

U. S. DEPARTMENT OF AGRICULTURE,

BUREAU OF SOILS—MILTON WHITNEY, Chief.

IN COOPERATION WITH THE NEW YORK STATE COLLEGE OF AGRICULTURE,
CORNELL UNIVERSITY, A. R. MANN, DIRECTOR;
E. O. FIPPIN, IN CHARGE OF SOIL SURVEY.

SOIL SURVEY OF SARATOGA COUNTY,
NEW YORK.

BY

E. T. MAXON, OF THE U. S. DEPARTMENT OF AGRICULTURE, IN
CHARGE, AND J. H. BROMLEY, OF THE NEW YORK
STATE COLLEGE OF AGRICULTURE.

W. E. McLENDON, INSPECTOR, NORTHERN DIVISION.

[Advance Sheets—Field Operations of the Bureau of Soils, 1917.]



WASHINGTON:
GOVERNMENT PRINTING OFFICE,
1919.

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.*

M. W. PATTERSON, *Secretary.*

U. S. DEPARTMENT OF AGRICULTURE,

BUREAU OF SOILS—MILTON WHITNEY, Chief.

IN COOPERATION WITH THE NEW YORK STATE COLLEGE OF AGRICULTURE,
CORNELL UNIVERSITY, A. R. MANN, DIRECTOR;
E. O. FIPPIN, IN CHARGE OF SOIL SURVEY.

SOIL SURVEY OF SARATOGA COUNTY,
NEW YORK.

BY

E. T. MAXON, OF THE U. S. DEPARTMENT OF AGRICULTURE, IN
CHARGE, AND J. H. BROMLEY, OF THE NEW YORK
STATE COLLEGE OF AGRICULTURE.

W. E. McLENDON, INSPECTOR, NORTHERN DIVISION.

[Advance Sheets—Field Operations of the Bureau of Soils, 1917.]



WASHINGTON:
GOVERNMENT PRINTING OFFICE,
1919.

LETTER OF TRANSMITTAL.

U. S. DEPARTMENT OF AGRICULTURE,
BUREAU OF SOILS,
Washington, D. C., July 31, 1918.

SIR: In the extension of the survey in the State of New York during the field season of 1917 a survey was undertaken in Saratoga County. This work was done in cooperation with the New York State College of Agriculture.

I have the honor to transmit herewith the manuscript report and map covering this work and to request their publication as advance sheets of Field Operations of the Bureau of Soils for 1917, as authorized by law.

Respectfully,

MILTON WHITNEY,
Chief of Bureau.

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

CONTENTS

	Page.
SOIL SURVEY OF SARATOGA COUNTY, NEW YORK. By E. T. MAXON, OF THE U. S. DEPARTMENT OF AGRICULTURE, IN CHARGE, and J. H. BROMLEY, OF THE NEW YORK STATE COLLEGE OF AGRICULTURE	5
Description of the area	5
Climate	7
Agriculture	8
Soils	11
Gloucester stony fine sandy loam	16
Gloucester fine sandy loam	17
Whitman stony fine sandy loam	18
Whitman loam	19
Dutchess loam	20
Dutchess silt loam	21
Honeoye loam	22
Mohawk loam	24
Lordstown stony silt loam	24
Lordstown shale loam	25
Allis silt loam	a6
Merrimac gravelly sandy loam	27
Merrimac sand	27
Merrimac fine sand	28
Merrimac very fine sand	30
Merrimac sandy loam	31
Merrimac fine sandy loam	31
Hinckley gravelly sandy loam	32
Hinckley sand	32
Hinckley sandy loam	33
Vergennes very fine sandy loam	34
Vergennes silt loam	35
Vergennes silty clay loam	36
Suffield fine sandy loam	36
Orono silt loam	37
Podunk fine sandy loam	38
Podunk silt loam	38
Muck	39
Rough stony land	39
Summary	40

ILLUSTRATIONS.

FIGURE.

Fig. 1. Sketch map showing location of the Saratoga County area, New York..	Page. 5
---	------------

MAP.

Soil Map, Saratoga County sheet, New York.

SOIL SURVEY OF SARATOGA COUNTY, NEW YORK.

By E. T. MAXON, of the U. S. Department of Agriculture, In Charge, and J. H. BROMLEY, of the New York State College of Agriculture.—Area Inspected by W. E. McLENDON.

DESCRIPTION OF THE AREA.

Saratoga County is situated in the eastern part of New York. It is about 180 miles from New York City and 200 miles from Montreal, Canada, and is upon the main highway of railroad traffic between these two cities. It is bounded on the north by Warren County, on the east by Washington and Rensselaer Counties, on the south by Albany and Schenectady Counties, and on the west by Montgomery, Fulton, and Hamilton Counties. The Hudson River forms most of the eastern boundary and the Mohawk River the extreme southeastern boundary. It has an area of 823 square miles, or 526,720 acres.

The eastern and southern parts of Saratoga County comprise a region of smooth to gently rolling upland lying 250 to 700 feet above sea level. The extreme northeastern and southeastern parts of this region are relatively smooth plains in the form of a high terrace or old lake bed, deeply and sharply dissected by both small and large streams. The southern and southwestern portion represents a low plateau cut by numerous stream channels which are well defined, though bounded by smooth slopes. The elevation of this region ranges from 500 to 1,000 feet above sea level. In the eastern and southeastern parts of it there are several rounded hills rising 200 to 300 feet above the surrounding plain.

The west-central and northwestern parts of Saratoga County are made up of massive ridges extending in a northeast-southwest direction and varying in elevation from 500 to 2,600 feet above sea level. The first and smallest of these ridges, which extends northward from Saratoga Springs, is characterized by a sharp, rocky escarpment along its eastern face and by a broad drift-choked basinlike valley along its western flank. The second ridge may be considered as a huge spur projecting southward from the Adirondack Mountains. It has sharp, abrupt escarpments along each slope, and constitutes a rough, mountainous area. Separated from this ridge by the deeply

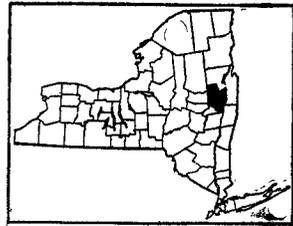


FIG. 1.—Sketch map showing location of the Saratoga County area, New York.

cut glacial stream channel now occupied by the Sacandaga River are southern outliers of the Adirondacks, consisting of high hills or mountains with steep, rocky slopes.

By far the greater part of the county has a well-established surface drainage system. The Sacandaga, Hudson, and Mohawk Rivers are the main drainage courses. The Sacandaga River in the northwestern part of the county flows sluggishly eastward through extensive deposits of recent alluvium. The Hudson River flows swiftly through a relatively narrow valley along the eastern side of the county. Snook, Anthony, and Mourning Kill and Fish and Kayaderosseras Creeks, the main tributaries of the Hudson River, adequately drain the eastern and central parts of the county, and Alplaus Kill, the main tributary to the Mohawk River in Saratoga County, carries the drainage of the southern and southwestern parts.

The Sacandaga River is used for floating pulp wood from the forests to mills along the Hudson River. The Hudson and Mohawk Rivers furnish power for numerous industrial plants, and the smaller streams supply abundant power for pulp mills and gristmills.

Before the advent of the white man in this region it was inhabited by the Iroquois as a hunting ground. Champlain and his Indian allies probably visited the northern portion of the county in 1609, and later traders and trappers journeyed along the eastern part, as the Hudson River was the main highway from the Dutch settlements in the lower Hudson Valley to the Canadian settlements in the north. The hostility of the Indians, together with the colonial wars, retarded occupation of this territory, but settlement probably commenced as early as 1689 in the eastern and southeastern part of what is now Saratoga County. The early settlers were from Connecticut, Massachusetts, and southeastern New York, and the present rural population is made up largely of their descendants. In recent years many foreigners have come into the larger manufacturing towns. In 1880 the census reported the rural and urban population as 46,231 and 11,432, respectively. Since then the rural population has decreased by 11,024, while the urban population has gained 15,278. The density of rural population is given by the 1910 census as 42.8 persons to the square mile. The central and southern parts of the county have the largest percentage of rural population.

The largest towns, with their population in 1910, are: Saratoga Springs, 12,693; Mechanicville, 6,634; Ballston Spa, 4,138; Waterford, 3,245; South Glens Falls, 2,247; Schuylerville, 1,614; and Stillwater, 1,004. Ballston Spa is the county seat. Saratoga Springs is a noted health resort. Most of the other towns are prosperous industrial centers.

The greater part of Saratoga County has good transportation facilities. The Delaware & Hudson Railroad and its branches extend

across the east-central part from north to south, and several lines of the Boston & Maine Railroad cross the southeastern part. Saratoga Springs is the junction point of the main line of the Delaware & Hudson, its Adirondack Branch, and the Boston & Maine. Mechanicville is an important railroad center. The Hudson Valley Electric roads furnish frequent service through the eastern part of the county from Waterford to Schuylerville and from Mechanicville through Ballston Spa to Glens Falls. The Schenectady Electric Railroad handles freight and passengers between Schenectady and Saratoga Springs. The new barge canal extends from Waterford in a westerly direction through the county along the Mohawk River, and the barge canal northward from Waterford along the Hudson River is practically completed.

There are numerous "State roads" in the southern and eastern parts of the county. The dirt roads are usually in good condition throughout most of the year. Telephone and rural mail delivery services extend to all the more settled parts of the county.

The numerous summer resorts throughout the county afford a good local market for farm products. Amsterdam, Troy, Albany, New York, and Boston are the most important outside markets.

CLIMATE.

