is necessary that the distribution of rainfall and duration of growing season be thoroughly understood. By use of this information we can determine how early in the spring we may plant without danger of frost, or how late we can plant, expecting the crop to mature before killed by frost. Further, the average rainfall by months will show the dry periods, during which we must do our plowing, cultivating and other farming operations which depend upon the dryness of the atmosphere and soil. In order that the reader may readily determine these facts, charts prepared by the College of Agriculture, University of Tennessee, with notation as to their character, are given.

CUMBERLAND PLATEAU POTATO EXHIBIT

Chart I—Latest Killing Frost in Spring

Chart I shows the latest date on which killing frost has occurred in the spring since careful records were begun. The crosses on this chart and on all following charts represent the stations at which the observations were made. The curved lines with dates at each end are drawn through all points that have had their latest killing frost in spring on the same date, as April 20, or April 30. The date of the latest killing frost for points not on one of these lines may be determined as follows: Take Haywood County, for example. On one side we have a line dated April 10 and on the other side a line dated April 20, and we see at once that the latest killing frost in that county occurred between April 10 and April 20. Or look at Williamson County. Here we have lines dated April 20 on all sides, but looking outside the April 20 lines we find April 30 lines, which are later. Therefore the latest frost in Williamson County, which is inside the April 20 line, must have been earlier than April 20. In the same way the date of the latest killing frost in the spring for any point in the State may be determined approximately by means of the chart.

All of our crops may be placed in one of two classes. One class will withstand a given amount of frost, while the other class will be destroyed by freezing temperature. Crops of the first class may be planted or sown as early as the soil can be properly prepared, but crops of the second class can not be planted with absolute safety until after the date of the latest killing frost in spring as shown, roughly, on this chart.

Chart II—Earliest Killing Frost in Fall

Chart II was made in the same manner as Chart I. The lines in this case show the dates of earliest killing frosts in fall since careful records were begun.

This chart will help us to decide the proper time to sow late forage crops that are not able to resist the frost. Knowing the length of time any crop needs to reach maturity, we can with the assistance of this chart determine when to sow in order to be perfectly safe from early frosts in the fall. A crop sown early enough to get out of the way of the earliest frost on record will be practically safe.

Chart III—Average Date of Latest Killing Frost in Spring

Chart III shows the average date of the latest killing frost in the spring.

Many crops that will not endure frost are many times more valuable if marketed early than if marketed only a week or two later. This being true, we are willing to take chances of losing a crop occasionally by frost in order to reach the market as early as possible. Having before us the average date of the latest killing frost in spring, and knowing the difference in the price of our product that a few days will make, we can easily calculate what will be the best time to plant. For example, a crop starting on the average date of the latest killing frost will in the long run be killed one year out of two. If, however, the crop planted at that date will be worth more than twice as much in the market as the one planted a few days later we can afford to take the risk. If the early crop is worth ten times as much as the late one we can profitably plant still earlier, while if it is worth but little more we must wait until danger from frost is practically past. Each farmer should know for his own locality what is the average date of the latest killing frost in spring. If it has not already been worked out he should begin keeping a record at once and get an average as soon as possible.

Chart IV—Average Date of Earliest Killing Frost in Fall

Chart IV shows the average date of the earliest killing frost in the fall and can be used in the same manner as Chart III.

If in a given locality the average date of the earliest killing frost is October 20, and if also some crop, as green corn, peas, or tomatoes, is much more valuable after that date than before it, because of scarcity; we can afford to take chances and plant late in order that, if a frost does not come, we may have a crop after our neighbor's crops are harvested.

DAIRY HERD IN MIDDLE TENNESSEE

Chart V—Average Number of Days in Growing Season

Chart V is obtained from Charts III and IV and shows the average number of days without killing frost, or the length of the growing season. We naturally expect to find a longer growing season in the South than the North and the chart shows this to be true in a general way. There are, however, great irregularities in the lines as compared with lines of latitude. We also expect the growing season to shorten with elevation above sea level, and comparing Chart V with Chart VI we find this is true and that most of the irregularities noted above are accounted for by differences in elevation.

There is, however, still one important disagreement between the lines on these two charts that must be accounted for in some other way. The point of difference is this: Stations west of the Cumberland Mountains having an elevation of 1,000 feet have a growing season of about 180 days, while stations with a similar elevation east of the Cumberland Mountains have a growing season of over 200 days. The difference must be due to the protection afforded to the eastern portion of the State by the Cumberland Mountains.

Knowing the time it takes a given crop to mature, and the average length of the growing season in a particular locality, the farmer can see at once whether he ought to sow that crop or not. For example, in the case of Irish potatoes the grower can tell from this chart whether or not he can grow two crops in one season, though it may never have been tried in his locality.

Chart VI—Elevation of Stations Above Sea Level

In Chart VI the lines represent elevation above sea level. It is of interest to study this chart in connection with each of the others, as it shows the effect which elevation has on the temperature and rainfall of a place. Valleys are found to be warmer than highlands, and valleys on the east of a mountain range are less subject to late frosts than those on the west. Precipitation is heavier on western than it is on eastern slopes.

Chart VII—Mean Annual Temperature

Chart VII, showing the mean annual temperature, is of value to the farmer because it assists him in determining the sections best suited for crops requiring high temperature, as cotton, or those requiring lower temperature, as fall apples and cabbage. This chart conforms much more closely to the chart showing the elevations than any of the others. As would be expected, we find the lowest temperatures at the highest altitudes, while the highest temperatures are observed in the lowest portions.

Chart VIII—Lowest Temperature in Thirteen Years

Chart VIII, showing the lowest temperature for thirteen years, should be considered before locating an orchard or a crop of any kind that is liable to be winterkilled. The orchardist would not wish to plant a tender variety of peaches in a place where a temperature of 20 degrees below zero is likely to occur.

TENNESSEE HOLSTEINS

*Chart IX—Number of Winters in Thirteen Years with
Zero or Below*

Chart IX shows the number of times in thirteen years that the temperature has been zero or below. It should be of value to those who are trying to carry either animals or tender crops through the winter, as from it a good general idea of the frequency of winters with severe weather can be obtained.

