

ISSUED MARCH 18, 1916

U. S. DEPARTMENT OF AGRICULTURE.

BUREAU OF SOILS—MILTON WHITNEY, Chief.

IN COOPERATION WITH THE NEW YORK STATE COLLEGE OF AGRICULTURE,  
CORNELL UNIVERSITY, B. T. GALLOWAY, DIRECTOR; E. O. FIPPIN,  
IN CHARGE OF SOIL SURVEY.

---

SOIL SURVEY OF CLINTON COUNTY,  
NEW YORK.

BY

E. T. MAXON, OF THE U. S. DEPARTMENT OF AGRICULTURE, AND  
W. R. CONE, OF THE NEW YORK STATE COLLEGE OF AGRICULTURE.

---

W. E. McLENDON, INSPECTOR, NORTHERN DIVISION.

---

[Advance Sheets—Field Operations of the Bureau of Soils, 1914.]



WASHINGTON:  
GOVERNMENT PRINTING OFFICE.

1916.

**BUREAU OF SOILS.**

MILTON WHITNEY, *Chief of Bureau.*  
ALBERT G. RICE, *Chief Clerk.*

SOIL SURVEY.

CURTIS F. MARBUT, *In Charge.*  
G. W. BAUMANN, *Executive Assistant.*

COMMITTEE ON THE CORRELATION AND CLASSIFICATION OF SOILS.

CURTIS F. MARBUT, *Chairman.*  
HUGH H. BENNETT, Inspector, Southern Division.  
W. EDWARD HEARN, Inspector, Southern Division.  
THOMAS D. RICE, Inspector, Northern Division.  
W. E. McLENDON, Inspector, Northern Division.  
MACY H. LAPHAM, Inspector, Western Division.  
J. W. McKERICHER, *Secretary.*

ISSUED MARCH 18, 1916

U. S. DEPARTMENT OF AGRICULTURE.

BUREAU OF SOILS—MILTON WHITNEY, Chief.

IN COOPERATION WITH THE NEW YORK STATE COLLEGE OF AGRICULTURE,  
CORNELL UNIVERSITY, B. T. GALLOWAY, DIRECTOR; E. O. FIPPIN,  
IN CHARGE OF SOIL SURVEY.

---

SOIL SURVEY OF CLINTON COUNTY,  
NEW YORK.

BY

E. T. MAXON, OF THE U. S. DEPARTMENT OF AGRICULTURE, AND  
W. R. CONE, OF THE NEW YORK STATE COLLEGE OF AGRICULTURE.

---

W. E. McLENDON, INSPECTOR, NORTHERN DIVISION.

---

[Advance Sheets—Field Operations of the Bureau of Soils, 1914.]



WASHINGTON:  
GOVERNMENT PRINTING OFFICE.

1916.

## LETTER OF TRANSMITTAL.

---

U. S. DEPARTMENT OF AGRICULTURE,  
BUREAU OF SOILS,  
*Washington, D. C., July 27, 1915.*

SIR: A soil survey of Clinton County, N. Y., was made as a part of the Field Operations of the Bureau of Soils for 1914, in cooperation with the New York State College of Agriculture, Cornell University. The selection of this county for survey was made after conference with State officials.

I have the honor to transmit herewith, and to recommend for publication as advance sheets of Field Operations of the Bureau of Soils for 1914, in accordance with law, the manuscript and map covering this work.

Respectfully,

MILTON WHITNEY,  
*Chief of Bureau.*

Hon. D. F. HOUSTON,  
*Secretary of Agriculture.*

# CONTENTS.

SOIL SURVEY OF CLINTON COUNTY, NEW YORK. By E. T. MAXON, OF THE		Page.
U. S. DEPARTMENT OF AGRICULTURE, and W. R. CONE, OF THE NEW YORK		
STATE COLLEGE OF AGRICULTURE.....		5
Description of the area.....		5
Climate.....		8
Agriculture.....		9
Soils.....		13
Coloma series.....		14
Coloma stony fine sandy loam.....		15
Coloma fine sandy loam.....		16
Coloma loam.....		17
Coloma fine sand.....		17
Coloma gravelly fine sandy loam.....		18
Dover series.....		18
Dover loam.....		19
Dover fine sandy loam.....		19
Dover gravelly fine sandy loam.....		20
Dover stony loam.....		21
Gloucester series.....		21
Gloucester stony fine sandy loam.....		22
Vergennes series.....		22
Vergennes clay.....		22
Vergennes clay loam.....		23
Vergennes fine sandy loam.....		24
Vergennes fine sand.....		25
Plainfield series.....		25
Plainfield fine sand.....		26
Plainfield fine sandy loam.....		26
Plainfield sand.....		27
Plainfield gravelly fine sand.....		27
Plainfield stony fine sandy loam.....		28
Merrimac series.....		28
Merrimac fine sandy loam.....		28
Merrimac fine sand.....		29
Otisville series.....		29
Otisville gravelly fine sandy loam.....		30
Otisville fine sand.....		30
Hinckley series.....		31
Hinckley fine sand.....		31
Hinckley sand.....		31
Podunk series.....		31
Podunk fine sandy loam.....		32
Miscellaneous material.....		33
Rough stony land.....		33
Rock outcrop.....		33
Coastal beach.....		33
Marsh.....		34
Meadow.....		34
Muck.....		34
Summary.....		35

## ILLUSTRATIONS.

---

### FIGURE.

	Page.
<b>Fig. 1.</b> Sketch map showing location of the Clinton County area, New York..	5

### MAP.

Soil map, Clinton County sheet, New York.

# SOIL SURVEY OF CLINTON COUNTY, NEW YORK.<sup>1</sup>

By E. T. MAXON, of the U. S. Department of Agriculture, and W. R. CONE, of the New York State College of Agriculture.

## DESCRIPTION OF THE AREA.

Clinton County is situated in the extreme northeastern part of New York. The land boundaries are the Province of Quebec, Canada, on the north, Franklin County on the west, and Essex County on the south. The Ausable River forms a part of the boundary between Clinton and Essex Counties, while Lake Champlain separates the county and State from Vermont on the east. Two small islands, Crab and Valcour, in Lake Champlain, are included with Clinton County. Plattsburg, the largest city in the county, is 168 miles north of Albany and 73 miles south of Montreal, Canada. The county is nearly 40 miles long from north to south and about 29 miles wide. Its total area is 1,049 square miles, or 671,360 acres.

The county has a range in elevation of over 3,700 feet. The highest point is in the western part of the county on Lyon Mountain, which reaches 3,830 feet above sea level. Lake Champlain lies only 101 feet above sea level.

In the eastern part of the county along Lake Champlain there is a comparatively narrow belt of level to gently rolling country, ranging in elevation from 100 to about 500 feet above sea level. This belt is nearly 5 miles wide in the lower part and gradually broadens out toward the north, taking in the entire northeastern corner of the county. A little less than one-third of the entire area of the county is embraced within this lower section. The lower part of this belt is underlain by limestone and the higher by sandstone. In some places, however, the sandstone extends farther eastward than at others. In this region the soils, where not derived from light sandy and stony deposits, are fertile and easily tilled; in fact, this belt constitutes the most highly developed farming region in the county.

Bordering this low strip along the lake front is a foothill region underlain by sandstone and quartzite. This has a rolling to hilly

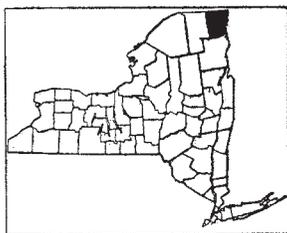


FIG. 1.—Sketch map showing location of the Clinton County area, New York.

<sup>1</sup> In the preparation of this report assistance was freely given by C. B. Tillson, county agent, in preparing agricultural statistics from the farmers' and census reports.

topography and an elevation of 500 to 1,000 feet above sea level, although in the northwestern corner of the county the rolling, non-mountainous areas range in elevation up to 1,400 or 1,500 feet. This region may be defined as bordering the upper branches of the larger streams, such as the Big Chazy, Saranac, and Ausable Rivers. The soils in this belt are uniformly free from limestone. General farming and dairying are the main occupations. Potatoes are the predominant cash crop and have a wide reputation for quality.

The western and southwestern parts of Clinton County, included in the towns<sup>1</sup> of Ellenburg, Dannemora, Saranac, and Black Brook, are characterized by massive ridges trending northeast and southwest, with intervening steep-sided valleys. The southerly slopes are usually steep and precipitous, while the northerly slopes are drift covered and more gradual. In general, this region lies at an elevation of 1,000 to 2,000 feet above sea level, only the more prominent and rugged peaks rising above this height. The highest points are Lyon and Catamount Mountains, which rise to elevations of over 3,000 feet above sea level. Crystalline rocks, granite and gneiss, are the underlying formations. A few valuable deposits of iron ore are being developed in this region. The general roughness of the topography and the stony character of the soil render it unsuitable for cultivated crops.

The drainage of the county is well established. The streams flow in a general easterly direction into Lake Champlain. The largest stream in the northern part of the county is the Big Chazy River, the tributaries of which drain the towns of Clinton, Ellenburg, Dannemora, Mooers, Altona, and Champlain. The English and Little Chazy Rivers also help to drain this part of the county. The Saranac River, the largest stream in the county, with its source in the northern part of the Adirondack Mountains, follows a north-easterly course through the south-central part of the county, draining the towns of Saranac, Black Brook, Dannemora, Schuyler Falls, Beekmantown, and Plattsburg. The Salmon, Little Ausable, and Ausable Rivers thoroughly drain the south and southeastern part of the county. The drainage of the western slope of Lyon Mountain empties into the upper Chateaugay Lake, whence it is carried by the Chateaugay River into the St. Lawrence.

These streams provide abundant power for the numerous grist and pulp mills of the county. The Saranac and Ausable Rivers in particular are utilized for floating pulp wood from the forested areas along their banks to the pulp mills.