The climatological data given in the table below are based on records from the station at Greenfield Center, located centrally in the upland part of the county at an elevation of 686 feet above sea level. These data are probably applicable to the western and south-western parts of the county. The northwestern part undoubtedly has a lower temperature throughout the year, while the eastern and southeastern parts adjacent to the river have a relatively higher temperature and a somewhat longer growing season.

The mean annual temperature is 45.4° F. The winters are long and severe, while the summers are mild and pleasant. The average date of the last killing frost in the spring at Greenfield Center is May 11, and that of the first in the fall, September 30. The date of the latest killing frost on record in the spring is June 9, and that of the earliest in the fall, September 14. The growing season is long enough to mature most of the crops grown in this general region.

The mean annual precipitation amounts to about 40 inches, and there is not a wide variation between the wettest and driest years. The smallest annual precipitation is 34.15 inches, and the largest 47.84 inches. The rainfall is fairly well distributed throughout the growing season, though short droughts are sometimes experienced. The snowfall of the region is heavy.

The following table gives the normal monthly, seasonal, and annual temperature and precipitation as recorded at Greenfield Center:

Normal monthly, seasonal, and annual temperature and precipitation at Greenfield Center.

Month.	Temperature.			Precipitation.		
	Mean.	Absolute maximum. ¹	Absolute minimum. ¹	Mean.	Total amount for the driest year (1900).	Total amount for the wettest year (1907).
	° F.	° F.	° F.	Inches.	Inches.	Inches.
December.....	23.2	65	-16	2.99	2.46	5.05
January.....	19.8	60	-36	3.60	3.82	4.97
February.....	18.9	51	-28	3.24	3.57	.99
Winter.....	20.6	65	-36	9.83	9.85	11.01
March.....	31.0	73	-11	3.78	4.67	2.60
April.....	45.0	86	15	3.11	1.34	4.10
May.....	56.7	94	20	3.27	2.03	4.42
Spring.....	44.2	94	-11	10.16	8.04	11.12
June.....	65.6	98	36	3.19	2.16	3.81
July.....	70.0	96	44	3.45	2.16	3.65
August.....	67.2	95	38	3.78	4.00	1.51
Summer.....	67.6	98	36	10.42	8.32	8.97
September.....	61.2	94	24	4.16	.78	8.62
October.....	50.0	83	18	3.36	2.00	4.40
November.....	35.8	73	4	2.43	5.16	3.72
Fall.....	49.0	94	4	9.95	7.94	16.74
Year.....	45.4	98	-36	40.36	34.15	47.84

¹ Figures for absolute maximum and minimum temperature are taken from records of station at Glens Falls, just over the line in Warren County.

AGRICULTURE.

Following the conquest of the French colonies in Canada by the English and the cessation of intercolonial strife, settlement and agricultural development began in this general region. Land was granted to settlers on condition that they "should locate, clear, and cultivate it within a reasonable time." Most of the region was forested, and the trees were felled, rolled in piles, and burned. The agriculture was crude; crops were planted among the stumps for a few years until these decayed and could be removed. Corn, wheat, potatoes, flax, and such other crops as were necessary for food and clothing were grown. The first settlers brought with them a few cattle, hogs, and sheep, and often chickens. As the country became cleared and more settlers came in farmers began to grow products to sell and

engaged in dairying. The northern and northwestern mountainous parts of the county were never extensively developed agriculturally, and lumbering has remained the chief occupation here.

The changes in agricultural conditions between the census years of 1879 and 1909 are shown in the following table, which gives the acreage and production of the principal crops:

Acreage and production of principal crops, 1879 and 1909.

Crop.	1879		1909	
	<i>Acres.</i>	<i>Tons.</i>	<i>Acres.</i>	<i>Tons.</i>
Hay and forage.....	74,856	75,569	75,604	75,421
Oats.....	25,041	<i>Bushels.</i> 726,036	15,819	<i>Bushels.</i> 435,812
Corn.....	25,035	612,222	14,568	482,561
Rye.....	15,695	133,879	6,645	103,261
Buckwheat.....	10,914	147,360	6,810	130,163
Wheat.....	1,892	24,150	127	3,466
Potatoes.....	10,100	855,827	7,278	579,652

The salient facts brought out by this table are that hay and forage is the only item in which there has not been a very decided falling off in acreage between the years 1879 and 1909, and that the gain in acreage in hay and forage is only about 1 per cent.

Hay is the most important crop in the county, the production in 1909 being valued at \$897,354. Approximately 48 per cent of the hay produced in that year consisted of timothy and clover mixed. A small acreage is devoted to clear timothy, and a smaller acreage to clover alone. Most of the mixed hay and the clover is fed on the farm. A small percentage of the timothy is sold.

Oats are the most extensively grown of the cereals. This crop is generally used as a nurse crop in seeding the land to grass. In 1909, 15,819 acres were in oats, yielding an average of 27.5 bushels per acre. Most of the oats grown is fed on the farm to horses or cows. The straw is either fed or used for bedding.

Corn has always been of importance in this county. It is grown both for the grain and for silage. In 1909, 14,568 acres of corn produced 482,561 bushels of ears, or an average of 31 bushels per acre. Silage yields 8 to 10 tons per acre. Practically all of the corn is fed on the farm.

Rye and buckwheat are grown to some extent in all parts of the county. Rye yielded an average of 15.5 bushels and buckwheat an average of 19.1 bushels per acre in 1909.

Potatoes were formerly an important cash crop, but low yields and scarcity of labor have discouraged their production. In 1909 only 7,278 acres were grown on the 3,611 farms in the county, and the yield averaged a little less than 80 bushels per acre.

The live-stock industry is important in Saratoga County. Nearly every farmer keeps a few cattle and some maintain large herds. In 1909 there were 25,382 cattle in the county, of which 16,224 were dairy cows. The value of all dairy products in 1909, excluding milk and cream used in the home, is given as \$787,410. The greater part of the milk is hauled to shipping stations, but in the more remote regions butter is made. Most of the cattle are grades, but there are a few herds of pure-bred Holsteins and some Guernseys and Jerseys. The census of 1910 reports the total number of hogs on the farms of Saratoga County as 10,612, and the total number of sheep as 11,483. Nearly every farmer keeps a few hogs as a source of meat supply, and practically every farmer raises some poultry. In 1909 the value of poultry and eggs produced amounted to \$423,247.

Commercial fruit growing is carried on to some extent. In 1909 there were 137,202 apple trees, 15,718 pear trees, 13,187 cherry trees, and 11,039 plum trees in the county, and the total value of the orchard crops was \$192,452.

Maple sugar and sirup are important products in certain parts of the county. In 1909, 41,908 maple trees produced 8,604 gallons of sirup and 26,807 pounds of sugar. Most of this is sold through local markets.

Truck gardening is carried on to a small extent in the eastern and southeastern parts of the county. The main crops are strawberries, raspberries, sweet corn, cucumbers, and melons.

The adaptation of soils to crops has been recognized only in a general way by the farmers of Saratoga County. The heavier Vergennes soils are usually in sod, either for mowing or for pasture. The thin soils and stony areas are generally used for pastures. Corn, oats, and potatoes are usually grown on the better soils.

The farm buildings and equipment as a whole are only fairly good, but in a few sections they are excellent. The outbuildings are generally large enough to house the crops and cattle. The farmhouses are usually large and substantial.

Farming methods in Saratoga County do not differ materially from those prevailing over the hill regions of New York State. Plowing is done in both the fall and spring, the depth varying from 3 inches on the poorer farms to 6 or 8 inches on the better farms. Seeding is generally done in the spring. Crop rotations are practiced in a general way. The most common rotation consists of corn for silage or grain one year, oats or rye in which timothy and clover is seeded one year, and sod for two or four years. Sod is usually left until the stand of grass is poor. On the heavy soils of the Vergennes series grass land is left for five to seven years, when it is reseeded with rye or oats. Potatoes are usually grown on sod land. Permanent pastures seldom receive any care in the way of

reseeding or cleaning up the weeds and brush. The farm woodlots seldom receive any care.

Over 53 per cent of the farmers in the county bought fertilizers in 1909, at an average expenditure of \$40.50 each. Most of the fertilizer is applied to grain or potatoes. The stable manure produced is generally utilized, being spread on sod before plowing for corn. Little green manuring is done. Lime in the form of ground limestone or burnt lime is used by only a few farmers.

The farm-labor problem is one of the most difficult which the farmers have to face. The numerous factories and shops in the adjacent towns offer high wages for short hours during the entire year and attract practically all the available supply of labor. During the present season (1917) many acres of crops remained unharvested from a lack of labor. In 1909 before labor was so scarce, 62 per cent of the farmers hired labor, for which an average expenditure of \$223.25 a year was made.

In 1910, 74.5 per cent of the total area of Saratoga County was in farms, and 62.7 per cent of the land in farms was improved. The average size of farms is 108.6 acres. Much of the land not in farms consists of forest or unproductive sand plains.

In 1910 there were 3,611 farms in the county, of which 2,873 were operated by owners, 663 by tenants, and 75 by managers. Of the farms operated by tenants 48 per cent are rented on a cash basis and 40 per cent on shares, with 12 per cent not specified. Of those farms operated by owners 1,747 were free from all mortgage debt.

In 1910 the value of all farm property in Saratoga County was \$15,960,106, showing an increase of 26.5 per cent in the preceding decade. Of the total value, 38 per cent was represented by land, 40.7 per cent by buildings, 7.5 per cent by implements, and 13.7 per cent by domestic animals.

The selling price of farm land depends largely upon the location, character of the soil, and improvements. The timbered areas are held at \$3 to \$12 an acre, according to the timber stand and distance from market. The undeveloped sand plains are valued at \$3 to \$15 an acre. The average selling value for farms in the greater part of the county is \$40 to \$60 an acre, but some farms in the southwestern part are held at \$125 an acre.