Chart X—Mean Annual Rainfall, in Inches

Chart X shows the annual precipitation for the entire time of observation at each station. This chart also conforms to a limited extent with the chart of elevation. The heavier rainfall is found on the western slopes of the mountains and the lighter rainfall on the eastern slopes. The heaviest rainfall for the State (over 59 inches) was measured on the Cumberland Plateau, while the lowest annual rainfall occurs at Bristol.

In considering the mean monthly or annual rainfall we must bear in mind that the mean, or average, rainfall is not the rainfall which is most likely to occur. This we can easily see by considering that in a month in which the normal rainfall is 5 inches the greatest possible deficiency is only 5 inches, while on the other hand the excess may be 10 or 15 inches or more. Thus one month having a rainfall of 15 inches would raise the normal twice as far as one month with no rainfall would lower it.

TENNESSEE BEES

Distribution of rainfall is one of the most important factors to successful farming. The rainfall of Tennessee, as shown by the following charts, is admirably distributed, and the only reason why Tennessee does not stand at the head as an agricultural state is because our people have not taken advantage of the climatic conditions as they are.

CHART 1—AVERAGE RAINFALL IN INCHES FOR THE SIX MONTHS
MARCH 1 TO AUGUST 31

The above chart shows that Tennessee is much better supplied with rain during the corn-growing season than the section commonly known as the Corn-Belt.

Chart 2 shows Tennessee and other states south of Kentucky and Virginia have an advantage of from twenty-five to seventy-five days of growing season over those States north of the Ohio River. This not only gives more time for the crop to grow, but gives more leeway at planting time and a better opportunity to get the seed bed in the best condition. Tennessee has a growing season about twenty-five days longer than the average for Illinois.

CHART 2—AVERAGE LENGTH OF GROWING SEASON, OR NUMBER OF DAYS BETWEEN THE LAST KILLING FROST IN THE SPRING AND THE FIRST KILLING FROST IN THE FALL

Chart 3 is a comparison between the corn crop and the July rainfall in Tennessee. The solid line represents the average corn crop for the State for fifteen years, in bushels per acre, as shown by the figures on the lefthand margin. It will at once be noticed that there is great similarity between the two lines. Examination of Chart 10 shows the average rainfall for the month of July for fifteen years. Since July is the month when most of the corn in Tennessee tassels, we may fairly conclude that the amount of moisture available at tasseling time is one of the principal factors controlling the size of the corn crop. From Tennessee northward and westward the corn all tassels during the months of July and August. Since the crop is largely dependent upon the moisture available during tasseling time, July and August are the critical months, and we must consider the rainfall for that period in any comparison we make. Charts 4 and 5 represent the average rainfall for July and August, respectively, for the region under discussion. They show that

CHART 3—COMPARISON BETWEEN THE CORN CROP OF TENNESSEE, IN BUSHELS PER ACRE, AND THE JULY RAINFALL, FOR 15 YEARS

Solid line represents corn crop

Broken line represents rainfall

CHART 4—AVERAGE RAINFALL FOR JULY IN INCHES

CHART 5—AVERAGE RAINFALL FOR AUGUST IN INCHES

Tennessee has a greater rainfall in July (her critical period) than the states north and west of her have in either July or August. In this respect, then, her opportunity for producing a large crop of corn is greater than that of those other states.

Another important factor upon which the amount of moisture available for the crop at tasseling time depends, is the water from the earlier rains that may be retained in the soil by proper methods of cultivation. Chart 7 shows the average rainfall for the three months, December, January, and February. Central Mississippi and Alabama have the greatest amount, over fifteen inches, while the entire Southeast section has twelve inches or more. Over the Ohio and upper Mississippi Valleys, the rainfall for these three months is from three to nine inches only. Here again Tennessee has a great opportunity for increasing the amount of available moisture at tasseling time by conserving the heavy winter rainfall. King, in his "Irrigation and Drainage," describes some careful experiments made to determine the amount of rainfall necessary to produce a certain yield of corn. In thirteen Northeastern and North Central States having an average rainfall of about fifteen inches during the corn-growing season, he estimates that after deducting a certain amount for loss by percolation and from light showers, the average effective rainfall is about twelve inches. His experiments show that this rainfall, if it came in the right amount and at the right time for greatest efficiency, would be enough to supply the necessary moisture for a crop of over seventy bushels per acre. In actual practice the average yield for these thirteen states is about thirty bushels per acre, or less than one-half of the calculated amount. King rightly ascribes this great difference to the fact that the rainfall is seldom or never properly distributed for the greatest efficiency. He also shows by actual experiments that by conservation in the soil of moisture from earlier rains the bad effect of improper distribution may be overcome to a considerable extent and the crop largely increased.

Looking at the subject from the standpoint of climatic conditions, there is no good reason why Tennessee, or the states southeast of Tennessee, should not be among our best corn-growing states. The summers are as warm as in the valleys of the Ohio, Missouri and upper Mississippi Rivers. The growing season is longer; the summer rainfall is more abundant

and the winter rainfall with the opportunity for moisture conservation is far greater. The fact, then, is that the yield of corn per acre in Tennessee is comparatively small, not because of climatic conditions, but because of failure to take advantage of them. Neither is the soil responsible for the deficiency, for many farmers scattered over all parts of the State have produced crops of corn that can not be excelled anywhere. The trouble is that most of us have not adapted our farming methods to our climatic and soil conditions. What is needed is a system of farm management and a rotation of crops that will utilize the abundant heat and moisture that our land receives.

CHART 6—COMPARATIVE CHART OF HEAT AND RAINFALL

The radiating lines represent the 12 months of the year. The concentric circles represent percentages counted from the center, which is zero. The irregular figure marked "Rainfall" represents the per cent of the annual rainfall that falls each month. The figure marked "Heat" represents the per cent of the year's effective heat that is received each month.