The first permanent white settler within the present limits of Clinton County was John La Frombis, who located near Chazy in

---

<sup>1</sup> The word "town" as used in New York and New England is synonymous with township.

1763.<sup>1</sup> A sawmill and dwelling were constructed on the Saranac River near the present site of Plattsburg prior to 1769. Mooers, in the northern part of the county, was settled in 1796. Canadian and Scotch refugees were the first white settlers in the town of Champlain. Dannemora, the last town to be established in the county, was settled in 1836.

Clinton County was formed from a part of Washington County in 1788, and included the present counties of Franklin and Essex. Essex County was set apart 11 years later, and Franklin County was formed in 1808.

In 1790 the population of the county was 1,036, while in 1910 it was 48,230. The city of Plattsburg has a population of 11,138, or 23.1 per cent of all the people in the county. It is the only place within the county that has a population exceeding 2,000. During the decade from 1900 to 1910 there was an increase of 2,704 in the population of Plattsburg, which was largely drawn from the rural districts, the increase for the county as a whole during that period being only 800. Some of the most important places in the county are Rouses Point, Champlain, Keeseville, Dannemora, Mooers, and Peru. A State prison is located at Dannemora, and an Army post at Plattsburg.

Summer tourists frequent many of the lakes within or bordering the county, creating a demand for a great deal of farm produce.

The county has good transportation facilities. Lake Champlain has from the first been utilized as a means of transporting the vast quantities of lumber cut in this county. At present extensive terminals are under construction in anticipation of the trade that will come after the completion of the new barge canal through the State.

As early as 1790 some wagon roads had been completed within the county. Since then macadamized roads have been built and others are under construction.

In 1850 the northern part of the county was connected by railroad with Ogdensburg and Boston, and in 1873 the eastern part obtained rail connections with New York. At present the Rutland Railroad traverses the northern part of the county east and west, and the Delaware & Hudson, with various branches, furnishes railroad accommodations for the central, eastern, northeastern, and southeastern parts of the county. New York, Albany, and Boston are of easy access. Potatoes, the chief market crop, are shipped mainly to New York.

The county is well supplied with schools, churches, and rural free delivery routes.

---

<sup>1</sup> See Histories of Clinton and Franklin Counties, N. Y., by D. H. Hund.

## CLIMATE.

Clinton County is characterized by long, cold winters and short, mild summers. The temperature along the eastern border of the county is undoubtedly moderated by Lake Champlain. At Plattsburg the mean annual temperature is 43.8° F. The average growing season, or the period between late frosts in the spring and early frosts in the fall, is 151 days. Farther away from the lake toward the higher uplands, as well as in the northern part of the county, the growing season is shorter.

In the eastern part of the county the average annual rainfall is 30.52 inches. Each of the three growing months, June, July, and August, has more than 3 inches of precipitation.

The following table of climatological data has been prepared from the records of the Weather Bureau station at Plattsburg:

*Normal monthly, seasonal, and annual temperature and precipitation at Plattsburg.*

Month.	Temperature.			Precipitation.		
	Mean.	Absolute maximum.	Absolute minimum.	Mean.	Total amount for the driest year.	Total amount for the wettest year.
	° F.	° F.	° F.	Inches.	Inches.	Inches.
December.....	22.3	65	-22	2.01	1.55	2.04
January.....	17.7	64	-22	2.01	1.67	4.10
February.....	18.2	56	-25	1.62	1.00	3.56
Winter.....	19.4			5.64	4.22	9.70
March.....	27.2	68	-12	2.23	2.00	7.12
April.....	41.4	88	10	1.97	1.26	4.09
May.....	54.9	93	19	2.55	2.00	.70
Spring.....	41.2			6.75	5.26	11.91
June.....	64.8	98	32	3.11	1.60	7.19
July.....	69.4	99	35	3.55	2.20	3.75
August.....	67.3	94	35	3.20	1.94	2.76
Summer.....	67.2			9.86	5.74	13.70
September.....	59.5	95	29	3.09	1.12	6.25
October.....	48.1	88	17	2.81	1.39	3.57
November.....	34.7	68	-3	2.37	1.09	2.13
Fall.....	47.4			8.27	3.60	11.95
Year.....	43.8	99	-25	30.52	18.82	47.26

Average date of first killing frost in fall, Oct. 9; of last in spring, May 10. Date of earliest killing frost in fall, Sept. 25; of latest in spring, June 23.

## AGRICULTURE.

Clinton County was originally heavily timbered with pine, spruce, hemlock, and the hardwoods, and lumbering became the chief occupation of the early settlers. Much of the timber was rafted down the lake into Canada. So engrossed were the people with this industry that it was necessary to import foodstuffs for several years. The discovery of iron and the construction of forges and charcoal kilns created a great demand for wood to burn. There is hardly a small stream in the county on which there was not at one time a forge and charcoal kiln. Lumbering continued to be the chief occupation for many years, and considerable quantities of saw logs and pulp wood are still being cut. Many of the prosperous farmers of Clinton County were formerly successful lumbermen.

The eastern part of the county was the earliest to be developed agriculturally. Wheat was the most important crop at first, but its production gradually declined with the development of the western part of the State. Hay, oats, barley, buckwheat, corn, and potatoes have been the staple crops for the last 50 years.

In order to bring out the relative standing of the agricultural interests of the county, the following table has been compiled from data given by the census of 1910:

*Acreage and production of the principal crops in Clinton County, and yield per acre for the State, 1909.*

	Acreage.	Production.	Average yield per acre.	Average yield per acre for State.
	<i>Acres.</i>	<i>Bushels.</i>	<i>Bushels.</i>	<i>Bushels.</i>
Potatoes.....	8,673	1,325,041	152.8	123.2
Oats.....	26,380	649,439	24.6	26.7
Buckwheat.....	5,470	102,833	18.8	19.9
Corn.....	4,923	154,628	31.4	35.4
Barley.....	1,517	32,853	21.6	24.0
		<i>Tons.</i>	<i>Tons.</i>	<i>Tons.</i>
Hay and forage.....	91,171	103,362	1.1	1.4

Hay has been an important crop since the early settlement of the county. It consists of timothy alone and timothy and clover mixed. Clover is practically the only legume grown in the county. It does best on the Dover and Vergennes soils. Timothy is extensively grown throughout the county, the best yields being obtained from the heavy Vergennes soils, especially the clay and clay loam. The Dover loam is also a good timothy soil. As a rule the land is left in sod too long. Mustard is the most serious weed pest in the

hay. Most of the hay for market is grown in the eastern and northeastern parts of the county.

Alfalfa has also been grown in an experimental way. In 1910 the census reported a total acreage of 33 acres, yielding 49 tons. With sufficient care in preparing the seed bed and the application of stable manure and lime, this crop could be profitably grown on some of the soils of the county, especially those underlain with limestone, such as the Dover series and some of the Vergennes soils.

Of the cereals, oats are the most extensively grown, yields of 75 to 100 bushels per acre of grain of excellent quality frequently being obtained on the Coloma soils, in the northern part of the county. Very little or no fertilizer is used for this crop.

Although nearly 5,000 acres in the county were planted to corn in 1909, it is not a good corn-growing section, the climatic conditions being unfavorable.

Potatoes have always been an important crop. As early as 1869 the production amounted to about 800,000 bushels, while in 1909, according to the census, 8,675 acres were devoted to the crop, producing 1,325,041 bushels. The soils mainly devoted to this crop are the Coloma fine sandy loam and stony fine sandy loam. The sections around Burnt Hill and Ellenburg have a wide reputation for the size and quality of their potato crops. Average yields of 200 bushels per acre are obtained in those sections. The Green Mountain and Rural New Yorker are the most commonly grown varieties. At the present time some attention is being given to the production of seed potatoes. Commercial fertilizers are used for this crop. No serious blights or other diseases are prevalent in the potato region of the county. New York City is the principal market for the crop.

Commercial fruit growing was only recently introduced into the county. A number of small and a few large commercial apple orchards have been established. These seem to be successful and an expansion of this industry may be expected. In 1910 there were 147,313 apple trees in the county, located mainly upon the Dover loam and fine sandy loam, in the southeastern part of the county near Peru. The varieties of apples grown in the more successful fruit sections of the county are the Fameuse, Wealthy, and McIntosh.

The keeping of sheep for wool early became an important industry in Clinton County. This industry was at its height during the decade ending in 1869, there being over 40,000 sheep in the county in the latter year. At the last census there were only 11,069 sheep in the county, and these were owned by a comparatively few farmers.

According to the census there were 10,000 dairy cows in the county in 1859 and 25,032 in 1909.

General farming is most extensively developed in the eastern part of the county, and dairying in the northern part, especially in the

territory served by the Rutland Railroad. Of the 25,032 dairy cows in the county, approximately 70 per cent are found in the northern part. The Coloma soils support more cows than those of any other series. The value of the dairy products of the county in 1909 was \$838,445, or \$33.49 per cow. The value of the same products for the State as a whole was \$51.54 per cow. Some of the milk is manufactured into butter and cheese, the remainder being shipped raw. Recently shipments of cream have been made. There are a few purebred dairy herds, mostly Holsteins. Some Ayrshires and Guernseys are also kept. About one-half of the farmers keep a few hogs for home killing.

In the following table the number and value of live stock in the county are shown:

*Number and value of live stock in Clinton County.*

	Number.	Value.	Average value.
Cattle.....	40,392	\$1,190,932	\$29.48
Horses.....	10,415	1,310,434	125.82
Sheep.....	11,069	65,814	5.95
Poultry.....	98,617	61,052	.62
Bees, colonies .....	1,829	6,546	3.58

The farms of this county are exceptionally well equipped. During the decade from 1899 to 1909 the equipment of farm machinery increased over 75 per cent, while for the State as a whole the increase was only 49 per cent. Modern machinery is to be seen upon all the better farms.