SOILS.

Saratoga County extends from the relatively low valleys of the Mohawk and Hudson Rivers to the rugged uplands of the Adirondack Mountains. The surface features reflect in a general manner the character of the underlying rock formations. These range in age from the pre-Cambrian through the Paleozoic into the Pleistocene. The pre-Cambrian age is represented by rocks of the Lauren-

tian and Greenville series. The light-colored Greenville gneisses are probably the most extensive. Schists, quartzites, and syenites of various types also abound. These pre-Cambrian formations underlie the higher, rougher areas in the western and northwestern parts of the county.¹

The Cambrian and Ordovician divisions of the Paleozoic era are typically represented in Saratoga County. Because of their distinct stratification, fossil content, and lack of metamorphosis the rocks present many sharp contrasts to the pre-Cambrian rocks. The Cambrian age is represented by the Potsdam sandstone, the Theresa formation, and the Little Falls dolomite. The Potsdam sandstone is a light-colored, siliceous sandstone occurring in the west-central part of the county near Greenfield Center, south of Palmer, west of Porter Corners, and in the vicinity of Barkersville. The Theresa formation consists of alternating beds of pure-gray fine-grained sandstone and bluish-gray, fine-grained dolomitic limestone. This formation is extensively developed in Saratoga County, especially in the central and west-central portions, south of Greenfield Center, east of Porter Corners, and in the immediate region of Amsterdam Reservoir and north of this place. The Little Falls dolomite is typically a pale bluish gray, fine-grained, crystalline dolomitic limestone. The weathered surface is generally lighter gray in color. This formation extends westerly from the vicinity of Saratoga Springs to Middlegrove and then southwesterly toward West Galway and north along the county line to the vicinity of Edinburg. The Ordovician age is represented by the Hudson River shale and sandstone and the Utica shale. The Hudson River formation is a dark shale alternating with many grit and chert beds. It predominates in the eastern and southeastern parts of the county from the vicinity of Gansevoort southward to Waterford. The Utica shale is dark gray to bluish gray and in conjunction with the Frankfort shale and sandstone occupies the southwestern part of the county.

The most recent deposits over the county are of Pleistocene age and were formed either during or after the glacial epoch. During the glacial period the continental ice sheet advanced and retreated from this region with accompanying erosion or deposition. The ice sheet moved in a southwesterly direction and carried rock material from the north with it. As the ice retreated or melted this material was dropped, forming a surface deposit of glacial till. In some places moving water transported the finer sediments to more quiet water, where they were deposited in the form of deltas or outwash plains. The glacial till represented in the ground moraine mantling nearly all the upland bears some relation to the underlying rocks, except where its depth is too great or along the line of contact

¹ Geological data are based on reports of the Geological Survey of New York.

between important formations where material from one is intermingled with that of the other. Thus, the till overlying the gneiss, quartzite, and schist formations ranges from brownish yellow to yellow and the till over the black shales has a characteristic dark-gray to black color.

The soils of Saratoga County are grouped into series on the basis of similarity in color, structure, origin, drainage, physiographic position, and geological origin. The types within the series differ only in texture, or the relative quantities of silt, clay, and sand of which they are composed.

The soils derived from the mantle of till composed largely of granite, gneiss, and schist are classified as Gloucester. They have a yellowish-brown to brown surface soil and a brownish-yellow to yellow subsoil. The topography is rolling to rough, and drainage is good. The Gloucester series includes the more extensive upland soils in the county, occurring in the west-central and northwestern parts.

The Whitman series represents poorly drained areas in the Gloucester soils, where the surface material is dark brown to dark gray and the subsoil is mottled gray and yellow. The stony fine sandy loam and loam types are mapped. The loam is extended into a region of mixed glacial till composed of granite, gneiss, and schist as well as some sandstone and shales. It occurs in the western part of the county throughout bodies of the Gloucester soils.

The glacial till, derived predominantly from light-colored sandstone and shales, with sometimes a considerable admixture of gneiss, schists, and quartzite rocks, gives soils of the Dutchess series. The presence of the Hudson River formations of shale and sandstone is the determining characteristic of this series. The igneous fragments are usually large and more prevalent along the boundary toward the Gloucester series. The surface soils are light yellowish brown in color and the subsoils yellow to grayish yellow.

The Honeoye soils are derived from a thin layer of glacial till, largely of limestone derivation, overlying limestone, the rock being exposed in many places over the fields. The surface soils are brown to dark brown and the subsoils light brown to yellowish brown. The topography conforms closely to the position of the underlying formations, and is rolling. Drainage is good, and in places on the thinner and stonier areas excessive. The Honeoye soils are confined to the southwest corner of the county.

The Mohawk series is characterized by brown to dark-brown surface soils and brown to rather dark grayish brown subsoils. The lower subsoil usually carries varying quantities of small, angular fragments of black shale. The topography is gently rolling, and drainage is adequate for crop production.

Soils derived from well-drained, light-colored, noncalcareous shales and sandstones, and with bedrock at less than 3 feet, are included

in the Lordstown series. The surface soils are light yellowish brown and the subsoils are yellow and free from mottling. The entire 3-foot section has a loose, open structure and rests upon thin-bedded sandstone at a shallow depth. This series differs from the Dutchess mainly in the greater abundance of sandstone fragments, in its shallow depth, and in the absence of any considerable quantity of igneous rock fragments. The topography is rolling to hilly and rough. The Lordstown soils are typically developed in the eastern and southeastern parts of the county.

The surface soils of the Allis series are light brown or grayish brown and the subsoils are mottled yellow, gray, and brown, and rest upon sandstone or shale rock at a depth of 3 feet or less. These soils have resulted from the weathering of the thin mantle of till derived from the underlying sandstone and shale that remained after the ice movement swept over this region. Large glacial erratics are sometimes scattered over the surface.

The upland soils in many places consist of sediments transported by running water and deposited in the beds of former lakes in the form of stream terraces or deltas and outwash plains. Where the material is derived from the crystalline rocks of the Adirondack mass, giving types with brownish surface soils and yellow subsoils, well drained and situated above normal overflow, the soils are classified in the Merrimac series. The topography of the Merrimac soils is that of a level plain with minor variations from place to place. These soils are most extensively developed in the eastern part of the county, though smaller, typical areas are found in nearly all parts of the upland.

The members of the Hinckley series have yellowish-brown surface soils, underlain by yellow subsoils. Rough stratification and cross bedding often appear below the 3-foot section. The material giving rise to the Hinckley series was derived from the coarser crystalline rocks and laid down under or along the margin of the ice sheet by running water. Occasional boulders and rounded gravel are characteristic of this series. The topography is broken, often approaching that of a kame moraine, and drainage is excessive. This series is most extensively developed along the old glacial valley extending southwest from Corinth.

The finer sediments deposited in old glacial lakes have given rise to the soils of the Vergennes series. The surface soils are brown to grayish brown and the subsoils are lighter brown. The surface is level to only gently undulating, except where traversed by glacial or postglacial streams, and drainage is not everywhere thorough.

The soils of the Orono series, which belongs in the glacial lake group, are light brown or brown, with bluish to greenish-gray subsoils frequently slightly mottled with yellow and rusty brown. The

deep subsoils and the substrata are always a stiff, impervious silty clay which upon drying out loses its greenish cast and becomes gray to light gray. The drainage is poor, except in small areas. These soils differ from the Vergennes only in their poor drainage, the material being the same as that from which the Vergennes soils are derived.

The Suffield soils consist of sediments derived from crystalline rocks and laid down in glacial lakes, either as true lake deposits or by moving currents within the lake. The surface soil is brown to grayish brown and the subsoil is mottled gray and yellow. Ferruginous strata are sometimes found throughout the lower subsoil. The surface is level or flat, and drainage is characteristically poor.

The surface soils of the Podunk series are light brown to grayish brown, and the subsoils are mottled yellow and gray. These soils consist of river and creek alluvium so recently deposited that no changes in its character have been brought about by weathering since deposition. Organic matter has accumulated in the surface horizon, but the subsurface layers have not been changed. Such soils are usually subject to overflows during high water.

Rough stony land comprises areas that are too rough and too stony for cultivation. It is mapped mainly in rougher sections of the county, where the predominating underlying rock is gneiss, schist, or granite.

Muck is decomposed vegetable matter with an admixture of mineral matter, accumulated under conditions of poor drainage. The surface material is dark brown to black and the subsoil is yellowish brown to black. The lower subsoil rests upon gravel, clay, or till at depths varying from a few inches to many feet. Muck is not extensive in Saratoga County.

The following table gives the name and the actual and relative extent of the several types of soil mapped in the county:

Areas of different soils.

Soil.	Acres.	Per cent.	Soil.	Acres.	Per cent.
Gloucester stony fine sandy loam	109,440	20.8	Allis silt loam	5,888	1.1
Merrimac fine sand	26,688	19.4	Vergennes silty clay loam	5,312	1.0
Rolling phase	75,200		Lordstown stony silt loam	5,056	1.0
Rough stony land	61,888	11.8	Merrimac gravelly sandy loam	4,992	1.0
Dutchess loam	55,424	10.5	Hinckley gravelly sandy loam	4,480	.5
Gloucester fine sandy loam	45,440	8.6	Vergennes silt loam	3,200	.6
Merrimac sand	24,256	4.6	Vergennes very fine sandy loam	2,880	.5
Podunk fine sandy loam	16,064	3.1	Suffield fine sandy loam	2,688	.5
Merrimac very fine sand	13,888	2.6	Mohawk loam	1,344	.3
Orono silt loam	11,264	2.1	Merrimac fine sandy loam	1,216	.2
Whitman stony fine sandy loam	11,072	2.1	Podunk silt loam	1,024	.2
Dutchess silt loam	9,600	1.8	Merrimac sandy loam	704	.1
Lordstown shale loam	8,512	1.6	Muck	512	.1
Whitman loam	6,272	1.2	Honeoye loam	448	.1
Hinckley sandy loam	6,016	1.1			
Hinckley sand	5,952	1.1	Total	526,720

GLOUCESTER STONY FINE SANDY LOAM.