CHART 7—AVERAGE RAINFALL IN INCHES FOR THE THREE MONTHS
DECEMBER 1 TO FEBRUARY 28

We must have a system that will increase the humus content of the soil and a rotation that will maintain a cover on the ground in the winter as well as in summer. The double-cropping system as practiced by many of our progressive farmers is well adapted for this purpose and should be used on all land not in meadow or pasture. By this system the supply of humus in the soil is increased, making it more receptive and retentive of moisture, thus preventing erosion and storing up water for use when rain is deficient. The necessary humus may be supplied in two ways—the crop may be fed and the manure returned to the land, or the crop may be turned under for green manure. The latter method is quicker while the former is possibly the more economical. Either is good and one or the other is absolutely necessary. With this system, Tennessee may not only increase her corn yield until it is second to none, but she may increase all her other crops in proportion. And not only Tennessee, but

the whole region south and east of Tennessee may be benefited by the use of the double-cropping system. North of Kentucky the weather conditions will not admit of this method of increasing soil fertility. This system of double-cropping permits the utilization of the maximum amount of the abundant heat and rainfall with which this section is blessed.

Chart 6 graphically shows the relative distribution of heat and rainfall through the year in percentages of the total amount of each for each month.

The second climatic essential for the success of the double-cropping system is sufficient rainfall properly distributed throughout the year. Let us first consider the winter rainfall as shown in Chart 7. Over the greater portion of the six states under discussion the winter rainfall is twelve inches or more. *This amount of water falling on a bare soil in so short a time can not fail to do considerable damage, both by washing and leaching.* This is especially true if the soil is deficient in humus. Under these conditions a winter cover crop is a necessity for the sake of soil conservation, and would be profitable if no other benefit were received from it. Under the double-cropping system there is always a crop on the ground during the winter to conserve the soil and use the abundant rainfall.

We will next consider the annual distribution of rainfall—first for Tennessee, and then for the whole district under discussion.

The rainfall for Tennessee may be divided into four types according to its distribution through the year as shown in Chart 8. They differ chiefly in the relative heights of the winter and summer maxima. For the present, let us note the resemblance between these four types and the area covered by each as shown by Chart 9.

These types resemble each other in that each has a winter and a summer maximum and a May and October minimum. Type 1 occupies a narrow strip at the west end of the State, and Type 4 covers a still smaller area in the northeast corner. The remainder of the State, which is over ninety per cent, is covered by Types 2 and 3.

Type 1 Type 2 Type 3 Type 4

Four Types of Rainfall Distribution in Tennessee

CHART 8

Areas covered by four types of rainfall

CHART 9

CHART 10—DISTRIBUTION OF RAINFALL FOR TENNESSEE, SHOWING WET PERIODS IN WINTER AND SUMMER WITH DRIER PERIODS IN SPRING AND FALL

Chart 10 represents the average distribution of rainfall throughout the year for the whole State. Type 1, Chart 9, is the only one of the four types that differs materially from Chart 10, and as this type occupies less than one-tenth of the State, any conclusions based on Chart 10 may be applied with reasonable fairness to the State as a whole.

Chart 11 is identical with Chart 10, except that the heavy lines representing rainfall, instead of arising from a common base line, are arranged to radiate from a common center. This shows clearly the rain cycle for the year and enables us to locate the various operations of the double-cropping system in their relation to rainfall. As practiced by progressive farmers and the Tennessee Experiment Station, the winter cover crop is sown during the comparatively dry months of September and October and occupies the ground through the wet months of

CHART 11—DISTRIBUTION OF RAINFALL FOR TENNESSEE ARRANGED IN CIRCULAR FORM TO SHOW MORE CLEARLY THE ANNUAL CYCLE OF RAINFALL WITH WET PERIODS IN WINTER AND SUMMER AND DRIER PERIODS IN SPRING AND FALL

winter and early spring. It is ready to be turned under for green manure in March or April, or to be cut for forage during May, which is drier than the months either before or after it, and offers the most favorable opportunity for harvesting one crop and putting in another. This second crop planted in May covers the ground during the wet summer months and protects it from washing rains when they are most frequent, and is ready to harvest during the drier months of fall.

Chart 12 represents the average monthly rainfall for Tennessee, the Carolinas, Mississippi, Alabama, and Georgia. Comparison to Chart 15 is invited, showing that the rainfall in

CHART 12—AVERAGE DISTRIBUTION OF RAINFALL FOR THE SIX STATES OF TENNESSEE, THE CAROLINAS, MISSISSIPPI, ALABAMA, AND GEORGIA, SHOWING WET WINTER AND SUMMER AND DRIER SPRING AND FALL

these southern states is greater and better distributed than in the five central northern states named in Chart 15.

Chart 13 represents the average monthly rainfall for five selected stations, which are situated on a line extending across the section from west to east and passing very near its center. This chart is introduced to show that the rainfall distribution at different points over the section corresponds very closely to the general average as shown in Chart 12.

Chart 14 is a circular arrangement of the lines on Chart 12, and shows the average yearly cycle of rainfall for the whole

Savannah

Macon

Montgomery

Meridian

Vicksburg

CHART 13—AVERAGE DISTRIBUTION OF RAINFALL AT FIVE SELECTED STATIONS, SHOWING SIMILARITY TO THE AVERAGE FOR THE WHOLE REGION AS SEEN IN CHART 12

CHART 14—AVERAGE DISTRIBUTION OF RAINFALL FOR SIX STATES AS SHOWN IN CHART 12
ARRANGED IN CIRCULAR FORM TO SHOW ANNUAL CYCLE OF RAINFALL WITH
WET WINTER AND SUMMER AND DRIER SPRING AND FALL

region. Here, as in the State of Tennessee, the distribution of rainfall is ideal for the double-cropping system. The old plan of growing only one crop a year, which is practiced throughout the country, is a great success in the North, but is a glaring misfit in the South. This is due to the great difference in climatic conditions. First, the growing season north of Tennessee is generally too short for two crops in one year. Second, the ground is usually frozen in the winter and the winter rainfall is small and usually in the form of snow, so that there is no imperative demand for a winter cover crop to prevent washing. Third, the annual distribution of rainfall is entirely different from that of the Southern States, as is shown by Charts 15 and 16, which represent the five states of Ohio, Indiana, Illinois, Missouri, and Iowa.

CHART 15—AVERAGE DISTRIBUTION OF RAINFALL FOR THE FIVE STATES OF OHIO, INDIANA ILLINOIS, MISSOURI, AND IOWA

Instead of two wet seasons, we find only one, and that is in the late spring and summer.