The methods of cultivation throughout the county are generally good. The more intelligent farmers have come to realize the necessity for larger crop yields and greater economy in farm management, in order to meet the increasing cost of farm machinery, work animals, and labor. They have the assistance of a county agent, whose business it is to advise them upon matters of farm administration. The importance of the adaptation of soils to crops has been generally recognized.

Crop rotations are practiced in a general way on most of the farms in this county. Upon the heavier soils, such as the clay and clay loam of the Vergennes series, hay is the main crop. Fields used for hay are generally mowed eight years, or until the grass gets too weedy to market, when it is plowed under and oats or barley grown for one year. Very little commercial fertilizer is used in growing the hay grasses.

The principal potato soils are the Coloma fine sandy loam and stony fine sandy loam. Some potatoes are also grown upon the

Dover fine sandy loam. The rotation followed on these soils consists of hay one, two, or three years, potatoes one year, then oats or barley, followed by timothy. Potatoes are the only crop to which commercial fertilizers are applied, the usual application being about 500 pounds per acre of a 2-8-10 mixture.<sup>1</sup> Many potato growers are obtaining increased yields by care in selecting seed.

According to the census, about one-third of the farmers in the county bought fertilizers in 1909, the average amount paid therefor per farm being \$43.62, while for the State as a whole the proportion of the farmers who purchased fertilizers was one-half and the average cost \$63 per buying farm. A few farmers save considerable expense by mixing their own fertilizers.

A high grade of work horses is being developed in Clinton County. There is considerable room for improvement in the strains of cattle raised.

The farmers of Clinton County are usually able to hire the necessary farm labor. Laborers are paid \$25 to \$30 a month and board, or \$1 to \$2 by the day during harvest time. According to the census, 2 in every 3 farmers in the county hired labor costing an average of \$179.69, including rent and board, in 1909. This is more than \$100 less than the average New York farmer expends for labor.

The total area of Clinton County is 1,049 square miles, while the average size of New York counties is about 765 square miles. In 1910 there were 450,324 acres, or 67.1 per cent of the area of the county, in farms, of which 207,479 acres, or 46.1 per cent, were improved. This means that considerably less than one-third of the area of the county is classified as improved farm land. Of the total land area of the State, 72.2 per cent is in farms, with 67.4 per cent of this improved.

In 1910 there were 3,608 farms in the county, of an average size of 124.8 acres, of which 57.5 acres were improved. For the entire State the average farm contained 102.2 acres, of which 68.8 acres were improved land. Of the farms in the county 3,009 were operated by the owners, 576 by tenants, and 23 by managers. Of those operated by owners, 1,890 were free from mortgage debt.

In 1910 the value of all farm property in Clinton County was \$18,116,645, showing an increase of 50.3 per cent during the last census decade. The increase throughout the State for the same period was 35.7 per cent.

In proportion to the value of their land, Clinton County farmers seem to have much better farm equipment than the average farmer of the State. The value of the land, however, is lower. The average value in Clinton County increased from \$13.95 an acre in 1900 to \$17.35 an acre in 1910. During the same period the average value of land in

---

<sup>1</sup> 2 per cent nitrogen, 8 per cent phosphoric acid, and 10 per cent potash.

the State increased from \$24.35 to \$32.13 an acre. The selling price of farming land shows a considerable range and depends upon improvements and location, as well as upon the productiveness of the soil. Good farms are held at \$40 to \$100 an acre. The farms of the rougher land can be purchased for much less. Large tracts of partly forested land can be bought at \$8 to \$15 an acre.

#### SOILS.

The soils of Clinton County have been separated into series and types, principally on the basis of geology, physiography, and character of the soil material. Classification into series is based upon color, structure, origin, drainage, physiographic position, and geological origin of the soils, and the types within any series are separated according to texture or the relative quantities of silt, clay, and sand of which they are composed. On the basis of this separation, 9 series and 26 soil types, exclusive of Rough stony land, Rock outcrop, Coastal beach, Marsh, Meadow, and Muck, were recognized in this county.

According to their origin and mode of formation, the soils of Clinton County fall into three general groups, namely, soils derived from glacial drift, soils derived from lacustrine deposits, and soils derived from alluvial deposits. The glacial-drift soils are the most widely distributed and owe their formation to the action of glacial ice in breaking down and transporting the rocks of the region. The lacustrine soils, although of but small extent, are important. These have resulted from the deposition of fine sediments in either marine waters or fresh-water lakes. The alluvial soils represent soil-forming materials which have been transported by running water and deposited along the stream courses, either in the form of terraces or as deltas and outwash plains.

The soil series bear a close relation to the broader geological divisions, while the soil types bear a close relation to lithologic phases and to minor topographic forms.

The underlying rocks of this region are among the oldest known. Of these the gneisses of pre-Cambrian age, with a red, gray, and brown color, underlie the higher uplands or mountainous regions in the western and southwestern parts of the county.<sup>1</sup> The Cambrian age is represented by the Potsdam sandstone. This presents great variations in texture, massiveness, color, and degree of induration; while some layers approach quartzite in appearance, some are quite pebbly, and elsewhere a coarser grit is the main phase. Red and white are the prevailing colors, with some gray bands throughout. The low-lying region between Lake Champlain and the uplands is underlain by rocks of the Lower Silurian. This is a formation of gray or bluish-gray

<sup>1</sup> Geology from the Geological Survey of the State of New York, by Cushing, 1893, p. 478.

sandy dolomite and dolomitic sandstone. The Chazy and Trenton limestones occur along the lake and have an important influence upon the soils overlying them.

During the epochs of time in which the above rocks were in the making this region was subjected to various uplifts and depressions, with accompanying erosion or deposition, resulting in a constant change of the physiography of the earth's surface. Thus in comparatively recent times, so recent that the deposits formed have suffered but little erosion, this region was covered by the Labrador ice sheet. As this sheet moved in a southwesterly direction through the county it carried rock material with it. As the ice disappeared by melting this material was dropped, mantling the surface with glacial drift.

The following table gives the names and extent of the several soils mapped in Clinton County:

*Areas of different soils.*

Soil.	Acres.	Per cent.	Soil.	Acres.	Per cent.
Coloma stony fine sandy loam...	144,320	21.5	Marsh.....	3,712	0.5
Coloma fine sandy loam.....	114,688	17.1	Hinckley fine sand.....	3,328	.5
Gloucester stony fine sandy loam	93,504	13.9	Otisville gravelly fine sandy		
Rock outcrop.....	59,328	8.8	loam.....	3,200	.5
Rough stony land.....	48,960	7.3	Plainfield gravelly fine sand....	3,200	.5
Dover loam.....	34,112	5.1	Otisville fine sand.....	2,944	.4
Dover fine sandy loam.....	26,944	4.0	Coloma gravelly fine sandy loam	2,688	.4
Plainfield fine sand.....	25,536	3.8	Dover gravelly fine sandy loam..	2,624	.4
Coloma loam.....	20,800	3.1	Merrimac fine sandy loam.....	2,624	.4
Vergennes clay.....	15,296	2.3	Vergennes fine sand.....	2,048	.3
Meadow.....	11,264	1.7	Merrimac fine sand.....	1,216	.2
Muck.....	9,344	1.4	Plainfield stony fine sandy loam	1,024	.1
Coloma fine sand.....	9,280	1.4	Hinckley sand.....	832	.1
Vergennes fine sandy loam.....	7,296	1.1	Plainfield fine sandy loam.....	832	.1
Dover stony loam.....	6,784	1.0	Coastal beach.....	192	.1
Plainfield sand.....	5,056	.7			
Vergennes clay loam.....	4,544	.7			
Podunk fine sandy loam.....	3,840	.6			
			Total.....	671,360	.....

COLOMA SERIES.

The surface soils of the Coloma series are light brown to yellowish brown in color, with yellow to yellowish-brown subsoils. The material is relatively coarse textured, only a small extent of the finer textured members of the series having so far been encountered. The topography is rolling to rough and hilly, or morainic. The series is derived from sandstones, mostly the Potsdam formation. In Clinton County the Coloma series is represented by five types—the stony fine sandy loam, fine sandy loam, loam, fine sand, and gravelly fine sandy loam.

## COLOMA STONY FINE SANDY LOAM.

The soil of the Coloma stony fine sandy loam is generally a light yellowish brown stony fine sandy loam, 8 to 10 inches deep, underlain by a light-yellow to yellowish-brown stony fine sandy loam. Both soil and subsoil contain large quantities of fragments of sandstone and quartzite. These fragments are usually angular and range in size from small stones to large slabs 8 or 10 inches in diameter and 2 or 3 feet in length. The depth of this till covering varies from a few inches to several feet. This type is distinguished from the Coloma fine sandy loam chiefly by the greater proportion of rock fragments which it contains and by its rougher topography.

On the northern slopes of Burnt Hill there are a few small areas where the soil and subsoil exhibit minor color variations. These small streaked areas vary in color from light gray to various shades of pink. They show no signs of agricultural differences. Three miles west of West Chazy there occurs an area of about 300 acres which is characterized by a dark-red to reddish-brown stony fine sandy loam to an average depth of 12 to 18 inches, where solid rock is encountered. The underlying rock is a calcareous sandstone. This small area is devoted mainly to pasturage, although a few crops are cultivated where the soil is of sufficient depth.

Along the border between this type and the Gloucester stony fine sandy loam there is a blending of material from the crystalline and the sandstone rocks, and in many places the line between the two had to be arbitrarily drawn. As there is very little agricultural development in the regions covered by the two types, a closer separation would not have any special value.

The Coloma stony fine sandy loam is the most extensive soil type in the county, being represented in all but the rougher mountainous sections. The largest area lies in the central part of the county. The topography is somewhat varied, ranging from undulating to rough and hilly. The open structure of the soil and subsoils favors rapid drainage.

Formerly the areas of this soil were heavily forested with spruce, hemlock, and maple, but this has been cut over at least once in the last hundred years. At present approximately 75 per cent of the type is left in forest or used as pasture. The present timber growth is a mixture of white pine, spruce, maple, birch, and poplar, most of which is cut as soon as it is fit for pulp wood in order to meet the demand of the numerous pulp mills in the county. Extensive forest fires have burned over large tracts of land throughout the county, as a result of which the organic-matter content of the soil is low.