The surface soil of the Gloucester stony fine sandy loam is a light-brown to yellowish-brown stony fine sandy loam, 4 to 6 inches deep. The subsoil, to a depth of 36 inches or more, is a bright-yellow to grayish-yellow stony fine sandy loam. The entire 3-foot section carries a high percentage of angular and rounded rock fragments varying in size from small cobbles to large boulders. These are mostly of gneiss, schist, syenite, and quartzite, with occasional fragments of granite and sandstone.

The Gloucester stony fine sandy loam occurs in the west-central and northwestern parts of the county. It is the predominating type in the towns¹ of Edinburg, Day, Hadley, Providence, and Corinth, and smaller areas are found in the adjacent towns. The type predominates along the slopes of the smaller valleys and extends into the rugged foothills and into the Adirondack uplands. The broken topography and the stoniness result in an open structure favorable to rapid drainage, and on some slopes the drainage is often excessive, the soil being droughty.

This soil originally supported a heavy stand of white pine, hemlock, oak, maple, spruce, and beech, practically all of which has been cut over. Probably less than 10 per cent of the type is under cultivation at the present time, and the fields are small and irregular. Large stone fences and stone piles are conspicuous in the cultivated districts.

Dairying is the main farm industry. A few grade cattle are kept and the milk is made into butter on the farm, enough roughage being grown to feed the stock. Corn, oats, rye, buckwheat, and hay are the principal crops. Some potatoes are grown for home consumption. Lumbering is carried on in a small way, portable mills being set up and lumber cut for local use. Cord and pulp wood is taken out in some sections. The manufacture of maple sirup and sugar is extensively carried on in season, and these are important cash products, being disposed of to local dealers. Crops are rotated only in a general way. Very little commercial fertilizer is used and in many cases the barnyard manure is wasted.

Land values on the Gloucester stony fine sandy loam range from \$8 to \$35 an acre, with few farms changing hands.

The rough topography, distance to markets, and poor transportation facilities all tend to make any intensive use of this soil unprofitable under present labor conditions. Some form of forestry might be undertaken.

¹ "Town," as applied in New York State, is synonymous with the "township" of other States.

GLOUCESTER FINE SANDY LOAM.

The Gloucester fine sandy loam, to an average depth of 6 or 8 inches, is a light-brown or yellowish-brown, mellow fine sandy loam. The subsoil is a yellowish fine sandy loam. Below the 3-foot section the material is lighter, being yellowish gray to gray. The surface soil and the lower subsoil carry varying quantities of angular fragments of crystalline rocks such as granite, gneiss, syenite, and quartzite, and smaller quantities occur through the remainder of the 3-foot section. These stones vary in size from small cobbles to massive boulders. The stones do not seriously interfere with cultivation except in some very stony areas which are included with this type because too small to separate on the map. Such areas are generally used for pasture or for woodlots. Variations in texture sometimes occur over small areas, the soil tending toward a very fine sandy loam or light loam.

The materials of Gloucester fine sandy loam are derived primarily from crystalline rocks, but in the general region extending from South Corinth through East Galway to Amsterdam Reservoir scattering fragments of the underlying limestone formation have sometimes been incorporated with the till mantle, though probably not in sufficient quantities materially to affect crop production. Two miles southeast of Greenfield the Potsdam sandstone comes close to the surface and fragments are scattered over the surface and throughout the 3-foot section. Another area about 2 miles west of Middlegrove carries a high percentage of fragments of this same formation. Such areas if larger might be classified with the Coloma series of soils.

Along the border between the Gloucester fine sandy loam and the Dutchess loam there is a blending of material from the crystalline rocks to the northward with that of the sandstone or shale rocks to the south, so that the line between the two soils is often arbitrarily drawn. Agricultural conditions in this immediate vicinity show no marked differences.

The Gloucester fine sandy loam occurs in the west-central and northwestern part of the county, in the towns of Milton, Galway, Greenfield, and Providence, and to a smaller extent in the adjacent towns. It occupies rolling uplands bordering the more rugged areas, and the topography varies from gentle slopes along rounded hills to broken, hilly areas. Most of the type can be cultivated with machinery, but the steeper areas are held in pasture or forest.

The gentle slope and the open structure of the subsoil permit of thorough drainage over the greater part of this type, but there are a few poorly drained areas on almost every farm in depressed positions or on level tracts. Many of these areas are too small to map with the Whitman series, to which they really belong.

The Gloucester fine sandy loam was originally covered with a heavy forest, practically all of which has been removed and partially replaced by a second growth of oak, maple, white pine, and chestnut. It is one of the most important soil types of the county, approximately 50 per cent being under cultivation at the present time. Dairying is the principal type of farming. Approximately half the farmers sell butter, but on farms near the towns the raw milk is sold daily. Corn for silage, oats, and hay are the main crops. Practically all of the oats and hay grown are used on the farm. A few acres of potatoes are grown on some farms, the product being disposed of through local markets. Buckwheat and rye are grown to a small extent.

Corn for ensilage yields 8 to 12 tons per acre, with an average of 9 tons. Oats yield 30 to 35 bushels. Hay yields from three-fourths to 1½ tons per acre, according to the age of the sod and the method of fertilization. Potatoes do well considering that little spraying or fertilization is done. The average yield is approximately 125 bushels per acre. Buckwheat yields from 15 to 18 bushels and rye 12 to 15 bushels per acre.

The farmers usually practice a general rotation of corn one year, oats or rye one year, seeded to clover and timothy, which is left two or three years. Barnyard manure is usually applied to sod land before plowing for corn, and commercial fertilizers are generally used on grain. Most of the crops are cultivated and harvested with horse-drawn machinery, with which the farms are fairly well equipped.

Land values on this soil range from \$30 to \$75 an acre, according to the location with respect to improved roads, the distance to market, and the character of the farm buildings. Many farms have been sold at a price for which the buildings alone could not be replaced.

The productiveness of this soil could be improved by increasing the number of live stock to utilize the roughage more completely, by deeper plowing, and by adding some form of lime. At present the lack of efficient labor makes it difficult to follow these suggestions.

WHITMAN STONY FINE SANDY LOAM.

The surface soil of the Whitman stony fine sandy loam is uniformly dark in color, varying from place to place, according to the drainage and the organic content. It is typically a dark-brown to dark-gray stony fine sandy loam, with an average depth of 8 inches. The subsoil from 8 to 36 inches is a mottled grayish-brown or grayish-yellow to gray stony fine sandy loam. The texture varies considerably even within small areas. The stones range in size from gravel to boulders and are thickly scattered over the surface and throughout the sub-

soil. Occasionally the stones have been partly removed from small areas and piled into stone fences.

The Whitman stony fine sandy loam is developed in the central and northwestern parts of the county. It occurs in low, poorly drained positions and in depressed areas throughout the uplands mantled with soils of the Gloucester series. The topography varies from flat to smooth, the areas lying on gentle slopes or along intermittent stream courses. Seepage from the higher areas makes the soil poorly drained in many places. The drainage, however, varies widely from place to place, the type including some areas that are wet for only a short period every year and other areas that are continually wet and may even have a thin mantle of alluvium spread here and there over the surface.

This soil is not important agriculturally, and only a few acres are in cultivation. Hay of poor quality is sometimes harvested from the drier fields. The greater part of the type is grown up to brush and small forest trees, such as elm, poplar, beech, hemlock, and ash. It is either considered waste land or is held at a very low valuation. The high stone content and the poor drainage make cultivation difficult. Some areas might be profitably reforested.

WHITMAN LOAM.

The surface soil of the Whitman loam is a dark-brown or dark grayish brown loam, ranging in depth from 4 to 8 inches, with an average of 6 inches. The subsoil is a yellowish loam, invariably mottled with gray, rusty brown, orange, or drab. The texture of the subsoil may vary from a fine sand or sandy loam to a heavy silt loam. A few small, angular fragments of light-colored sandstone and shale, together with some large glacial boulders of foreign or local origin, are scattered over the surface and through the lower part of the 3-foot section. Small ridges of well-drained or fairly well drained Dutchess soils are sometimes included with this soil where too small to separate properly on the map.

Where this type is mapped along the larger streams it may include local areas covered by a thin mantle of alluvium derived from the light-colored sandstone and shale soils of the immediate region. Some of the wetter areas may have a thin covering of Muck, but where these are too small to map or represent only minor physical conditions they are included with the Whitman loam. The large area in the town of Malta, east of Ballston Spa, is not typical. This region was scoured by ice or running water and a thin mantle of till was laid down, derived from sandstone, shale, and crystalline rocks. The surface here is covered with many glacial boulders.

The Whitman loam is extensively and typically developed in the towns of Charlton, Galway, Milton, Clifton Park, Ballston, and Malta. It occurs in low, flat, poorly drained positions throughout the region occupied by the Dutchess soils, and really represents poorly drained Dutchess material.

Agriculturally this type is unimportant. Only the drier ridges are devoted to crops, the remainder being used for pasture or wood lots. Some hay of poor quality is cut from the better drained areas. Yields of hay are low. The pastures are wet and start late in the spring. Many of the fields have been abandoned and allowed to grow up with alder, elm, birch, ash, and other water-loving plants. Part of this land can be reclaimed and used for crop production by thorough drainage and the use of some form of lime.