CHART 16—CIRCULAR ARRANGEMENT OF DATA IN CHART 15, SHOWING ANNUAL CYCLE OF RAINFALL WITH WET SUMMER AND DRY FALL, WINTER, AND SPRING

There is only one dry season, which includes fall, winter and early spring. Crops put into the ground in the fall or spring occupy it during the wet summer season and are harvested in the late summer or fall. Here the conditions are just suited to the single-cropping system, and this system is suited to the conditions because it was developed under and for these conditions. It would be absurd for an Iowa farmer with his short growing season and his light winter rainfall to attempt to use the double-cropping system. But it would be no more absurd than for the Southern farmer to stick to a system developed to fit conditions entirely different from those under which he is working. He must have a system that fits his conditions if he is to get the most out of farming, and when he realizes that his conditions are almost perfectly adapted to the growing of two crops each year instead of one he will be in position to live up to his opportunity.

In discussion of the soils, the showing made from a production standpoint is comparatively poor, but this has been caused by failure to take advantage of the abundant rainfall and long growing season—to produce two crops each year, turning under or pasturing the winter crop so as to increase the humus content and fertility of the soil. The use of ground limestone, which can be secured at reasonable cost, makes the growing of red clover easy, and when red clover can be grown, we can soon restore the original fertility of the soil.

CROPS

Any crop produced in the United States can be grown in this section, with the exception of tropical fruits. West Tennessee grows as her principal crops, cotton and tobacco, both of which are readily convertible into cash; in addition, corn, wheat, oats and in fact all the cereal crops are produced. In addition, this section is the natural home of Bermuda, a heavy producing summer pasture and hay grass. After this grass starts growth in the spring, it will support two head of cattle or horses to the acre. By the use of bur clover with Bermuda, the pastures are green throughout the year. Again, Bermuda planted in gullies will quickly stop washing, and soon the sides of the gullies are covered and furnish a considerable pasture during the summer.

Japan clover (*Lespedeza*) is a great soil builder, particularly

in West Tennessee, where it will soon cover any abandoned land. It is a legume that furnishes a considerable pasture during the summer, and fields left in Japan clover are soon restored to their natural fertility. Hay made from this plant has a feeding value about equal to alfalfa and it produces from one to three tons per acre where it is planted on good land. If allowed to grow until late September or early October before cutting, it reseeds itself from year to year. Many abandoned fields in Tennessee growing only broom sedge, have been restored to cultivation by it, and Lespedeza pastures are unsurpassed for all kinds of stock.

Grasses for hay and pastures are produced in abundance in West Tennessee, and more attention should be given to their planting.

This section is one of the most favored for the economical growing of stock, but this has been sadly neglected. Any farmer in West Tennessee who will take advantage of the natural conditions, and raise stock, will soon have a fertile farm and be in position to make good returns on his investment. Too little attention has been given to this class of farming in this portion of the State.

Alfalfa can be readily grown in West Tennessee. All soils require liming and most of them respond to phosphorus. Three and four cuttings are made each year. It is not necessary to enter into any discussion of the merits of alfalfa, as it is too well known by farmers of all sections.

Sweet clover, crimson clover, bur clover, and hairy vetch may be grown to perfection in this section.

Soy beans and cowpeas furnish good crops when planted after a small winter grain crop has been harvested. Both are soil improvers of great importance, if fed and the manure returned to the soil.

Sorghum, both sweet and non-saccharine, makes splendid growth, and the sweet sorghum is used for making molasses and as a forage crop. In fact, West Tennessee soils will grow any crops that can be grown in the Temperate Zone, and in addition, has the important crops of cotton and tobacco as cash crops.

Experiments at the West Tennessee Station have shown conclusively that the soils of that section are easily restored. The main need of most of the soils is lime and humus, although in

growing alfalfa and other clovers and legumes, phosphoric acid has shown good results. The principal need is a winter cover crop to prevent washing and loss of plant food from the soil, which occur in this section because of the mild winters, with alternate freezing and thawing of the soil. Crimson clover is our best winter cover crop because of the fact that it is a winter-growing legume and furnishes cover for the ground and pasture for hogs, cattle, horses and sheep. If turned under in the late spring, besides supplying much needed humus to the soil, it materially increases its nitrogen content. Wheat, oats, rye, and barley all furnish excellent winter cover crops, but unquestionably crimson clover, if the land can be prepared and the seed planted under the proper conditions, far outclasses these.

The College of Agriculture, University of Tennessee, after experimenting, suggests the following rotations which are desirable for West Tennessee conditions:

Five-Year Live Stock Rotation.

- 1st year—Soy beans or cow peas.
- 2d year—Wheat.
- 3d year—Clover and grass.
- 4th year—Clover and grass.
- 5th year—Corn, followed by winter cover crop for pasture and green manure.

Five-Year General Farm Rotation.

- 1st year—Soy beans and cowpeas.
- 2d year—Wheat.
- 3d year—Clover.
- 4th year—Cotton, followed by cover crop.
- 5th year—Corn, followed by cover crop.

Three-Year Cotton Planter's Rotation.

- 1st year—Oats, cowpeas, cover crop.
- 2d year—Cotton.
- 3d year—Corn and cowpeas.

Four-Year Cotton Planter's Rotation.

- 1st year—Cotton, followed by cover crop.
- 2d year—Corn and cowpeas.
- 3d year—Oats and Japan clover.
- 4th year—Japan clover.

Liming is often necessary in order to get a satisfactory crop of clover.

GUIDE IN THE ESTABLISHMENT OF A ROTATION

The table on page 61 was prepared with a view to furnishing a practical guide during the establishment of the five-year general farming rotation. The spring of the year 1914 is taken as the commencement of the project and it is assumed that the land is in an ordinary state of fertility. According to this plan the rotation will not be in full operation until 1916, at least two years being required to accomplish this result.

It will be seen that after the establishment of the rotation—1916 and later—a change is made in the commercial fertilizers, both for corn and for the small-grain crop. This change consists in the omission of both the cottonseed meal and the muriate of potash. In the case of the rye, the manure would much more than replace these two ingredients and the residues from the clover and grass would be expected to furnish an appreciable supply of nitrogen for the corn which follows. Also in case of freshly cleared land neither meal nor potash salt is advised from the outset. Also, attention is called to the fact that in the experiments at the Jackson Station little or no increase has been obtained from phosphates of any kind.