Owing to its rough, stony character, this soil is unsuited for cultivation, except in small, irregular areas which approach the conditions of the Coloma fine sandy loam. Its best use is for forestry.

The farms on this type are necessarily of small size and the fields of irregular shape. Potatoes and oats do well on this soil, the former yielding 175 to 200 bushels and the latter 60 to 70 bushels per acre. Potatoes are usually fertilized with commercial preparations, the ordinary application being 500 pounds per acre of a 2-8-10 mixture. Hay yields are small. Very little fruit is grown upon this type.

The price of land of the Coloma stony fine sandy loam has a wide range, depending upon distance from market, the quantity of standing timber, and the condition of the improved land. Unimproved land with very little timber brings \$5 to \$15 an acre, while tracts of improved land are held at \$40 to \$60 an acre.

#### COLOMA FINE SANDY LOAM.

The surface soil of the Coloma fine sandy loam is a light-brown, mellow fine sandy loam, about 9 inches deep. The subsoil is a grayish-brown to yellow fine sandy loam. The entire soil section carries a moderate quantity of sandstone and quartzite fragments, which are usually of small size.

This is an important soil type, occupying a foothill position with reference to the sandstone uplands. It is quite widely distributed, the largest and probably the most typical areas being in the north-western part of the county, in the towns of Clinton and Ellenburg.

The topography varies from gently rolling to hilly, which insures good natural drainage. There are only a few small areas that are poorly drained.

The forest growth on this type consists of white pine, maple, birch, and poplar, the greater part of which is small, owing to the prevailing custom of early cutting for pulp wood.

This type is not calcareous. The soil is easily tilled, as it does not contain enough stones seriously to interfere with cultivation.

Probably 60 per cent of the type is under cultivation, the principal crops being potatoes, oats, and hay. It is considered one of the best potato soils in the county. The usual rotation consists of potatoes, oats, and hay for two or three years, or as long as a paying crop is obtainable. All of the fertilizer used is applied to the potato crop. Average yields are as follows: Potatoes 175 to 200 bushels, oats 60 to 70 bushels, buckwheat 25 bushels, and hay 1 ton per acre. Owing to the short growing season, corn is not successfully grown. Very little commercial fruit growing is carried on.

Dairying is an important industry on this type in the northern part of the county. A large proportion of the milk produced is shipped out of the county, although some butter and cheese are manufactured in local factories. Holstein is the predominant breed of dairy cattle. Many colts of excellent grade are being raised by the farmers throughout the county.

The adaptation of certain crops to this soil has been generally recognized and followed by the farmers and the prevailing agricultural practices are good. The average selling price of this land is \$50 to \$75 an acre.

The following table gives the results of mechanical analyses of samples of the soil and subsoil of this type:

*Mechanical analyses of Coloma fine sandy loam.*

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>						
162107.....	Soil.....	2.2	6.4	4.6	23.4	17.3	33.7	12.0
162108.....	Subsoil.....	2.6	8.2	6.0	28.2	19.2	26.1	9.5

COLOMA LOAM.

The Coloma loam consists of a brown to light-brown mellow loam to an average depth of 10 inches, underlain by a yellowish-brown to grayish-brown loam. Both soil and subsoil contain varying quantities of angular fragments of light-colored sandstone and quartzite, ranging in size from small stones to massive blocks. The divergence in texture from the typical soil is toward the fine sandy loam rather than toward a heavier loam.

The Coloma loam is not extensively developed, being found mainly in the northern part of the county, in the towns of Champlain, Mooers, and Clinton, with smaller areas in Ellenburg and Altona Towns. The topography is gently rolling, none of the land being too rough for tillage. However, some of it requires drainage.

The soil is mellow and easily tilled, and the stone content, except in a very few localities, is not high enough to interfere with the use of farm machinery. Approximately 65 per cent of this type is under cultivation, oats, hay, and potatoes being the principal crops. Oats yield 65 to 70 bushels, hay 1 to 1½ tons, and potatoes 150 bushels per acre. Stable manure and small quantities of commercial fertilizers are used. Dairy farming is the most important industry on this type. Holstein cattle of high grade predominate. Most of the milk produced is carried to milk stations for shipment.

The buildings upon the Coloma loam are in fairly good condition. The average value of the land of this type is \$75 an acre.

COLOMA FINE SAND.

The surface soil of the Coloma fine sand is a light-brown to yellowish loamy fine sand about 6 inches deep. The subsoil is a yellow to light-yellow loose fine sand. A few sandstone fragments are scattered over the surface and through the soil.

This type occurs in many small areas throughout the county in conjunction with other types of the Coloma series, being most extensively developed in the towns of Plattsburg, Schuyler Falls, Peru, and Mooers. It occupies gently to steeply rolling country and includes a number of low, rounded ridges and hills, and in some cases intervening plains. The drainage, with a few exceptions, is excessive.

Only a small proportion of this soil is cultivated, agriculture being carried on in a desultory manner. Large areas support only a meager growth of native grasses or scrub pine, birch, and poplar. Land of this type has a low valuation.

#### COLOMA GRAVELLY FINE SANDY LOAM.

The Coloma gravelly fine sandy loam to an average depth of 8 inches is a brownish-gray to light-brown gravelly fine sandy loam. The subsoil is a yellow to pale-yellow gravelly fine sandy loam. The entire soil section carries a high percentage of angular and waterworn fragments of sandstone and quartzite, giving it an open structure. While in most of the areas of this type the sandstone fragments are of small size, those areas in the vicinity of Cannon Corners are exceedingly stony in character.

This type occurs in small scattered bodies throughout the sandstone region, mainly in connection with the Coloma fine sandy loam in the eastern part of the county. It occupies slight ridges or slopes of hills. On the whole the natural drainage is excessive.

White pine, spruce, maple, birch, and poplar constitute the characteristic forest growth on this type. Some of the type is devoted to general farming, with fair returns.

Since the areas of Coloma gravelly fine sandy loam are small and most of the land is farmed in connection with other types, it is difficult to arrive at any accurate estimate of the yields per acre of the different crops, or of the comparative selling price of the land. As cultivated at present the type has a slightly lower agricultural rank than the Coloma fine sandy loam.

#### DOVER SERIES.

The Dover series includes types with light-brown or dark-brown to reddish soils, and light-brown to yellowish or reddish subsoils. Limestone fragments are scattered over the surface and throughout the soil and subsoil. These soils occur in those limestone lowland belts of the Appalachian region which have been subjected to glaciation. The topography is undulating to hilly, and drainage is good. Outcrops of limestone are common. The soils are derived from glacial-till material which has been considerably modified by the admixture of local limestone material. In Clinton County this series, which embraces the best of the farming lands, is represented by four types, a loam, fine sandy loam, gravelly fine sandy loam, and stony loam.

## DOVER LOAM.

The surface soil of the Dover loam is a brown mellow loam 8 to 12 inches deep. The color of the subsoil is more variable and ranges from brown to light brown, often somewhat mottled with gray in the lower portion. The subsoil, while generally a loam in texture, varies in places from a heavy fine sandy loam to sandy clay loam, but such areas are not extensive enough to separate on the map. This type is not one of great depth, being underlain by limestone, which frequently outcrops. The stone content is low, with limestone predominating, though a few small angular fragments of sandstone and quartzite are also present.

The Dover loam is confined to a narrow belt along Lake Champlain, in the towns of Champlain, Chazy, Beekmantown, Plattsburg, Schuyler Falls, Peru, and Ausable. The topography is level to gently rolling and the natural drainage is good.

This type formerly was heavily forested with white pine, nearly all of which has been removed. It is recognized as the strongest soil in the county. Approximately 90 per cent of the type is under cultivation, being used mainly for general farming. Hay is the principal crop, yielding ordinarily  $1\frac{1}{2}$  tons per acre. Oats and buckwheat are the other important crops, the ordinary yields being 50 and 25 bushels per acre, respectively. Corn and barley are also grown to some extent. Some excellent young apple orchards are located upon this type. Alfalfa has produced fair yields on a few fields where the conditions were favorable. In the past very little commercial fertilizer or lime has been used on this soil. It is the general opinion that this type is not so productive as formerly. There is a tendency to keep the land too long in sod.

Agricultural conditions vary over the type, but in general the farm buildings are substantial and in good condition. The markets are close at hand and the roads excellent. Land values range from \$50 to \$100, with an average of \$75, an acre.

## DOVER FINE SANDY LOAM.

The surface soil of the Dover fine sandy loam is uniformly a brown, mellow fine sandy loam to heavy fine sandy loam, with an average depth of 10 inches. The subsoil is a yellowish-brown to grayish-brown fine sandy loam, mottled in places with yellow and brown. The entire soil section carries a variable percentage of fragments of sandstone, quartzite, and limestone, but usually not sufficient to interfere seriously with cultivation. There are only two areas of enough importance to mention which contain sufficient rock fragments to hinder cultivation, and these are used for pastures. One of these areas lies about 2 miles northwest of Ingraham and the other 1 mile northeast of Beekmantown. Their combined area is less than

600 acres. This type is distinguished from the Coloma fine sandy loam by the underlying limestone formation and the presence of limestone fragments throughout the soil section.

The Dover fine sandy loam is found only in the eastern part of the county in the towns of Chazy, Beekmantown, Plattsburg, Schuyler Falls, Peru, and Ausable. The topography is nearly level to gently rolling, being similar to that of the Dover loam. Some of the type is in need of artificial drainage, but the larger proportion of it is naturally well drained.

Approximately 75 per cent of this type is utilized for agriculture, being devoted mainly to general farming and dairying. The soil is easily tilled and farm machinery can be used on all parts of it.