DUTCHESS LOAM.

To an average depth of 8 inches the Dutchess loam is a light-brown to yellowish-brown, medium-textured loam. The subsoil from 8 to 36 inches is a yellow loam. A small quantity of angular fragments of light-colored, noncalcareous shales and a few fine-grained sandstones and igneous boulders are scattered over the surface and throughout the lower section. This till mantle rests at a shallow depth upon the underlying shale and sandstone formation. The entire 3-foot section has a relatively loose, open structure due to the rock fragments. The relative proportion of shale and crystalline-rock fragments varies considerably. Throughout the northern part of the towns of Charlton and Ballston and in the towns of Galway and Milton the crystalline rocks, such as gneiss, syenite, schist, and quartzite predominate. This may be regarded as a transitional region from the typical Gloucester soils on the north into the more typical Dutchess soils on the south. The relatively small, isolated areas of Dutchess soil in the towns of Wilton and Moreau are not strictly typical, as they carry a relatively high percentage of crystalline-rock fragments, both on the surface and in the lower section and small pockets of interbedded and roughly stratified materials are in evidence.

The Dutchess loam occurs in the south-central and southwestern parts of the county, being well developed in the towns of Galway, Milton, Ballston, Charlton, Clifton Park, and Malta. It occurs as a low plateau much dissected by relatively narrow, shallow valleys or stream depressions, and has as a result an undulating to gently rolling topography. Although the general region occupied by this soil is poorly drained, the Dutchess loam has relatively good surface and internal drainage.

This is one of the most important agricultural soils in the county. Approximately 70 per cent of it is under cultivation. General farming and dairying are the main occupations. Orcharding is of some importance. Corn for ensilage, hay, oats, and potatoes are the chief crops. Rye and buckwheat are grown to a less extent. Corn yields 8 to 14 tons per acre, hay from 1 to 1 $\frac{3}{4}$ tons, oats from 25 to 40 bushels, and potatoes from 75 to 150 bushels. Most of the crops grown are used to maintain the dairy stock. Every farmer keeps a few cattle and cows and either makes butter or sells raw milk to near-by factories or shipping stations.

Fruit seems to do well, good yields of fair quality being obtained. Apples, plums, pears, and cherries are the principal fruits. Peaches are grown to a smaller extent. The Baldwin, Greening, and Ben Davis are the predominating varieties of apples.

The farmers on this type generally practice some form of crop rotation. A common rotation in use consists of corn for silage, oats, or rye, seeded to clover and timothy, and hay for two or three years. Barnyard manure is generally spread on sod and turned under for corn. Commercial fertilizers are used on small grains and on corn and potatoes. Cultivation is usually performed with modern implements and is for the most part thorough. The farm buildings are usually adequate and kept in a fair state of repair. The barns are of sufficient size to house the forage, tools, and stock. The farm fences are not always substantial. Practically every farm has one or more silos.

Land values on the Dutchess loam vary according to the percentage of tillable land, the distance from market, the location with respect to improved roads, and the character of the buildings. Values range from \$35 to \$125 an acre.

DUTCHESS SILT LOAM.

The surface soil of the Dutchess silt loam consists of 6 or 8 inches of light yellowish brown silt loam, carrying a small percentage of angular fragments of light-colored shale and occasionally of sandstone. The subsoil from 8 to 36 inches or more is a yellow to pale-yellow silty loam. Only a few rock fragments of foreign origin are found over the surface and mixed with the soil and subsoil.

Scattered throughout the towns of Stillwater and Saratoga are several small bodies of this soil with typical color characteristics, but variable in texture. The surface soils are light loams or silty loams and the subsoils are loams. These variations are usually frequent, but of such small extent that they can not be practically separated on the map. The topography is rolling or ridgy. Road cuts through the ridges show glacial till overlying thin beds of poorly

stratified material, which in turn rests upon coarse ground moraine or in some cases on bedrock. Agriculturally these variations do not materially differ from the typical areas.

The Dutchess silt loam is confined to the eastern and southeastern parts of the county, in the towns of Stillwater, Saratoga, Clifton Park, and Halfmoon. It occurs as a relatively thin mantle of till overlying the metamorphosed beds of Hudson River shale. The topography is rolling or consists of ridges standing slightly above the surrounding country. Because of the favorable surface relief and the loose, open structure of the subsoil the type is well drained.

The Dutchess silt loam is not considered as productive as it was five years ago, owing probably to poor management and labor shortage. Approximately 75 per cent of it is under cultivation. General farming and dairying are the main industries. Corn, oats, potatoes, and hay are the main crops. Fruit is grown in a small way. Apples, plums, cherries, and peaches are the principal orchard fruits. Corn is grown for silage and yields 8 to 10 tons per acre. Oats are grown as a subsistence crop and yield 25 to 35 bushels. Rye and buckwheat yield an average of 12 and 20 bushels, respectively, per acre. Potatoes were formerly grown with marked success, but yields at present are only 75 to 125 bushels per acre. Hay is usually a light crop, averaging 1 ton per acre.

Dairying is engaged in on a small scale, the milk being either sold raw or made into butter. The dairy and other cattle are usually grades of only fair breeding. Rotations are followed to some extent, but the land is usually left in grass too long, and the plowing is too shallow. Barnyard manure is sometimes used, but commercial fertilizers rarely.

Land values vary according to the improvements, the size of the farm, and the location, and range from \$25 to \$75 an acre.

This soil requires the addition of organic matter, more thorough cultivation, deeper plowing, and probably the use of some form of lime. More live stock could profitably be maintained to make more thorough use of the roughage. Short, systematic rotations would seem advisable.

HONEOYE LOAM.

The Honeoye loam consists of a brown loam to silty loam, 9 to 12 inches deep, underlain by lighter brown loam. This till mantle rests upon the underlying bedrock of limestone at shallow depths. Small quantities of angular rock fragments are scattered over the surface and throughout the 3-foot section. They are mainly limestone of local origin, but some are of granite, gneiss, or schist. The stones are not sufficiently large or numerous to interfere with cultivation.

The area of Honeoye loam mapped 2 miles northeast of North Milton varies from the typical in including a large percentage of till material similar to that giving the Gloucester soils, with its characteristic boulders.

In one small area 2 miles northeast of North Milton and a few others in the vicinity of Blue Corners a stony variation of the Honeoye loam is mapped. The soil is a brown to dark-brown stony loam, varying in depth from 4 to 24 inches. Where the till mantle is shallow there is very little difference in color or texture between the soil and subsoil, but where the bedrock is 18 to 20 inches below the surface the subsoil is lighter brown in color. Outcrops and small fragments of the underlying fine-grained limestone formation are frequently observed, and occasional boulders and fragments of rock foreign to the immediate vicinity are sometimes scattered over the surface and throughout the soil section. The shallowness of the soil section, the numerous outcropping ledges, and the high stone content interfere with cultivation. The topography is generally flat or conforms to the surface of the underlying rock formations, but in a few places there are sharp escarpments separating the different levels. The shallowness of the soil and the nearness of the underlying rocks to the surface render the soil droughty, and mowing lands and pastures usually suffer from lack of moisture. Most of this soil has been cut over and the merchantable timber removed, leaving a mixed stand of smaller white pine, hemlock, chestnut, oak, and maple. Only a small proportion of the type is used for hay production, most of it being in pasture or woodlots. Land values are low. The pastures where the soil is deepest might be profitably improved by cutting the rank growth of weeds and small brush. Systematic methods of forestry might be practiced on the larger woodlots.

The Honeoye loam is typically developed in a few areas in the extreme southwestern part of the county, in the towns of Galway and Charlton. It occurs as a relatively thin mantle of glacial till overlying limestone beds, and the topography corresponds closely to the form of the underlying ledges. It may be classed as rolling. The soil is well drained.

Agriculture on this type is fairly well developed. General farming and dairying are carried on, and corn, oats, buckwheat, rye, and hay are grown with fairly good success. Corn yields 30 to 45 bushels of grain or 9 to 12 tons of silage per acre; oats yield 30 to 35 bushels; buckwheat, 15 to 25 bushels; rye, an average of 15 bushels; and hay 1 to 1½ tons. The dairies are usually small and the cows consist of grade stock. The milk is generally made into butter. The crops grown and the methods of tillage and fertilization follow closely those on the adjacent soil types.

Farms on this soil are held at \$30 to \$75 an acre, according to the location and improvements.

MOHAWK LOAM.

The Mohawk loam consists of about 10 inches of dark-brown, mellow loam underlain by slightly lighter colored loam, which extends to a depth of 36 inches or more. The subsoil is rather compact and heavier than the surface soil, sometimes approaching a silt loam or silty clay loam in texture. The lower subsoil is often underlain by soft, black shales, fragments of which are scattered throughout the 3-foot section, being especially numerous in the subsoil. There are also strewn upon the surface and throughout the entire soil section varying quantities of angular and partially rounded fragments of gneiss, quartzite, and occasionally of limestone. These stones seldom interfere seriously with cultivation.

The Mohawk loam is typically developed in one area of approximately 1,200 acres west of the village of West Charlton. It occurs in a narrow belt adjacent to the Honeoye soils and overlying the soft, black Utica shales. The topography is gently rolling and drainage is well established.

This soil is used in about the same manner as the surrounding soils. General farming and dairying are the chief occupations, with hay, corn for silage, and oats as the main crops. Yields equal, if they do not exceed, those obtained on the adjacent farms. Good dairies are maintained. The milk is either disposed of raw or used in the manufacture of butter.

Farming methods are thorough and manure and commercial fertilizers are used to good advantage. The buildings are well kept and the farm equipment seems to be adequate for successful farming. Land values range from \$35 to \$125 an acre.

LORDSTOWN STONY SILT LOAM.