MIDDLE TENNESSEE

Middle Tennessee has the Central Limestone Basin, the blue-grass area, where all the crops can be successfully grown. Here are the phosphate beds of Tennessee, and a great deal of the soil has this important plant food in abundance, and in addition it has an abundance of potash. Long-continued croppings have exhausted the soil supply of lime, but practically the entire area has outcroppings of high-grade limestone, and this can be had at a low cost. This section is devoted to growing the small grains, corn, sorghum, grasses, and clover. Much attention is devoted to stock raising for the markets, and more attention is being paid to this important class of farming each year. Both cotton and tobacco can be grown, but experience has shown that farmers can make better returns from other kinds of farming.

In this section rational rotations, with winter cover crops, are being generally adopted by the farmers. More attention is being paid each year to stock raising and dairying, and the use of stable manure and winter-growing legumes for green manure is

rapidly restoring the original fertility. This soil, with its red clay subsoil, is readily responsive to kind treatment. Some of the soils need acid phosphate, and practically all need lime, but the potash content is ample for many generations.

HIGHLAND RIM

Parts of the Highland Rim section of Middle Tennessee have long been regarded as too poor for profitable farming, and only in the last few years has a plan of rotation and fertilization been worked out which will make them among the best farm investments in the State. The section, as a whole, is admirably adapted to the growing of tobacco, producing yields not exceeded by those of any other section. Other crops, such as corn, small grains, clovers, soy beans and cowpeas, can be produced in paying quantities when attention is paid to fertilizing and liming these soils.

These soils are divided into practically two classes. One is a dark-red, or chocolate-colored, soil with red clay subsoil. This has an ample supply of potash, and with the liming of the soil and use of acid phosphate to fertilize the clovers, either to be turned under or fed and the manure saved and spread, is rapidly restored to its original fertility and produces large crops of corn, the small grains, grasses and clovers. It is well adapted to alfalfa, and several thousand acres are growing in this section, producing 3 to 5 tons per acre each year. When properly handled, there are few more productive lands anywhere than these dark-red lands of the Highland Rim.

The gray soil is not so good, but responds to good treatment. Lime, with an application of 200 pounds of 16% acid phosphate and about 20 pounds muriate of potash per acre to fertilize for the legumes, which should either be fed and the manure spread on the ground, or turned under as a green-manure crop, rapidly brings these soils to a profitable producing basis.

A system of crop rotations has been worked out, which if followed will prove profitable and at the same time improve the fertility of the soil.

List of Rotations

A—General Farming—Five-Year Rotation

1st year—Corn, followed by winter cover crop for pasture and green manure.

2d year—Cowpeas or soy beans.

3d year—Wheat or other small grain.

4th year—Clover and grass.

5th year—Clover and grass.

B—Green Manure and Grain—Three-Year Rotation

1st year—Corn, followed by winter cover crop for pasture and green manure.

2d year—Cowpeas or soy beans.

3d year—Wheat, followed by crimson clover for green manure.

NOTE—A most excellent rotation wherever crimson clover does well.

C—General Farming—Three-Year Rotation (or Longer if Desired)

1st year—Corn.

2d year—Wheat.

3d year—Clover, or clover and grass for one or more years.

NOTE—This is a well-known rotation, which has been followed successfully in many instances, but under average conditions Rotation A is considered to be decidedly preferable.

D—Pasture for Hogs—Two-Year Rotation

1st year—Corn and cowpeas.

2d year—Rye, sown in fall, and alsike or red clover, sown in spring.

E—Pasture for Hogs—Two-Year Rotation

1st year—Red or alsike clover and barley.

2d year—Soy beans or cowpeas.

TABLE—Five-year crop rotation (No. 1), showing crops, amount per acre of fertilizers, etc., suggested for each field during the establishment of the rotation—based on experiments conducted on gray-colored soils of Highland Rim—all operations assumed to begin in spring of 1914.

FIELD 1	FIELD 2	FIELD 3	FIELD 4	FIELD 5
1914—Corn—followed with winter cover crop. Acid phosphate 200 lbs., muriate of potash 20 lbs., cottonseed meal 100 lbs.	1914—Cowpeas. Acid phosphate 300 lbs., muriate of potash 50 lbs.	1914—Soy beans. Acid phosphate 300 lbs., muriate of potash 50 lbs.	1914—Spring oats. Acid phosphate 200 lbs., muriate of potash 20 lbs., nitrate of soda 100 lbs.	1914—Spring oats. Acid phosphate 200 lbs., muriate of potash 20 lbs., nitrate of soda 100 lbs.
1915—Soy beans. Acid phosphate 300 lbs., muriate of potash 50 lbs.	1915—Wheat (sown in Oct., 1914). Ground limestone 2 tons, acid phosphate 200 lbs. in fall, and manure 6-10 tons, top-dressed during the winter.	1915—Corn—followed with winter cover crop. Acid phosphate 200 lbs., muriate of potash 20 lbs., cottonseed meal 100 lbs.	1915—Red clover (sown late in Aug. or early in Sept., 1914). Ground limestone 2 tons, acid phosphate 300 lbs., muriate of potash 50 lbs.	1915—Clover and grass (sown late in Aug. or early in Sept., 1914). Ground limestone 2 tons, acid phosphate 300 lbs., muriate of potash 50 lbs.
1916—Wheat (sown in Oct., 1915). Ground limestone 2 tons, acid phosphate 200 lbs. in fall, manure 6-10 tons, top-dressed during the winter.	1916—Clover and grass (sown in spring, 1915).	1916—Soy beans. Acid phosphate 300 lbs., muriate of potash 25 lbs.	1916—Corn—followed with winter cover crop. Acid phosphate 200 lbs., muriate of potash 20 lbs.	1916—Clover and grass (for hay and pasture).
1917—Clover and grass (sown in spring, 1916).	1917—Clover and grass (for hay and pasture).	1917—Wheat (sown in Oct., 1916). Ground limestone 2 tons, acid phosphate 200 lbs. in fall, manure 6-10 tons, top-dressed during winter.	1917—Soy beans. Acid phosphate 300 lbs., muriate of potash 25 lbs.	1917—Corn—followed with winter cover crop. Acid phosphate 200 lbs., muriate of potash 20 lbs.
1918—Clover and grass (for hay and pasture).	1918—Corn—followed with winter cover crop. Acid phosphate 200 lbs., muriate of potash 20 lbs.	1918—Clover and grass (sown in spring, 1917).	1918—Wheat (sown in Oct., 1917). Acid phosphate 200 lbs. in fall, manure 6-10 tons, top-dressed during winter.	1918—Soy beans. Acid phosphate 300 lbs., muriate of potash 25 lbs.