Oats and hay are the staple crops. Some corn is grown and in favorable seasons good yields are obtained. Alfalfa has been grown in an experimental way, and the results indicate that with proper cultural methods and drainage it can be made a profitable crop.

The dairy farms on this type do well, showing the effect of good rotations and the conservation of stable manure.

Fruit growing is gradually being extended. Apples are now more extensively grown on a commercial scale than any other fruit, and while orchards are comparatively young they give promise of satisfactory returns. The principal varieties of apples are Fameuse, McIntosh, and Wealthy, named in the order of their importance.

The average selling price of land of this type is about \$50 an acre.

Below are given the results of mechanical analyses of samples of the soil and subsoil of the Dover fine sandy loam:

*Mechanical analyses of Dover fine sandy loam.*

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>						
162126.....	Soil.....	1.7	6.6	8.4	31.9	15.6	28.4	7.2
162127.....	Subsoil.....	1.8	6.4	7.4	29.4	17.7	30.2	7.1

DOVER GRAVELLY FINE SANDY LOAM.

The Dover gravelly fine sandy loam to an average depth of 8 inches is a brown, friable fine sandy loam. The subsoil is a yellowish-brown to grayish-brown fine sandy loam or sandy loam. Gravel and rounded or waterworn fragments of sandstone, quartzite, and limestone of small size are liberally sprinkled throughout the entire soil section. Angular fragments of the above-mentioned rocks also form a part of the gravel content. The type as mapped is not entirely uniform, since small areas occur where the gravel content is very small, the soil in these places differing little from the Dover

fine sandy loam. The presence of limestone fragments differentiates the type from the Coloma gravelly fine sandy loam.

The Dover gravelly fine sandy loam is of comparatively small extent. It is found only in four towns—Beekmantown, Chazy, Plattsburg, and Peru. Small bodies, many too small for separate mapping, lie within the Dover fine sandy loam in the town of Beekmantown.

The type occupies small ridges or slopes through the uplands. It is all well drained and under cultivation.

This soil is loose and easily tilled, and except in a very few localities the gravel content is not high enough to interfere with cultivation. The greater part of it is utilized for general farming, potatoes, hay, and oats being the staple crops. On account of the loose, porous nature of the subsoil, crops sometimes suffer for lack of moisture during periods of dry weather. In general, the agricultural practice and crop yields do not differ from those of the adjoining type, the Dover fine sandy loam. Little or none of this type is changing hands.

#### DOVER STONY LOAM.

The Dover stony loam consists of a brown to light-brown loam or silty loam, strewn with limestone fragments and underlain at a depth of 8 to 15 inches by solid limestone. There is little difference in color or texture between the soil and subsoil. Occasionally there are a few fragments of sandstone and quartzite intermingled with the limestone fragments. In many places the underlying limestone formation outcrops and is entirely devoid of soil or is but thinly coated. Locally the fine earth consists of material similar to that forming the soil of the Vergennes clay.

This type occurs throughout the low-lying limestone belt along Lake Champlain. It is most largely developed in the towns of Champlain, Chazy, and Beekmantown, with smaller scattered areas in the towns of Plattsburg and Peru. The entire area of Crab Island and the larger part of Valcour are included in this type.

Areas of this type illustrate in a graphic manner the action of the glacier in grinding its way through rock formations, leaving prominent ridges with only a scant covering of till.

Only a very small proportion of this type is under cultivation and that in small patches. Most of it is covered with a mixed forest of cedar, elm, ash, and maple. Its best use is for pasture land, to which some of it has been applied. The drainage is excessive.

#### GLOUCESTER SERIES.

The Gloucester soils are brown to yellowish brown in the surface soil and grayish brown to yellowish brown in the subsoil. Usually the texture of the material grades coarser with depth. The rock frag-

ments are of granite, gneiss, and schist. The soils are derived from local glaciation of the underlying crystalline rocks. The resultant till is not of great depth. The topography ranges from rolling to mountainous. Drainage is usually good and sometimes excessive. Only one type of this series is mapped in Clinton County.

#### GLOUCESTER STONY FINE SANDY LOAM.

The surface soil of the Gloucester stony fine sandy loam, to an average depth of 8 inches, is a brown to light-brown or yellowish-brown mellow fine sandy loam. The subsoil varies from a grayish-brown to yellowish-brown fine sandy loam. The entire soil section carries a high percentage of angular and subangular rock fragments, varying in size from small cobbles to massive bowlders. The prevailing rocks are of gneiss and granite, with some quartzite and sandstone.

The Gloucester stony fine sandy loam occurs only in the western and southwestern parts of the county, for the most part in the towns of Dannemora, Saranac, and Black Brook. The topography is generally rough, although there are some gently rounded hills. The stony, sandy character of both soil and subsoil gives an open structure favorable to rapid drainage, and upon some slopes the drainage is excessive and the conditions droughty.

At present less than 1 per cent of this type is under cultivation, the remainder being in forest. The predominant tree growth consists of maple, birch, and poplar. Only a small percentage of this type can be profitably cultivated, and that only in small and irregularly shaped fields. Its best use is for forestry.

When not held for the iron-ore beds underlying it, this type brings \$5 to \$20 an acre, the price depending upon the timber stand. Areas that have been cleared of timber and stones are held at a higher figure.

#### VERGENNES SERIES.

The surface soils of the Vergennes series are of brown or various shades of gray, and are underlain by lighter gray or drab colored subsoils, often calcareous. The soil material consists of sediments laid down in glacial lakes in northern New York and Vermont. The surface is level to gently undulating. Artificial drainage is usually necessary. In Clinton the Vergennes series is represented by four types—the clay, clay loam, fine sandy loam, and fine sand.

#### VERGENNES CLAY.

The soil of the Vergennes clay to an average depth of 9 inches is a brownish-gray to gray or dark-gray clay. The subsoil is a heavy, plastic clay of a gray to bluish-gray color, often mottled with rusty

brown. Both the soil and the subsoil have a dense structure. Although the type occupies the low, depressed areas bordered by till and limestone ledges, it is practically free from stone and sandy material.

The Vergennes clay occurs only in the eastern part of the county, in a narrow belt along Lake Champlain. It is well developed in the towns of Champlain, Beekmantown, Chazy, and Plattsburg, with smaller areas in the towns of Peru and Ausable. Practically all of the type lies along streams emptying into Lake Champlain and none of it is more than 100 feet above the lake level. This nearly level, valley-bottom topography, together with the slight range in elevation, makes natural surface drainage slow and inadequate, even at the best. During the early spring much of the type bordering Lake Champlain is under water for several weeks.

Practically all of this type is under cultivation, hay and oats being the principal crops grown. Alfalfa is grown in an experimental way. Hay yields ordinarily  $1\frac{1}{2}$  to 2 tons and oats about 50 bushels per acre. Most of the hay is sold. Some of the mowing lands have not been plowed in 20 years, while the average duration of sod for the type is about 8 years. When plowed the land is sowed to oats and returned to grass. The agricultural practices on this type are not such as tend to increase or maintain the productiveness of the soil.

Where this land is not held for speculation farms can be purchased at \$60 to \$70 an acre.

#### VERGENNES CLAY LOAM.

The surface soil of the Vergennes clay loam is usually a dark-brown to dark grayish brown heavy loam with an average depth of 9 inches. The subsoil is a gray to drab heavy clay, usually mottled with brown. The type is quite free from stone fragments. Textural variations consisting of small sandy bars or streaked areas of till, lightly sprinkled over the lacustrine deposit, are frequent throughout this type, but such areas seldom exceed 4 acres in extent.

The Vergennes clay loam occurs in a few scattered areas in the lowlands, bordering Lake Champlain. The most extensive area is in the immediate vicinity of Champlain. Smaller areas are scattered throughout the towns of Champlain, Chazy, Beekmantown, Plattsburg, and Peru. The topography is level to gently undulating, being similar to that of the Vergennes clay.

This soil is easily tilled, the surface soil being mellow and friable and seldom puddling. Care should be taken, however, to work it only under favorable moisture conditions.

Most of the type is held in connection with some of the lighter upland soils on which dairy farming is practiced, being used mainly

for the production of hay. Oats and corn are also grown. Hay yields  $1\frac{1}{2}$  to 2 tons and oats 65 bushels per acre. Corn yields 12 tons of silage per acre.

Agriculture is usually in a prosperous condition upon farms embracing this type. Land values are influenced by the area of upland included in the farm, and probably range from \$60 to \$75 an acre.

The following table gives the results of mechanical analyses of samples of the soil and subsoil of the Vergennes clay loam:

*Mechanical analyses of Vergennes clay loam.*

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>						
162120.....	Soil.....	2.0	10.4	7.4	6.2	10.0	43.8	20.1
162121.....	Subsoil.....	1.2	3.2	2.4	8.2	10.0	40.8	34.2

VERGENNES FINE SANDY LOAM.

Where typically developed the surface soil of the Vergennes fine sandy loam is a dark-brown to dark-gray fine sandy loam, 6 to 9 inches in depth. The subsoil is a light-yellow fine sandy loam, often mottled with brown, to a depth of 20 to 24 inches, where a heavy, plastic, drab-colored clay is encountered. The type is practically free from rock fragments. While the surface soil has a uniform color and texture, the subsoil is variable. Colors ranging from light gray to yellow are frequent, and the texture is often a fine sand through the entire lower section. These areas, however, are not large enough to be separated on a map of the scale used.

The Vergennes fine sandy loam is not extensively developed, though it occurs in relatively small areas throughout the limestone region in the lowlands bordering Lake Champlain, in the towns of Mooers, Champlain, Chazy, Beekmantown, Plattsburg, Schuyler Falls, and Peru.

The topography is level or nearly so. In general the natural drainage is deficient, and ditching or tiling is necessary to bring the soil into satisfactory condition for agriculture.

Probably less than 30 per cent of the Vergennes fine sandy loam is under cultivation. The soil is mellow and easily tilled, and when properly drained should produce good yields of hay, corn, and potatoes. A large part of the type is in permanent pasture.