The surface soil of the Lordstown stony silt loam is a yellowish-brown, mellow, stony silt loam 5 to 8 inches deep. The subsoil is a light-yellow or pale-yellow, stony silt loam. Bedrock is generally encountered at 18 inches to 3 feet below the surface, but in a few areas it may be slightly deeper. The surface usually is thickly strewn with fragments of fine-grained sandstone ranging in size from small cobbles to slabs 18 inches or more across. While the rock fragments are usually of local derivation, foreign rocks, such as gneiss, schist, and quartzite, are sometimes encountered. In many places the underlying shaly-sandstone formation outcrops in the form of narrow ledges or lies just below the surface. Variations in texture tend toward the loam type.

The Lordstown stony silt loam is typically developed in the eastern and southern parts of the county in the towns of Saratoga, Stillwater, and Clifton Park. It occurs as a thin mantle of till derived from and overlying the hard, thin-bedded, light-colored sandstones of the Hudson River formation. The topography is rolling to hilly and rough and drainage is thorough.

Probably less than 50 per cent of this soil is under cultivation. It formerly supported a heavy stand of timber. In the forested areas there is now a mixed stand of chestnut, white pine, beech, and soft maple. The cultivated areas formerly were highly productive, but continued cropping without replacing organic matter has gradually reduced the yields. Dairying and general farming are now carried on. Only a few cattle of indifferent breeding are kept on the farms, and the milk is usually made into butter. Hay, oats, buckwheat, rye, corn for silage, and potatoes are the principal crops grown. There are a few small apple orchards.

Hay yields from one-half to $1\frac{1}{2}$ tons per acre, with an average of 1 ton. Most of the hay is fed on the farm, the surplus being sold. Oats yield 25 to 35 bushels per acre and buckwheat 12 to 20 bushels. Corn, generally grown for ensilage, yields 8 to 10 tons per acre. Potatoes yield 75 to 125 bushels per acre. Only a small quantity of commercial fertilizer is used on these crops, but all stable manure is generally saved and spread on the fields.

The methods of cultivation followed on this soil are not always the most progressive. The plowing is usually too shallow and land is left too long in sod.

The price of this land ranges from \$15 to \$75 an acre, depending upon the location with respect to markets and roads and the character of the improvements. Very few farms are changing hands at present.

Shorter rotations, the addition of organic matter to the soil, and the use of some form of lime are means that can be used to increase the productiveness of farms on the Lordstown stony silt loam.

LORDSTOWN SHALE LOAM.

The Lordstown shale loam is a light yellowish brown to yellow loam or silty loam, composed largely of small angular fragments of the underlying soft Hudson River shales. The underlying bedrock comes close to the surface and in many places is exposed, and the average depth of soil material throughout the type is less than 4 inches. A few boulders of crystalline rocks and a small quantity of angular sandstone fragments are scattered over the type in places.

This soil occurs along slopes bordering the old glacial channels and is the result of the weathering of the ledges since the glacial

period. It is well developed in the eastern and southeastern parts of the county in the towns of Moreau, Northumberland, Saratoga, Stillwater, Halfmoon, Waterford, and Clinton Park. The largest area is in the town of Waterford. The type occurs on narrow ridges or knolls and has a rolling surface. The loose, open, shaly surface soil and the shattered, thinly bedded structure of the underlying formation render this soil subject to drought, and crops often suffer severely.

Agriculturally this soil is unimportant. Only a few small areas are under cultivation, the remainder being held in pasture or as waste land. Some of the deeper areas are used for hay, corn, oats, potatoes, and buckwheat, which give relatively low yields. None of this land is changing hands at present. It can probably best be used for some form of forestry.

ALLIS SILT LOAM.

The surface soil of the Allis silt loam is a dark-yellow to grayish-yellow, mellow silt loam, with an average depth of 6 inches. In local areas the surface soil varies from yellowish brown to dark gray, the color depending on the drainage conditions. The subsoil is a mottled, pale-yellow to grayish-yellow heavy silt loam. The entire 3-foot section contains a variable percentage of comparatively small, angular fragments of light-colored sandstone and shale and a few large glacial erratics. The type is comparatively shallow, the soil mantle ranging in depth from a few inches to about 22 inches. Within the large area south of East Line there occur a few ridges where the soil mantle is slightly deeper than typical, and better methods of cultivation and fertilization have rendered the farms here more productive than elsewhere.

The Allis silt loam is extensively developed in the towns of Ballston and Malta and to a smaller extent in some of the adjacent towns. The largest bodies occur in the vicinity of East Line. This soil represents the weathered product of a shallow mantle of till overlying the light-colored shales or the residue left in the weathering of the shales since glacial times.

The topography is usually flat, conforming to the surface of the underlying formation, and owing to the shallowness of the soil, the heavy, compact structure of the subsoil, and the low, depressed position, drainage is poorly developed.

Practically all of this type has been cleared of the merchantable timber. Some of the drier areas are under cultivation or used for hay production; the remainder is in pasture or is waste land. Grass and grain are the main crops. Yields are only fair. A few apple orchards on this type do only fairly well.

Land values range from \$8 to \$50 an acre. Only a few farms are changing hands.

This soil needs underdrainage and liming. The drier pastures should be cleared of weeds and brush. Some areas might be reforested to advantage.

MERRIMAC GRAVELLY SANDY LOAM.

The surface soil of the Merrimac gravelly sandy loam is a brown to yellowish-brown gravelly sandy loam, with an average depth of 8 inches. The subsoil to 36 inches or more is a light yellowish brown or yellow gravelly sandy loam. The gravel usually consists of small waterworn fragments of gneiss and quartzite, and seldom occurs in sufficient quantities to interfere with cultivation. Small areas of gravelly fine sandy loam are included with the type as mapped in this county.

The largest areas of Merrimac gravelly sandy loam are mapped in the town of Corinth. Smaller areas are scattered throughout the towns of Edinburg, Hadley, Day, Greenfield, Milton, and Saratoga Springs. The type occurs on a level to gently undulating terrace high above normal overflow. The loose open structure and the gravelly subsoil render the type subject to drought unless handled with care.

Only a small percentage of this soil is under cultivation. It largely supports a mixed growth of poplar, jackpine, and scrub oak, together with an undergrowth of sedge and briers, and is practically waste land. The small areas under cultivation are devoted to the general farm crops of hay, corn, buckwheat, rye, and potatoes. Hay yields one-half to $1\frac{1}{4}$ tons per acre, corn for ensilage 6 to 12 tons, buckwheat 10 to 20 bushels, rye 10 to 18 bushels, and potatoes 75 to 125 bushels.

Cultural methods over this type vary with the locality from poor to very good, and the yields are in direct proportion to the farming methods. Land values vary from \$8 to \$100 an acre.

MERRIMAC SAND.

The surface soil of the Merrimac sand is a brown to slightly yellowish brown sand varying in depth from 4 to 8 inches, with an average of 6 inches. The subsoil is a yellow to bright-yellow, loose incoherent sand, tending toward a coarse sand. Below the 3-foot section the color often changes to yellowish gray. Some small rounded gravel may occur on the surface and throughout the subsoil. Patches of light sandy loam and coarse sandy loam soils too small to map are included with this type.

The Merrimac sand is mapped most extensively in the eastern and northeastern parts of the county, with the largest areas in the towns of Moreau, Saratoga Springs, and Milton. It occurs on level or gently undulating terraces or outwash plains, and the open struc-

ture of the subsoil permits of thorough and in places excessive underdrainage.

Less than 30 per cent of this soil is under cultivation. It formerly supported a heavy stand of timber, and there is now in many places a mixed growth of alder, poplar, jackpine and scrub oak. Other large areas support only a scant vegetation of weeds, sedges, and briars. Some fields are under cultivation to the general farm crops, including rye, buckwheat, potatoes, beans, and truck crops. Sweet corn, melons, and berries are grown on a small scale for local markets. Rye yields 8 to 12 bushels, buckwheat 8 to 15 bushels, potatoes 75 to 125 bushels, and hay an average of one-half ton per acre.

Agricultural conditions and cultural methods on the Merrimac sand are poor. No definite crop rotations are practiced and no attention is given to replacing the depleted organic matter. Green manures or commercial fertilizers are seldom used.

Land values vary widely with the location, the buildings, and the available tillable land. The range in price is from \$3 to \$60 an acre, few farms being held at the latter figure.

With careful handling the Merrimac sand might be made productive. If stable manure is not available green manure should be applied, and some form of lime could be used to good advantage. Growing crops in short rotations would be advisable. The more remote bodies of this soil should be reforested.

MERRIMAC FINE SAND.

The surface soil of the Merrimac fine sand is a brown or brownish-gray fine sand, with an average depth of 6 inches. The subsoil is a yellowish-brown to yellow fine sand grading into a grayish-yellow fine sand below the 3-foot section. The entire section is generally free from gravel. The surface soil sometimes tends toward a loamy fine sand or a loamy very fine sand in texture.

The Merrimac fine sand is extensively developed in the eastern and southeastern parts of the county, especially in the towns of Moreau, Wilton, Northumberland, Saratoga Springs, Malta, Clifton Park, and Halfmoon. Smaller areas are found in the adjacent towns of Hadley, Greenfield, Milton, and Ballston. The type occupies level to gently undulating plains representing deposits laid down by running water during glacial times. The natural drainage is good.

This is not an important soil type agriculturally, for less than 40 per cent is now under cultivation. It was formerly heavily forested, but the merchantable timber has been cut, leaving a mixed stand of poplar, birch, white pine, and chestnut. Many areas support only a vegetation of briars, ferns, and brush.