Guide in the Establishment of a Rotation

A table has been prepared with a view to furnishing a practical guide during the establishment of the five-year general farming rotation. The spring of the year 1914 is taken as the commencement of the project and it is assumed that the land is in an ordinary state of fertility. According to this plan the rotation will not be in full operation until 1916, at least two years being required to accomplish this result.

It may be noted that after the establishment of the rotation—1916 and later—a change is made in the commercial fertilizers, both for corn and for the small-grain crop. This change consists in the omission of both the cottonseed meal and the muriate of potash. In the case of the rye, the manure would much more than replace these two ingredients and the residues from the clover and grass would be expected to furnish an appreciable supply of nitrogen for the corn which follows. Also, in case of freshly cleared land, neither meal nor potash salt is advised from the outset.

Notes on Table

1. The liming may be done earlier than directed in the table. In fact, although especially beneficial to clover, liming is apt to increase the yield of any of the crops to an appreciable extent. According to experimental evidence, two tons of ground limestone will be ample for at least five years, and possibly for twice that length of time.

2. The acid phosphate and muriate of potash should always be applied before planting the crop for which they are especially intended, and give best results when applied in the row for crops planted in rows. For broadcast-sown crops these materials may be applied broadcast before the land is turned, or may either be drilled in afterward or scattered broadcast and well harrowed into the soil.

3. As a cover crop after corn, to prevent loss during the winter, choice may be had of wheat, rye, crimson clover, and hairy vetch. Crimson clover is an ideal crop in some respects, but requires a fairly fertile soil in order to thrive. Even then, when sown in corn at the last working, it is apt to be killed before

winter by dry, hot weather. Rye would help to hold the crimson clover from freezing out during the winter, and the mixture may be sown considerably later than crimson clover alone. Hairy vetch can be sown later than crimson clover and any time during September is favorable, provided the soil-moisture supply is good. If sown in early October it is apt to go through the winter. Like crimson clover, it may be sown with either rye or wheat. Rye can be sown later than wheat and makes the earliest spring growth.

The cover crop should be turned under at an early stage of growth—in the case of rye and wheat not later than when in boot; but for crimson clover and vetch when in early bloom. Attention is called to the fact that vetch makes only a small growth during the fall, winter, and early spring, and is a vigorous grower only after warm weather comes in the spring; so that to get the most good out of this crop for green-manure purposes it must remain on the land later by several weeks than either of the others, or until about the middle of May. This would not, however, be a serious objection, as either cowpeas or soy beans can be planted to advantage after this date.

4. The manure is advised as a top-dressing on the wheat for the special purpose of getting a good stand of clover and grass from a spring seeding. If the land is of such quality that the manure is not needed for this purpose it may well be applied for the corn crop, which offers a greater possible increase in grain than the wheat.

In the absence of manure an extra amount of both the phosphate and potash is advised.

5. Either red or alsike clover may be used, and a mixture of the two is sometimes advisable. Alsike when sown in late summer or early fall would be expected to produce an appreciable part of the hay crop of the next two years, but red clover is apt to disappear after the first year. When spring-sown, one lasts about as long as the other, provided the red clover disease, which does not affect the alsike, is not serious.

In the case of a failure of clover, in the spring following the seeding, an application of 100 pounds per acre of nitrate of soda may be made to advantage for the grass, and should be applied as early in March as the spring growth begins.

In case of a poor stand of both clover and grass at the beginning of the second year, a seeding of 25 pounds per acre of Japan clover (*Lespedeza*) about the first of April is recommended.

6. For the red-colored soils of limestone origin the same fertilizers, etc., may be used, except that the potash can be reduced by one-half.

CUMBERLAND PLATEAU

The Cumberland Plateau is the least developed of all; yet with the addition of liberal applications of lime and phosphate these can be made to yield good crops. The soils of the Cumberland Plateau are mainly fine sandy loams. This kind of soil is easily cultivated, allows an excess of water to escape readily, is adapted to a great variety of crops, and contains enough clay to make it retentive of manure and fertilizer. This section is well adapted to fruits, forage crops, and Irish and sweet potatoes. This is considered the best section in Tennessee for the growing of Irish potatoes.

Analyses of these soils show a deficiency of phosphoric acid and nitrogen, the phosphorus can be cheaply supplied and the nitrogen produced by growing legumes and turning them under or feeding and returning the manure to the soil.

Most of the plateau section remains to be cleared, and there appears no reason why the new lands should not be put at once under a rotation that, with the aid of liming, phosphating and the careful saving and use of farmyard manure, will maintain a high state of productiveness. Generally speaking, a long rotation, covering a period of five or more years, is better than a short two- or three-year rotation. The first rotation given below is the best adapted for the Cumberland Plateau.

List of Rotations

1. General Farming—Five-Year Rotation

1st year—Corn, followed by winter cover crop of rye for pasture and green manure.

2d year—Cowpeas or soy beans.

3d year—Rye or other small grain.

4th year—Clover and grass.

5th year—Clover and grass.

Note—Potatoes could be introduced the 5th year after clover instead of clover and grass.

2. General Farming—Four-Year Rotation

- 1st year—Corn—rye cover crop.
- 2d year—Sorghum and peas sown broadcast.
- 3d year—Clover and grass.
- 4th year—Clover and grass.

3. Potato Grower's Four-Year Rotation

- 1st year—Potatoes, followed by cowpeas and millet for hay.

Note—The hay crop is sown at last working of the potatoes and is harvested before the potatoes are dug.

- 2d year—Spring oats and Canadian field peas, followed by buckwheat, with which clover and grass are seeded.

- 3d year—Clover and grass.

- 4th year—Clover and grass.