The forest growth on this type consists of cedar, hemlock, elm, ash, and maple. Because of the varying agricultural conditions on this type, no satisfactory valuations of the land can be obtained.

Results of mechanical analyses of samples of the soil and subsoil of this type follow:

*Mechanical analyses of Vergennes fine sandy loam.*

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>						
162148.....	Soil.....	0.3	2.2	3.7	62.4	16.0	12.6	2.6
162149.....	Subsoil.....	.1	1.0	2.2	58.3	23.9	9.7	4.6

VERGENNES FINE SAND.

The surface soil of the Vergennes fine sand to an average depth of 6 to 8 inches is a dark-gray fine sand to loamy fine sand. The subsoil is a gray to brownish-gray, rather loose fine sand, with an average depth of 4 feet. In places the lower subsoil is underlain by a heavy plastic clay at about 30 inches, but such areas are of small extent. The type is practically free from rock fragments.

The Vergennes fine sand occurs principally in the eastern part of the town of Mooers. Its topography is level and drainage is only fair. Tile drainage systems must be installed throughout most of the type before it can be utilized to the best advantage. This soil is very easy to cultivate, owing to its open structure and texture.

Approximately 50 per cent of the Vergennes fine sand is now under cultivation, being devoted to general farming and dairying. The principal crops, hay, oats, and potatoes, make ordinary yields of 1½ to 2 tons, 35 bushels, and 150 bushels per acre, respectively. Very little fertilizer is used.

On uncultivated areas of this type there is now a scant growth of birch, poplar, cottonwood, elm, and maple. Pasture lots usually support a vigorous growth of brakes and berry bushes.

Because of the diversity of agricultural conditions over this type land values vary. Probably \$50 an acre is a fair average for the well-improved farms.

PLAINFIELD SERIES.

The surface soils of the Plainfield series range in color from brown to grayish brown, while the subsoils are usually some shade of yellow or yellowish brown. The series owes its formation to deposition of sandstone débris from running water in the form of terraces, plains, and filled-in valleys. The soils are usually of the coarser textures. The Plainfield series is represented in Clinton County by five types, the fine sand, fine sandy loam, sand, gravelly fine sand, and stony fine sandy loam.

## PLAINFIELD FINE SAND.

The surface soil of the Plainfield fine sand consists of a brown to grayish-brown mellow fine sand, varying in depth from 5 to 8 inches. The subsoil, to a depth of 3 feet or more, is a yellow to light yellowish brown fine sand. While the surface sometimes carries a few small waterworn fragments of sandstone or quartzite, the lower sections are noticeably free from the coarser textured materials. The soil is deficient in organic matter.

The Plainfield fine sand is most extensively developed along the Saranac, Salmon, Ausable, and Little Ausable Rivers, in the towns of Plattsburg, Schuyler Falls, Ausable, and Peru. Less extensive areas are scattered throughout the county, either along the present streams or along former glacial watercourses.

The topography is level to gently undulating, most of the type being a level plain. In a few places sand dunes have been formed by wind action, but these are not extensive enough to separate on the map. Drainage is usually excessive.

The Plainfield fine sand represents material brought down from the sandstone region and deposited as either a delta or terrace formation. At first these deposits occurred when the lake was at a relatively high level, and as the lake waters subsided the sand plains were developed to the eastward. In the towns of Schuyler Falls the deposits from the Saranac join those of the Little Ausable River. Some of these deposits overlie the limestone formations, especially south of the Saranac River in the towns of Plattsburg and Schuyler Falls, but these soils show no difference in their vegetative covering from areas overlying sandstone.

This type was originally forested with white pine, but nearly all of the valuable timber has been cut or destroyed by fire. Only a very small acreage of the type is under cultivation, most of it being waste land partially covered with a mixed forest of white pine, birch, and poplar and an undergrowth of sand grass and huckleberry. A little pulp wood is cut each year, and some pasturage is obtained on these areas.

Where sufficient moisture can be maintained in the upper portion of the soil, the Plainfield fine sand can be used successfully in the production of early garden crops. A few hundred acres are utilized for that purpose with fair success. No difficulty is experienced in cultivating this soil. The best use of the type is for forestry.

The value of land of this type ranges from \$10 to \$45 an acre, prices depending upon its timber stand or its value for pasture or agriculture.

## PLAINFIELD FINE SANDY LOAM.

The surface soil of the Plainfield fine sandy loam, to an average depth of 10 inches, is a brown to grayish-brown fine sandy loam.

The subsoil is a yellow to brown, rather light-textured fine sandy loam. In places the surface soil is more yellowish than brown, dependent upon the quantity of organic matter present. The surface soil is comparatively free from gravel, but the lower subsoil often carries a low percentage of small gravel.

This type is relatively inextensive, occurring in small areas along the Saranac, Ausable, and Little Ausable Rivers. The topography is level or nearly so.

Freedom from stones and a mellow structure make the soil easily cultivated. It also responds readily to commercial fertilizers. The natural drainage is not always adequate, owing to the location of the type in small pockets. General farm crops are produced, giving good yields. Agricultural methods differ little from those on adjoining soils.

This land is held mainly in connection with other types, and it is therefore impracticable to obtain accurate data as to crop yields and selling price.

#### PLAINFIELD SAND.

The Plainfield sand consists of 5 to 8 inches of light-brown to dark grayish brown, medium-textured sand, underlain by yellow to grayish-yellow sand, extending to a depth exceeding 3 feet. In some places the subsoil tends toward a coarse sand. A small quantity of rounded gravel is encountered in the lower subsoil.

This type is not extensively developed. Areas are found in the towns of Mooers, Saranac, Plattsburg, Peru, and Ausable. The topography is nearly level to gently undulating. Drainage is excessive.

A few acres of this type are under cultivation to general farm crops, most of the remainder being covered with a poor stand of pine, birch, and poplar. A part of it is entirely barren. This land will no doubt ultimately revert to forest.

#### PLAINFIELD GRAVELLY FINE SAND.

The surface soil of the Plainfield gravelly fine sand is a brown to light-brown fine sand, with an average depth of 7 inches. The subsoil is a yellow to light yellowish brown fine sand to medium fine sand. The entire soil section carries a relatively high percentage of medium-sized gravel. These do not seriously interfere with cultivation.

This soil is found along or in the vicinity of the larger streams in the county, such as the Big Chazy, Saranac, Salmon, and Little Ausable Rivers.

The topography is nearly level. There is sometimes an escarpment of several feet where the surface rises to the level of another terrace, and again the general level may be broken by shallow depressions or slight elevations. The drainage is usually excessive.

Probably 20 per cent of this type is under cultivation to general farm crops. The remainder is covered with a mediocre growth of white pine, birch, poplar, and maple. Hay, oats, and corn are the principal crops grown, and in seasons of favorable moisture conditions good yields are obtained.

The selling price of this soil varies according to the farm improvements, the timber stand, and the value of adjoining soil types.

#### PLAINFIELD STONY FINE SANDY LOAM.

The surface soil of the Plainfield stony fine sandy loam is a gray to grayish-brown fine sandy loam, with an average depth of 8 inches. The subsoil is a yellow or bright yellowish brown fine sandy loam. Both the soil and the subsoil carry a high percentage of rock fragments, mainly sandstone and quartzite, varying in size from small gravel to boulders a foot or more in diameter. It is necessary to remove the stones before cultivation can be carried on.

The total extent of this type is 1.6 square miles. The largest areas are located about 3 miles west of Peru and  $3\frac{1}{2}$  miles west of Schuyler Falls. The topography is nearly level to rolling. Drainage is thorough and often excessive.

The forest growth on the Plainfield stony fine sandy loam consists of maple, hemlock, pine, poplar, and birch. Much of the land is not suited for agriculture on account of its stony character and light, leachy texture. Probably 300 acres of it is under cultivation. Hay, oats, and buckwheat are the principal crops. Yields are low. Land values range from \$8 to \$20 an acre.

#### MERRIMAC SERIES.

The surface soils of the Merrimac series are brown to light brown, and the subsoils yellow or light yellowish brown. This series is largely composed of the coarser textured types. The soil-forming material was derived mainly from crystalline rocks and was deposited as glacial terraces along the streams. Owing to their coarse texture and open structure the soils are usually excessively drained. This series differs from the Plainfield mainly in the source of the soil-forming material, the Merrimac coming from the crystalline rocks, granite and gneiss, while the Plainfield is mainly derived from sandstone. The Merrimac series is represented in Clinton County by only two types, the fine sandy loam and fine sand.

#### MERRIMAC FINE SANDY LOAM.

The surface soil of the Merrimac fine sandy loam is a light-brown to grayish-brown fine sandy loam to loamy fine sand varying in depth from 5 to 10 inches, with an average of 8 inches. The subsoil is a yellow fine sandy loam grading into yellow fine sand, usually resting

upon gravel at a depth of 3 feet or more. The upper section carries very little, if any, gravel; the lower subsoil contains about 10 per cent. The comparatively loose, mellow surface soil permits of easy cultivation.

This type, which is inextensive, occurs mainly in the towns of Black Brook and Ausable, along the high terraces bordering the Ausable River. A few small areas occur throughout the crystalline uplands in the town of Black Brook.

The topography is nearly level, except for the slight elevations or depressions and the escarpments from one level to another. The natural drainage is thorough, but very little of the type is excessively drained.

A few acres of this type are used for home gardens, the remainder either being waste land or supporting a mixed forest of scrub pine, poplar, and birch, and an undergrowth of blueberry. In its present condition this type is of little value. The average price, probably, does not exceed \$15 an acre.

#### MERRIMAC FINE SAND.

The Merrimac fine sand to an average depth of 8 inches is a loose, brown fine sand, underlain by a yellow to light yellowish brown fine sand which extends to a depth of 3 feet or more. This type is quite uniform in texture throughout the various areas.

The Merrimac fine sand is very inextensive in this county, occurring in several scattered areas throughout the towns of Black Brook and Saranac, in the southwestern part of the county, and also near Upper Chateaugay Lake. The topography is level or nearly so, but the drainage is rapid.