A few areas are under cultivation to general farm crops, principally rye, buckwheat, oats, and potatoes. Truck crops, including

sweet corn, cucumbers, tomatoes, and melons, are grown for the local markets. Ordinary yields of the general farm crops are rye, 10 to 20 bushels; buckwheat, 15 to 20 bushels; oats, 30 to 45 bushels; and potatoes, 75 to 150 bushels per acre. A few mowings yield one-half to 1½ tons of hay per acre. When the soil is heavily fertilized truck crops give good yields.

This soil was formerly regarded as one of the most desirable in the county, and it was used for all the general farm crops, but continued cropping and poor management have gradually depleted the supply of organic matter, so that yields scarcely pay expenses. A few farmers, however, have practiced crop rotations, applied barnyard manure, and turned under good sods, and their farms are now in a productive condition.

Land values on the Merrimac fine sand range from \$20 to \$75 an acre, according to the improvements and the location of the land with respect to towns and shipping points.

The Merrimac fine sand is well adapted to early truck crops, such as asparagus, radishes, early cabbage, beets, onions, squash, cantaloupes, strawberries, blackberries, and raspberries. Care should be taken to increase the content of organic matter by applying manure and plowing under green crops. Applications of some form of lime should also prove beneficial.

Merrimac fine sand, rolling phase.—The surface soil of the rolling phase of the Merrimac fine sand consists of 4 to 6 inches of light-brown fine sand. The depth and color of the surface layer vary from place to place according to the topography and organic content. The subsoil to 36 inches is a yellow incoherent fine sand. This soil is practically free from rock fragments or gravel, either on the surface or in the 3-foot section. The texture of the surface soil sometimes approaches very fine sand or fine sandy loam.

In the area about 2 miles south of Clifton Park the texture varies widely even within short distances. Agricultural conditions here are probably better and land values higher than in other areas of the phase.

The Merrimac fine sand, rolling phase, is one of the most extensive soils in the county. Large areas are found in the eastern part, in the towns of Moreau, Wilton, Northumberland, Saratoga Springs, Saratoga, Malta, Stillwater, Clifton Park, Halfmoon, and Milton. The soil was originally laid down as an alluvial plain, later changed by wind action into a region of low hills extending in a northeast-southwest direction. The rolling topography, together with the loose, incoherent structure of the subsoil, renders this soil subject to drought.

Only a very small percentage of the Merrimac fine sand, rolling phase, is under cultivation. It is mostly waste land, supporting a

stunted growth of poplar, birch, jackpine, scrub oak, and a varied undergrowth of weeds and briars. Many areas are typical dune sand ridges, the surface moving with every high wind. Cultivation is usually carried on in small patches, where potatoes, buckwheat, and rye are grown. Yields are relatively low unless the fields are heavily fertilized. Some areas have been reforested. Land values range from \$3 to \$15 an acre. For its improvement this soil requires the same methods suggested for the other sand types.

The following table gives the results of mechanical analyses of samples of the soil and subsoil of the typical Merrimac fine sand:

Mechanical analyses of Merrimac fine sand.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>						
162561.....	Soil.....	0.1	4.3	13.0	51.4	18.1	7.8	5.1
162562.....	Subsoil.....	.1	5.2	14.5	51.8	18.2	6.0	3.9

MERRIMAC VERY FINE SAND.

The Merrimac very fine sand consists of a brown very fine sand or slightly loamy very fine sand, 6 to 10 inches deep, underlain by a light yellowish brown or yellow very fine sand which extends to a depth of 3 feet or more. Variations in texture occur, the soil in some places approaching fine sand. The entire 3-foot section is free from gravel and rock fragments.

The Merrimac very fine sand is most extensively developed in the eastern and southeastern parts of Saratoga County in the towns of Saratoga, Stillwater, Halfmoon, Waterford, and Clifton Park. The topography varies from undulating to gently rolling, and the drainage is good.

Approximately 60 per cent of this soil is under cultivation. General farming and dairying are the main industries, with potatoes, corn, rye, and buckwheat as the principal crops. With the addition of commercial fertilizers potatoes yield from 75 to 160 bushels per acre. Corn for ensilage yields an average of 10 tons per acre. Rye and buckwheat yield an average of 10 and 18 bushels, respectively. Grass does fairly well, the yield of hay ranging from one-half ton to 1½ tons per acre.

Cultural methods on this soil are only fairly good. Stable manure and commercial fertilizers are generally used on the potato and grain crops. The buildings and equipment are fair.

The molding-sand industry is important on this type, the material being removed from the subsurface layer and hauled to shipping stations. With care in replacing the surface layer the productive-

ness of the soil for crops is not impaired. This sand is either sold by the ton or by the acre, and brings from \$100 to \$300 an acre, according to the depth of the material and the distance from market.

MERRIMAC SANDY LOAM.

The soil of the Merrimac sandy loam is a brown sandy loam 4 to 12 inches deep, the depth depending upon the organic content and the cultural practices. The subsoil to a depth of 3 feet or more is a light yellowish brown, slightly loamy sand or sand. A small percentage of rounded gravel is sometimes found over the surface and scattered through the 3-foot section.

The material of the deposits giving this soil is derived from crystalline rocks. It is typically developed in scattered areas throughout the uplands. Areas are mapped along the Sacandaga River in the towns of Edinburg, Day, and Hadley; along Kayaderosseras Creek in the towns of Corinth and Greenfield; and to a smaller extent along some of the older glacial channels in other parts of the county. The surface is relatively level to gently undulating, but the open structure and coarse texture give good drainage.

Only a small proportion of this soil is under cultivation. It is usually farmed in conjunction with the adjoining types and is handled in about the same manner. Rye, buckwheat, corn, and potatoes are the principal crops grown.

Rye yields 10 to 15 bushels per acre, buckwheat 10 to 15 bushels, corn 25 to 30 bushels, and potatoes 50 to 125 bushels. Hay is usually a light crop, yielding one-half to three-fourths ton per acre.

Cultural methods are generally poor over this type. Too little attention is paid to maintaining or replenishing the supply of organic matter in the soil. The buildings, fences, and equipment are often worn out or neglected, and land values are low.

MERRIMAC FINE SANDY LOAM.

The surface soil of the Merrimac fine sandy loam is a brown fine sandy loam with an average depth of 8 inches. The subsoil to a depth of about 18 inches is a yellowish-brown to yellow loamy fine sand, below which depth it grades into a fine sand of a bright-yellow color. The surface soil and lower subsoil sometimes carry a few small rounded gravel.

This soil is confined to widely scattered bodies. The largest area is mapped along Alplaus Kill, in the town of Charlton. Smaller areas are found in the towns of Milton, Malta, Halfmoon, Stillwater, Northumberland, Moreau, and Hadley. The topography is relatively level or gently undulating, but the natural drainage is good.

Nearly all of this soil is under cultivation. Corn, oats, rye, and potatoes are the principal crops. Plums, cherries, apples, and small fruits, such as strawberries and raspberries, are grown with success.

Yields vary according to the methods of cultivation and fertilization practiced. Corn is grown both for ensilage and grain and yields an average of 10 tons of the former or 35 to 45 bushels of the latter per acre. Oats yield 25 to 40 bushels, rye 10 to 25 bushels, and potatoes 75 to 150 bushels per acre. Mixed hay yields from three-fourths to 1½ tons per acre.

Good cultural methods are employed on this soil, and both stable manure and commercial fertilizer are used. The farm buildings and general equipment are better than on the lighter sand types of the Merrimac series.

HINCKLEY GRAVELLY SANDY LOAM.

The Hinckley gravelly sandy loam consists of a brown, gravelly sandy loam, averaging 6 inches in depth, underlain by a yellow to pale-yellow gravelly light sandy loam. At about 30 inches the subsoil becomes a grayish-yellow, loose gravelly sand. The gravel fragments vary from medium sized to large cobbles, all more or less waterworn. Relatively large boulders of syenite, granite, or quartzite are often scattered over the surface.

In some areas the soil grades toward a gravelly fine sandy loam. These finer areas occur principally east of Kayaderosseras Creek, in the vicinity of Rock City Falls, and in the towns of Milton and Greenfield.

The Hinckley gravelly sandy loam occurs as a roughly stratified morainic deposit in the northern part of the county. The largest areas are mapped in the town of Corinth. Smaller typical areas occur in the towns of Providence, Milton, Greenfield, Moreau, Hadley, Day, and Edinburg. The topography varies from rolling to broken, or approximately that of a kame moraine. The high gravel content and open structure of the subsoil give this type excessive drainage and make it more or less droughty.

This land was formerly covered with a heavy stand of timber, but lumbering and forest fires have left only a scrubby growth of briars and shrubs. A little pasturage is obtained from some fields, and general farm crops are cultivated on others.

HINCKLEY SAND.

The Hinckley sand is a light-brown sand, 4 to 8 inches deep, underlain by a yellow or grayish-yellow sand which extends to a depth of 3 feet or more. The entire 3-foot section has a loose, open structure. Small quantities of rounded crystalline gravel and occasional boulders occur on the surface or in the soil material.

The Hinckley sand is not extensively developed in Saratoga County. The largest area is mapped $2\frac{1}{4}$ miles west of Rock City Falls. Smaller areas are found in the towns of Moreau, Greenfield, and Providence. The topography is rolling to hilly, and drainage is excessive.

This soil was formerly covered with a heavy stand of timber, most of which has been removed. It is now practically waste land and either supports a thin weed-covered sod or is partially covered with a stunted growth of soft maple, poplar, white pine, and birch. This land could probably be reforested to the best advantage.