This is a rotation practiced by Mr. O. H. Overdell on recently cleared land near Crossville.

4. Potato Grower's Three-Year Rotation

- 1st year—Cowpeas, hogged off and followed by rye cover crop for pasture.

- 2d year—Potatoes, followed by rye cover crop for pasture.

- 3d year—Corn, with cowpeas and rye sown at last cultivation.

Guide in the Establishment of a Rotation

A table has been prepared with a view to furnishing a practical guide during the establishment of the five-year general farming rotation. The spring of the year 1914 is taken as the commencement of the project and it is assumed that the land is in an ordinary state of fertility. According to this plan the rotation will not be in full operation until 1916, at least two years being required to accomplish this result.

It may be noted that after the establishment of the rotation—1916 and later—a change is made in the use of commercial fertilizers, both for corn and for the small-grain crop. This change consists in the omission of both the cottonseed meal and the muriate of potash. In the case of the rye, the manure would much more than replace these two ingredients and the residues from the clover and grass would be expected to furnish an appreciable supply of nitrogen for the corn which follows. Also, in case of freshly cleared land neither meal or potash salt is advised from the outset.

TABLE—Five-year crop rotation (No. 1), showing crops, amount per acre of fertilizers, etc., suggested for each field during the establishment of the rotation—based on experiments conducted on Cumberland Plateau soils—all operations assumed to begin in spring of 1914.

FIELD 1	FIELD 2	FIELD 3	FIELD 4	FIELD 5
1914—Corn—followed by a winter cover crop of rye. Acid phosphate 200 lbs., muriate of potash 10 lbs., and cottonseed meal 100 lbs.	1914—Cowpeas. Acid phosphate 300 lbs., muriate of potash 20 lbs.	1914—Soy beans. Acid phosphate 300 lbs., muriate of potash 20 lbs.	1914—Spring oats. Acid phosphate 200 lbs., muriate of potash 10 lbs., nitrate of soda 80 lbs.	1914—Spring oats. Acid phosphate 200 lbs., muriate of potash 10 lbs., nitrate of soda 80 lbs.
1915—Soy beans. Acid phosphate 300 lbs., muriate of potash 20 lbs.	1915—Rye. Ground limestone 2 tons, acid phosphate 200 lbs., manure 6-10 tons.	1915—Corn—followed by a winter cover crop of rye. Acid phosphate 200 lbs., muriate of potash 10 lbs., cottonseed meal 100 lbs.	1915—Red clover (sown in Aug., 1914). Ground limestone 2 tons, acid phosphate 300 lbs., muriate of potash 25 lbs.	1915—Clover and grass (sown Aug., 1914—hay).
1916—Rye. Ground limestone 2 tons, acid phosphate 200 lbs., manure 6-10 tons.	1916—Clover and grass (hay).	1916—Soy beans. Acid phosphate 300 lbs., muriate of potash 20 lbs.	1916—Corn—followed by a winter cover crop of rye. Acid phosphate 200 lbs.	1916—Clover and grass (chiefly for pasture).
1917—Clover and grass (hay).	1917—Clover and grass (chiefly for pasture).	1917—Rye. Ground limestone 2 tons, acid phosphate 200 lbs., manure 6-10 tons.	1917—Soy beans. Acid phosphate 300 lbs., muriate of potash 20 lbs.	1917—Corn—followed by a winter cover crop of rye. Acid phosphate 200 lbs.
1918—Clover and grass (chiefly for pasture).	1918—Corn—followed by a winter cover crop of rye. Acid phosphate 200 lbs.	1918—Clover and grass (hay).	1918—Rye. Acid phosphate 200 lbs., manure 6-10 tons.	1918—Soy beans. Acid phosphate 300 lbs., muriate of potash 20 lbs.

EAST TENNESSEE

East Tennessee, with its varied soils, is especially adapted to general farming and stock raising, but truck crops, strawberries in particular, have proven profitable. Peaches, early apples, etc., can be raised to advantage on the ridges and higher hills. These lands nearly all respond to phosphate and lime. All the farm crops, such as corn, small grains, grasses, clover and alfalfa, do well under favorable conditions. Considerable attention is given to cattle raising. In the vicinity of the mountains the free grazing lands which are accessible during the summer months can be utilized to great advantage, the cattle being carried through the winter on corn fodder and winter pasture. Most of the cattle are sold to be finished at other points, but some of the more progressive farmers have built silos and finish their beef cattle ready for the markets.

A great many strawberries are produced each year in East Tennessee, besides considerable quantities of the various garden crops.

Proper crop rotations, with the use of phosphate and lime for the legumes, will readily build up most of the East Tennessee soils to a high state of productiveness. Any of the general farm crop rotations recommended for the Highland Rim are good for East Tennessee conditions. As a matter of fact, better farm practice prevails generally over East Tennessee than in other sections of the State.

FRUITS

Tennessee offers all the conditions necessary to successful fruit culture—proper soil, climate, drainage and altitude. These, combined with scientific methods, produce as fine fruit as can be grown in any part of the world. Apples, peaches, pears, plums, grapes, strawberries, are grown in great abundance, though there is no reason why the production can not be largely increased. Tennessee is the real home of the grape. They are found in large quantities in their wild state, while the varieties usually grown in the Temperate Zone are very prolific. Vineyards demand no more attention here than elsewhere, while the yield is all that could be desired. In West Tennessee is what is known as the strawberry belt, and the growers place the crop

on the Northern markets at the least possible cost. Strawberries of superior quality are also grown in Middle and East Tennessee. Berries of every variety are successfully grown. Wild blackberries and dewberries are plentiful. Ample transportation facilities enable the shipments to compete in point of time with the most favored localities. Tennessee is also known as a great peach State, and it is seldom indeed that there is a complete failure of this crop. Growers are turning their attention to apples in all divisions of the State. A yield of twenty to thirty-five bushels of apples to the tree is by no means unusual.

ADVANTAGES TO THE SETTLER

Tennessee to-day offers many advantages to the prospective settler, in the way of reasonably priced lands, good climate, ample rainfall and long growing season.