The Merrimac fine sand is developed mainly as terrace deposits, along streams flowing away from the crystalline rock areas. It is associated with the Gloucester and Hinckley soils of the region.

None of this type is under cultivation. Where it is not a barren waste it affords some pasturage and a small quantity of pulp wood. Most of this soil should be reforested. The selling price is low.

#### OTISVILLE SERIES.

The soils of the Otisville series are brown to light brown in color, with light-brown to yellow subsoils. The subsoil is usually coarser in texture than the upper section and consists of interstratified and cross-bedded material. This series is noncalcareous, consisting mainly of materials derived from shales and sandstones. The materials have been formed within or underneath the ice and left as characteristic kames and eskers. The soils of the Otisville series have not been subjected to material modification by glacial-lake waters,

although in some cases they may have been covered by them. This series is represented in Clinton County by two types—the gravelly fine sandy loam and fine sand.

#### OTISVILLE GRAVELLY FINE SANDY LOAM.

The surface soil of the Otisville gravelly fine sandy loam is a light-brown fine sandy loam, with an average depth of 9 inches. The subsoil is a light-brown to yellowish-brown fine sandy loam, usually somewhat coarser in texture than the surface soil and extending to a depth of 3 feet or more. Both soil and subsoil contain a large percentage of rounded, waterworn fragments of sandstone and quartzite, as well as a few angular and subangular stones of the same formation. The gravel is usually of small size, so that cultivation is not materially impeded.

This soil type is inextensive and occurs in widely separated areas throughout the glaciated uplands. Some fair-sized areas occur in the towns of Chazy and Saranac. The topographical features are marked. In the town of Chazy it is noticeable as an esker, in some places rising to an elevation of 40 or 50 feet above the surrounding country and extending a distance of nearly 10 miles in a northwest-southeast direction. The large area in the western part of the town of Saranac has a broken topography. The open structure of both soil and subsoil favors good internal drainage. In some cases the subsoil is so porous that drainage is excessive.

About 30 per cent of this type is under cultivation, mainly to general farm crops, of which good yields are obtained. Apples and small fruits do especially well. Much of the type must remain in forest.

The value of land of the Otisville gravelly fine sandy loam ranges from \$10 to \$40 an acre.

#### OTISVILLE FINE SAND.

The Otisville fine sand is a light-brown loamy fine sand about 6 inches deep, underlain by a yellow to yellowish-brown fine sand, which usually extends to a considerable depth. Very little stone or gravel is encountered.

This type occurs in small areas widely scattered throughout the county and is confined mainly to the slopes of terraces of the Plainfield series. It is most extensive in the town of Saranac. The drainage of the entire type is excessive.

Scarcely any of the Otisville fine sand is under cultivation. A few small areas afford pasturage, but most of the type is waste land. In places it supports a poor stand of maple, birch, and poplar, with an undergrowth of berry bushes. The type is strictly nonagricultural. It should be reforested for pulp-wood production.

## HINCKLEY SERIES.

The members of the Hinckley series have brown to yellowish-brown surface soils, underlain by yellow to yellowish-brown subsoils. The material is assorted to a greater or less extent, always much more so than glacial-till material, and the soils are more leachy and droughty than the soils derived from till. The soil-forming material comes from the coarser crystalline rocks, granite, gneiss, and schist, and was laid down by moving water. The series occupies the rolling to steep slopes of terraces as well as eskers and kames of the glacial regions. The Hinckley series is represented in Clinton County by the fine sand and sand types.

## HINCKLEY FINE SAND.

The Hinckley fine sand consists of a brown to light-brown fine sand, with an average depth of 6 inches, underlain by a yellow to bright-yellow fine sand. The soil is comparatively free from stones. Areas of this type occur in the upland section of the county, in the towns of Black Brook, Saranac, and Ausable. Its greatest development is along the Ausable River, in association with various types of the Merrimac and Gloucester series. It occupies rolling to steep slopes of terraces and the drainage is excessive. The Hinckley fine sand differs from the Merrimac fine sand only in this steeper topography.

None of this land is suitable for cultivation, and most of it is devoid of vegetation. It could be reforested.

## HINCKLEY SAND.

The Hinckley sand is a light-brown to yellowish-brown medium sand, 5 to 9 inches deep, underlain by a yellow to grayish-brown sand, extending to a depth of 3 feet or more. Where typically developed this type carries only a few rounded stones and gravel of small size. The small area near the village of Black Brook carries a relatively large quantity of rounded crystalline rocks, usually of large size.

The Hinckley sand occurs only in four small areas, in the towns of Black Brook and Dannemora. The topography is rolling to hilly, and drainage is excessive.

The original forest on this type, consisting of spruce, pine, hemlock, and maple, has been removed, and at present the soil supports a growth of birch, poplar, and underbrush. Some pasturage is afforded. This type could most advantageously be reforested in connection with the adjoining tracts.

## PODUNK SERIES.

The Podunk series is characterized by brown to dark-brown surface soils and yellow to gray subsoils, often mottled with brown. This

series is developed largely in New York and New England. The subsoil is often underlain by gravel at a depth of 3 feet or more. Through the mountainous regions where the Gloucester soils are developed in the uplands, the soil-forming material in Clinton County has been derived mainly from crystalline rocks, while through the eastern part of the county there is undoubtedly a mixture of material from both the crystalline and sandstone formations. The series occupies first-bottom positions along streams in noncrystalline-rock regions. Drainage is usually poorly established. Only one type of the Podunk series, the fine sandy loam, was recognized in this county.

PODUNK FINE SANDY LOAM.

The Podunk fine sandy loam consists of about 10 inches of a brown to dark-brown fine sandy loam, underlain by a light-yellow to grayish-yellow, mottled with brown, fine sandy loam. In places the surface soil is streaked with yellow and gray, but such areas are not extensive. While the surface soil is usually free from gravel and rock fragments, the lower subsoil often rests upon beds of gravel or boulders.

Although the areas of the Podunk fine sandy loam are relatively small, they are widely distributed along the large streams throughout the county. The topography is uniformly level, and drainage is only fairly well developed, as much of the type is subject to overflow.

Owing to their occurrence in small, narrow bodies along the various streams, areas of this soil are little used for agriculture. Upon the larger areas some hay is cut, yields of 1½ to 2 tons per acre being obtained. However, this is not always of the best quality. The areas afford good pasturage and most of the land is utilized for that purpose. Some tracts support a growth of alders, elm, and swamp grasses. Some of the larger and better drained areas could be brought into cultivation.

The following table gives the results of mechanical analyses of samples of the soil and subsoil of the Podunk fine sandy loam:

*Mechanical analyses of Podunk fine sandy loam.*

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>						
162132.....	Soil.....	0.2	2.4	3.7	46.5	25.9	15.1	6.1
162133.....	Subsoil.....	1.0	6.1	7.5	45.5	21.0	14.3	3.8

## MISCELLANEOUS MATERIAL.

## ROUGH STONY LAND.

The Rough stony land in Clinton County consists of those areas which, on account of roughness of surface owing to rock fragments and rock outcrops or to steepness of slopes, can not be cultivated and are therefore of little value for agriculture. The soil material may be that of any of the recognized soil types. This type occurs mainly in the uplands, where the underlying rock formations have been badly eroded or where only a thin mantle of the coarser glacial debris was left. Some of the more level areas of the Gloucester stony fine sandy loam have been devastated by forest fires. Such areas are located north of Lyon Mountain and north of Clintonville.

Very little of this type is underlain by limestone. The principal rocks are sandstone and quartzite, where the adjacent soils are of the Coloma series, and granite, gneiss, or schists contiguous to the Gloucester series.

Rough stony land is found in every town of the county, although the larger proportion is located in the rougher uplands section in the western half of the county. The largest areas lie in the towns of Ellenburg, Peru, Clinton, and Black Brook. The topography varies from hilly to mountainous, with the more hilly surface predominating.

None of this type is under cultivation. Some of it affords a scant pasturage during a part of the season. Most of the people living on this type make their livelihood cutting cordwood and pulp wood. They keep some stock which runs at large during the summer months.

All of this type was formerly heavily forested with spruce, pine, and the hardwoods, most of which has been removed. The present cover is usually a mixed growth of pine, birch, poplar, and maple.

Rough stony land is valued mainly for its timber growth, but also is utilized for pasture. Beds of iron ore underlie some of the type in the western part of the county, but these are not being mined at present.

## ROCK OUTCROP.

The term Rock outcrop as used in this county applies to areas of bare rock in the form of flat areas, mountains, ledges, and steep cliffs. In places a small quantity of soil may be found between the large boulders. The rocks are of various geologic formations.

Rock outcrop is most extensive in the towns of Altona, Dannemora, Saranac, Black Brook, and Peru. Smaller areas occur in various other towns of the county.

## COASTAL BEACH.

Coastal beach is the term applied to loose, incoherent, light-colored sandy material thrown up by wind or water action. These

sands often have a depth of many feet, some of the dunes or ridges standing 30 feet or more above the water level.

The Coastal beach occurs along the shores of Lake Champlain in the towns of Plattsburg and Peru. A small area is also mapped on the shore of Upper Chateaugay Lake, in Ellenburg Town.

While some of this material along Cumberland Bay is utilized for home gardens, the type is in general nonagricultural, as it drifts badly where exposed to heavy winds. In places it supports a scanty growth of sand grass, scrub pine, and poplar.

#### MARSH.

The Marsh as recognized in this county consists of several areas along Lakes Champlain and Upper Chateaugay, which lie scarcely above the level of the water. The soil consists of a heavy mud to silty clay, very dark colored at the surface, and having various shades of gray and drab, heavily mottled with brown, below. There are no trees on the type, with the exception of a fringe bordering the shore line or along the streams flowing through the various areas. The type usually supports a heavy growth of cat-tails, reeds, rushes, etc. It affords some pasturage, and a small quantity of swamp-grass hay is obtained from it. Artificial drainage is impracticable.

#### MEADOW.

Meadow is the term applied to areas that under present conditions of drainage are not adapted to cultivation or to any form of agriculture, aside from pasturage. This type occurs as narrow strips along stream courses and is usually wet throughout most of the year. It is subject to frequent overflows. The material making up these areas is extremely variable in texture. The color also has a wide range, even over small areas. The surface soil is usually of a dark color, while the subsoil varies from gray to yellow and is nearly always mottled.

Meadow is mapped in nearly all sections of the county. The largest areas are found along the larger streams. The topography is flat and the drainage poor. The areas support a growth of cedar, alder, and willows, and in places swamp grass. Some grass is cut, the remainder of the land being utilized for pastures.

#### MUCK.

Muck as a soil type consists mainly of organic material formed from the decomposition of vegetable remains under conditions of poor drainage. The Muck in Clinton County is not uniform. The color is brown to black. The subsoil usually contains more brown than the surface soil, and the material is less decayed.

The largest and most numerous areas of Muck are encountered in the towns of Mooers, Champlain, Chazy, Altona, and Clinton, while small areas are found widely scattered throughout the county.

The forest growth is cedar, hemlock, ash, and elm, most of which is second growth.

Very little of this land is under cultivation. Some hay is cut, and a little pasturage is afforded. With drainage such crops as onions, tomatoes, celery, cabbage, and spinach should do well.

#### SUMMARY.

Clinton County is the extreme northeastern county of New York State, bordering Lake Champlain. It has an area of 1,049 square miles, or 671,360 acres. It lies on the northern slopes of the Adirondack Mountains, and some of the ranges extend into the southern and western parts of the county. These uplands are conspicuous topographical features of the county. The elevation ranges from 100 feet, the level of Lake Champlain, to 3,830 feet above sea level, on Lyon Mountain. The greater part of the agricultural land lies between the elevations of 100 and 1,800 feet.

The drainage of the county is mainly into Lake Champlain. The several large rivers descending to the lake afford much water power. The population of the county in 1910 was 48,230. Of this number, 11,138, or 23.1 per cent, were in the city of Plattsburg. The rural population is decreasing. The eastern and northern parts of the county are the most thickly populated.

The climate is characterized by severe winters and short, mild summers. The average growing season is about 151 days. The western and northern parts of the county are cooler and have a lighter rainfall than the extreme eastern part. The mean annual precipitation at Plattsburg is 30.52 inches.

Only 67.1 per cent of the county is classified as farming land. General farming and dairying are carried on. The principal crops are potatoes, hay and forage, oats, buckwheat, corn, and barley. Potatoes and hay are the main money crops. The production of potatoes, hay, and forage is steadily increasing, while the output of corn, oats, barley, and buckwheat is stationary. Very little rye and wheat are now grown in the county. Oats are by far the most important of the cereal crops. Some attention is being paid to the development of commercial apple orchards in the southeastern part of the county.

Sheep raising is of much less importance in the county than formerly. The number of dairy cows is rapidly increasing. Considerable attention is paid to the raising of good horses throughout the county.

The adaptation of crops to soils is generally recognized. Hay is grown for market mainly on the heavier soils of the Vergennes and Dover series; potatoes are grown upon the lighter textured soils of the Coloma series. Crop rotations are generally practiced.

Approximately 50 per cent of the county can best be used for forestry. While much of this land now supports some forest growth little attention has been given to the matter of providing for the future supply.

There are valuable deposits of iron ore throughout the county.

The soils of the county have been separated into 9 series and 26 types, exclusive of Rough stony land, Rock outcrop, Coastal beach, Meadow, Marsh, and Muck. The lighter textured soils predominate, especially the stony fine sandy loams and fine sandy loams.

The Coloma soils are the most extensive types in the county. They occur throughout the uplands section and are well drained. The Coloma stony fine sandy loam is the most extensive type. Owing to its high stone content, it is not a good soil for farming. When cleared, however, excellent yields of potatoes are obtained. The Coloma fine sandy loam is an extensive type, differing from the Coloma stony fine sandy loam only in its smaller content of stones. This soil is used for general farming and dairying, potatoes and oats being the most important crops. The Coloma loam has a more level topography. It is devoted mainly to dairying. The Coloma fine sand and gravelly fine sandy loam are not highly developed.

The Gloucester series is derived from granite, gneiss, and schist. The topography ranges from hilly to mountainous. One type, the Gloucester stony fine sandy loam, was mapped. The greater part of this type is in forest, and very little of it is capable of being profitably cultivated.

The Dover soils occupy the low-lying country in the eastern part of the county and are characterized by the presence of limestone. These lands support some of the best developed farms in the county. The topography is gently rolling and drainage is fair to good. Four types were mapped—the loam, fine sandy loam, gravelly fine sandy loam, and stony loam. The loam and fine sandy loam are mainly devoted to general farming and dairying. The greater part of the Dover gravelly fine sandy loam is utilized for general farming, potatoes, hay, and oats being the staple crops. The stony loam is best used for pasture and forest land. Most of it is covered with a forest growth.

The Otisville and Hinckley soils are light textured. These soils are of small extent and so uneven in topography that their agricultural value is low.

The lacustrine and terrace soils are represented by the Vergennes, Plainfield, and Merrimac series.

The Vergennes clay is of importance only in the eastern part of the county, where it is utilized for the production of market hay. The clay loam, of somewhat lighter texture than the clay, produces good yields of the staple farm crops. The fine sand, although of small extent, is fairly well developed. It is devoted to general farming and dairying. The fine sandy loam requires drainage before the best results can be obtained with crops. It is now mainly used for permanent pasture.

The Plainfield series is most extensively developed in the eastern part of the county, and is represented by extensive sandy plains, slightly developed agriculturally. The sand, fine sand, fine sandy loam, gravelly fine sand, and stony fine sandy loam were mapped. While truck crops can be grown in some of the more favorable localities, the series as a whole should be reforested.

The Merrimac soils are of light texture and well drained. They are not utilized to any extent for crop production, but could probably be reforested with profit. The fine sandy loam and fine sand were mapped.

The Podunk soils are developed in low, poorly drained areas subject to frequent inundation. One type, the fine sandy loam, was mapped. This soil is used mainly as mowing or pasture lands. Its agricultural value is low.

Rough stony land, Rock outcrop, Meadow, Marsh, and Coastal beach are of little value for agriculture. Muck, if properly drained, could probably be used for the production of special crops.



[PUBLIC RESOLUTION—No. 9.]

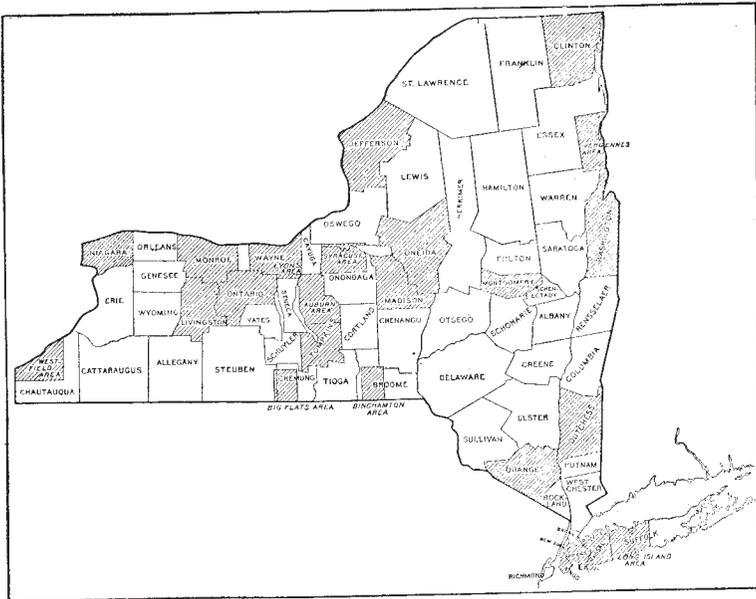
JOINT RESOLUTION Amending public resolution numbered eight, Fifty-sixth Congress, second session, approved February twenty-third, nineteen hundred and one, "providing for the printing annually of the report on field operations of the Division of Soils, Department of Agriculture."

*Resolved by the Senate and House of Representatives of the United States of America in Congress assembled,* That public resolution numbered eight, Fifty-sixth Congress, second session, approved February twenty-third, nineteen hundred and one, be amended by striking out all after the resolving clause and inserting in lieu thereof the following:

That there shall be printed ten thousand five hundred copies of the report on field operations of the Division of Soils, Department of Agriculture, of which one thousand five hundred copies shall be for the use of the Senate, three thousand copies for the use of the House of Representatives, and six thousand copies for the use of the Department of Agriculture: *Provided,* That in addition to the number of copies above provided for there shall be printed, as soon as the manuscript can be prepared, with the necessary maps and illustrations to accompany it, a report on each area surveyed, in the form of advance sheets, bound in paper covers, of which five hundred copies shall be for the use of each Senator from the State, two thousand copies for the use of each Representative for the congressional district or districts in which the survey is made, and one thousand copies for the use of the Department of Agriculture.

Approved, March 14, 1904.

[On July 1, 1901, the Division of Soils was reorganized as the Bureau of Soils.



Areas surveyed in New York.

# **NRCS Accessibility Statement**

---

This document is not accessible by screen-reader software. The Natural Resources Conservation Service (NRCS) is committed to making its information accessible to all of its customers and employees. If you are experiencing accessibility issues and need assistance, please contact our Helpdesk by phone at 1-800-457-3642 or by e-mail at [ServiceDesk-FTC@ftc.usda.gov](mailto:ServiceDesk-FTC@ftc.usda.gov). For assistance with publications that include maps, graphs, or similar forms of information, you may also wish to contact our State or local office. You can locate the correct office and phone number at <http://offices.sc.egov.usda.gov/locator/app>.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotope, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.