The information in this pamphlet is compiled from official bulletins issued by the College of Agriculture, University of Tennessee, and can be depended upon. The farmers of this State have at their command the services of this College, and in addition, under the Division of Extension, a majority of the counties have county agents who are educated and trained to give the farmers in the section where located the benefit of accurate information as to agricultural questions.

Tennessee will welcome the settler who desires to make his home within her borders. She needs young men to assist in developing her natural resources. Opportunity is here, and awaits the ambitious farmer who is seeking a location.

The following data compiled from the United States Department of Agriculture Yearbook for 1914 give some very interesting information. They show that of the main crops grown in Tennessee the values per acre equal those in most of the states, and on some commodities, such as barley and hay, they are higher than any. By good farming, the yield per acre in Tennessee can be brought to the top, and on account of her closeness to the good markets her farm products will always command a good price:

<i>Corn, Bushels</i>	<i>Tenn.</i>	<i>Ky.</i>	<i>Ill.</i>	<i>Ind.</i>	<i>Iowa</i>	<i>Neb.</i>	<i>Mich.</i>	<i>Kas.</i>	<i>Wis.</i>
10 yr. aver., per acre.....	24.9	27.6	34.8	37.1	34.9	25.3	33.7	19.9	36.3
1914 average.....	24.	25.	29.	33.	38.	24.5	36.	18.5	40.5
5-yr. aver. val. per acre....	\$15.82	\$16.00	\$16.82	\$18.57	\$17.17	\$10.49	\$20.91	\$ 8.21	\$21.50
Value per acre, 1914.....	16.32	16.00	17.69	19.14	20.90	12.98	24.12	11.66	26.32
<i>Wheat, Bushels</i>									
10-yr. aver., per acre.....	11.1	12.6	16.	16.	17.4	17.9	16.4	14.1	17.7
1914 average.....	15.5	16.5	18.5	17.4	18.6	18.6	19.7	20.5	19.1
5-yr. aver. val. per acre....	\$12.21	\$12.71	\$13.90	\$13.66	\$16.25	\$13.43	\$15.07	\$12.76	\$16.55
Value per acre, 1914.....	16.28	17.00	18.68	17.92	17.86	17.67	20.29	19.48	19.10
<i>Oats, Bushels</i>									
10-yr. aver., per acre.....	21.2	21.3	31.5	29.	31.9	25.3	30.8	24.9	32.5
1914 average.....	23.	21.	29.3	28.5	33.	32.	33.5	33.5	27.
5-yr. aver. val. per acre....	\$10.77	\$10.74	\$11.68	\$11.15	\$11.57	\$ 8.80	\$12.67	\$10.42	\$12.12
Value per acre, 1914.....	12.19	11.13	12.89	12.26	13.53	12.80	15.08	14.07	11.61
<i>Barley, Bushels</i>									
10-yr. aver., per acre.....	24.3	25.8	29.	25.7	26.2	21.3	25.2	17.2	27.5
1914 average.....	27.	28.5	29.5	25.	26.	23.5	26.	24.5	27.3
5-yr. aver. val. per acre....	\$20.81	\$20.09	\$18.44	\$16.39	\$16.21	\$ 8.61	\$16.88	\$ 7.48	\$17.98
Value per acre, 1914.....	22.14	21.94	18.00	16.75	14.30	11.04	16.90	11.52	16.93
<i>Hay, Tons</i>									
10-yr. aver., per acre.....	1.37	1.20	1.20	1.24	1.39	1.39	1.29	1.28	1.49
1914 average.....	1.20	.95	.85	1.00	1.38	1.69	1.28	1.51	1.75
5-yr. aver. val. per acre....	\$19.20	\$15.95	\$14.47	\$15.02	\$12.31	\$10.36	\$16.68	\$10.24	\$17.49
Value per acre, 1914.....	20.40	15.20	12.24	14.10	13.94	11.66	15.36	11.17	16.28

Constructive live stock breeding is being carried on all over Tennessee. Herds of pure-bred cattle, both milk and beef, are being established, and the value of farm animals is rapidly increasing. Foundation studs of Percherons have been established for the purpose of furnishing stallions to Tennessee farmers at reasonable prices, to be used in producing a heavier type of farm horses and mares. A foundation herd of milking Shorthorns has been started by the College of Agriculture, and the bull calves from this herd will be available to communities interested in improved cattle.

Below is a statement secured from the United States Department of Agriculture, showing number and value of farm animals in Tennessee in 1914:

	<i>Number</i>	<i>Value</i>
Horses.....	346,000	\$10,136,000
Mules.....	270,000	34,290,000
Milch cows.....	355,000	14,555,000
Other cattle.....	503,000	11,267,000
Sheep.....	674,000	2,494,000
Hogs.....	1,501,000	11,708,000

The spirit of coöperation between the railroads, banks, business men, and the College of Agriculture, Division of Extension,

Department of Agriculture and the farmers is well developed and all are working hand in hand for the agricultural development of the State.

The Department of Agriculture will gladly give any information it has as to localities, prices of land, or other data.

Acknowledgment is hereby made for courtesies shown by members of faculty, College of Agriculture, University of Tennessee, and to Mr. A. D. Knox, Assistant Agricultural Agent of the Nashville, Chattanooga & St. Louis Railway.

If interested, write

H. K. BRYSON,
Commissioner of Agriculture.
Nashville, Tenn.

A Tennessean's Creed

I BELIEVE IN TENNESSEE

- the home of more than two million people, through whose veins flow the purest of Anglo-Saxon blood, and whose ancestors, by deeds of valor, made a glorious history.
 - a State where capital and labor work side by side in harmonious relation; where every home is a kingdom, and each child a priceless jewel.
 - where the cold breeze of the north meets the warm zephyrs of the south, making a salubrious climate in which it is a pleasure to live.
 - with her hills studded with giant forests, beneath whose roots are found an inexhaustible store of minerals and valuable ores.
 - on whose blue grass hills graze live stock in lordly herds and unnumbered flocks, and whose fertile fields contribute liberally to the markets of the world.
 - I love the music of her industries, where the buzz of the saw, the hum of the spindle, the roar of the furnace, blend in wonderful harmony.
- To me, citizenship in Tennessee is a privilege, and during the years to come I shall co-operate in making the State bigger and better by being a true, loyal and enthusiastic Tennessean.
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