Some areas are included with the Hinckley sand, in which the soil is really a fine sand. These finer textured areas occur most typically and extensively west of Kayaderosseras Creek in the towns of Greenfield, Milton, Providence, and Galway. Smaller areas are mapped throughout the uplands in the towns of Hadley and Day. This soil is very similar to the sand in most characteristics. Some of the smoother fields are under cultivation. Corn yields 6 to 8 tons of ensilage per acre, rye and buckwheat 8 to 15 bushels, and potatoes 60 to 100 bushels. Land values range from \$5 to \$30 an acre.

Where the Hinckley sand or fine sand is to be farmed, care must be exercised to build up the organic content by applying stable manure and plowing under green-manure crops.

The following table gives the results of mechanical analyses of samples of the soil and subsoil of the Hinckley sand:

Mechanical analyses of Hinckley sand.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>						
162507.....	Soil.....	8.7	27.1	14.7	31.5	7.2	5.6	5.2
162508.....	Subsoil.....	12.6	31.7	17.4	30.0	4.1	1.6	2.4

HINCKLEY SANDY LOAM.

The surface soil of the Hinckley sandy loam is a mellow, brown sandy loam, 4 to 9 inches in depth. The subsoil is a yellow, light sandy loam, underlain by loose sand of a grayish-yellow color. Scattered over the surface and throughout the subsoil are a small quantity of rounded gravel and frequently large bowlders of foreign origin. The texture varies considerably even within short distances, and ranges from a fine sand to medium sand. The small extent of these sandier areas and their relatively low agricultural value did not warrant closer separation. Some areas of less than 10 acres are included with this type which either consist of glacial till or are only thinly covered with semistratified deposits, and such areas carry more glacial erratics than the typical Hinckley areas.

The Hinckley sandy loam is most extensively and typically developed west of Sturdevant Creek, in the town of Corinth. Smaller areas are mapped adjacent to the Sacandaga and Hudson Rivers in the northern part of the county. The type occurs as a roughly stratified deposit laid down at the edge of or under the ice sheet in the form of ridges or hillocks. The loose, incoherent structure of the subsoil renders this type subject to excessive drainage. On many of the steeper knolls the surface soil has been either washed or blown away.

Only a very small percentage of the Hinckley sandy loam is under cultivation. It supports a thin growth of sedges and weeds or a mixed stand of poplar, birch, and pine and other soft woods. Scant pasturage is available during the early part of the season. Patches of corn, rye, buckwheat, potatoes, and hay return low yields. Most of this type should be reforested.

In a few small areas northwest of Porter Corners and in one area about seven-eighths of a mile west of Mosherville, the soil is finer than typical, approximating a fine sand. Most of these finer textured areas are under cultivation, but the yields are relatively low. In general, the soil conforms to the characteristics of the typical Hinckley sandy loam.

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

Mechanical analyses of Hinckley sandy loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>						
162503.....	Soil.....	3.7	16.9	18.2	46.1	5.2	4.5	5.3
162504.....	Subsoil.....	6.7	28.8	22.6	35.6	2.9	1.3	2.0

VERGENNES VERY FINE SANDY LOAM.

The surface soil of the Vergennes very fine sandy loam is a light-brown to dark grayish brown, compact very fine sandy loam with an average depth of 9 inches. The subsoil is a light-brown very fine sandy loam, underlain at 30 inches by a mottled brown and gray compact silt loam. The entire 3-foot section is free from gravel or rock fragments. This type is characterized by its compact structure and its variable texture. Some low ridges throughout areas of this type have a lighter soil than is typical, and the depressions a heavier textured soil.

The largest and most typical area of Vergennes very fine sandy loam is mapped in the vicinity of Bacon Hill. Smaller areas are found in the towns of Hadley, Moreau, Northumberland, Saratoga,

Stillwater, Halfmoon, and Clifton Park. The topography is rather level, but drainage is fair except in depressed areas.

Approximately 90 per cent of this soil is under cultivation, hay, corn, oats, wheat, and potatoes being the main crops. Dairying is carried on in connection with general farming. This type is recognized as one of the best in the county. Mixed clover and timothy yields 1 to 2 tons per acre, corn for silage 10 to 15 tons, oats 35 to 50 bushels, and potatoes from 100 to 200 bushels. Both raw milk and butter are produced. Good cultural methods are followed, and crops are generally rotated. Stable manure and commercial fertilizers are generally used. The farm buildings and equipment are substantial and kept in good repair. Land values range from \$75 to \$150 an acre.

VERGENNES SILT LOAM.

The Vergennes silt loam consists of a light-brown to grayish chocolate brown silt loam, with an average depth of 9 inches. The subsoil is a heavy, compact silt loam or silty clay loam of a grayish-brown color, uniformly heavier than the surface soil. Small local areas with poor drainage have a grayer surface soil and a mottled subsoil, approaching closely the characteristics of the brown silt loam. Along the slopes the subsoil often comes close to the surface. The lower subsoil usually is slightly calcareous.

The Vergennes silt loam is an important soil type in the eastern part of Saratoga County adjacent to the Hudson River. The largest areas are mapped northeast of Grangerville and southeast of Quaker Springs. It occurs as a level plain laid down in glacial lakes and subsequently more or less eroded along the margins. Most of the type is relatively level to gently undulating, but some areas occupy steep and rounded slopes. Drainage is not very well developed, as the run-off is poor and the close, dense structure of the subsoil retards the underdrainage, but this is not a soil that could be classed as poorly drained.

Approximately 85 per cent of the Vergennes silt loam is under cultivation. Hay, the main crop, consists largely of timothy and alsike clover. Corn, oats, and rye are grown to a smaller extent. Dairying is the principal live-stock industry. Hay yields 1 to 2½ tons per acre. The hay crop is usually sold. Corn for grain yields 25 to 45 bushels per acre, but the crop is generally grown for silage and yields 10 to 12 tons per acre. Oats generally yield 30 to 45 bushels and rye 15 to 25 bushels per acre.

Agricultural conditions on the Vergennes silt loam average only poor to fair, but some farms are highly developed. Land values now range from \$25 to \$100 an acre, with an average of probably \$50.

Much of the Vergennes silt loam should be underdrained, not only to remove the excess surface water, but also to lengthen the time in which the soil can be handled, as it should not be plowed or cultivated when too wet. Tillage when the soil is too dry is also apt to injure the tilth. More organic matter should be incorporated in this soil, and the use of some form of lime might prove beneficial. Systematic and shorter crop rotations should be followed.

VERGENNES SILTY CLAY LOAM.

The soil of the Vergennes silty clay loam consists of a brownish or slightly pinkish brown, compact silty clay loam, 3 to 9 inches deep. The subsoil is a light-brown to grayish-brown, heavy, tenacious silty clay. The lower subsoil is sometimes slightly mottled with brown and drab. The lower subsoil and the unweathered material below are moderately to strongly calcareous. Small areas of well-drained Vergennes silt loam closely associated with this type are included, as their small size and relative unimportance did not warrant separation.

The Vergennes silty clay loam is mapped only in the eastern and northeastern parts of the county. The largest areas are found in the eastern part of the towns of Moreau and Northumberland. Smaller bodies are mapped in the towns of Saratoga and Stillwater. The topography is generally level to undulating, but some areas occupy steep slopes.

Practically all of the Vergennes silty clay loam has been brought under cultivation, and the production of hay for sale is the chief industry. A small acreage is given to oats. Hay yields from 1 to 2½ tons per acre. The steep slopes are used as pasture for cattle. The difficulty of working this soil under the prevailing moisture conditions may explain the large acreage in sod. In general this soil requires the addition of some form of lime, underdrainage, and the application of organic matter.

SUFFIELD FINE SANDY LOAM.

The Suffield fine sandy loam consists of a grayish-brown to dark-gray fine sandy loam, with an average depth of 6 inches, underlain by a subsoil of yellow to gray fine sandy loam, heavily mottled with orange, rusty brown, and drab. The subsoil below 30 inches is usually a grayish silt loam. Occasionally a layer of iron concretions or accretions is encountered at a depth of about 18 inches. The color, texture, and structure of this soil are extremely variable. Some small areas may have a covering of a few inches of Muck or peaty Muck, underlain by a loose, incoherent, gray fine sand or a compact fine

sandy loam to silt loam. In other places the surface material is a gray fine sand with the water table at a shallow depth.

The Suffield fine sandy loam is not extensively developed in Saratoga County. The largest area is mapped in the town of Moreau. Smaller areas are found in the region of water-laid deposits in the eastern and southeastern parts of the county, especially in the towns of Northumberland, Wilton, Stillwater, Saratoga Springs, Halfmoon, Clifton Park, Milton, and Ballston. The type occupies low, depressed areas around stream heads or along stream courses, and is invariably poorly drained, owing not only to the level or flat surface, but in part to the heavy, compact structure and texture of the lower subsoil. The soil is wet or too damp to work during most of the year except in dry periods.

This is an unimportant type, only a few acres being under cultivation. Most of it is waste land or covered with a stunted growth of poplar, soft maple, elm, birch, and ash. Some of the type is pastured. A small yield of inferior hay is sometimes cut from the drier areas. Land values are low.

This soil type ought never to have been cleared. Some form of forestry would probably make the best returns.

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

Mechanical analyses of Suffield fine sandy loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>						
162519.....	Soil.....	0.5	0.4	0.2	29.8	42.4	15.7	11.3
162520.....	Subsoil.....	.0	.6	.4	21.9	53.5	16.1	7.3

ORONO SILT LOAM.

The surface soil of the Orono silt loam is a light-brown to grayish-brown silt loam with an average depth of 8 inches. The subsoil is a gray, yellow, and brown, mottled, rather heavy silt loam. The intensity of mottling in the lower subsoil varies with the degree of poor drainage from place to place.

This is an extensive soil in the eastern part of the county, in the towns of Clifton Park, Halfmoon, Waterford, Stillwater, Malta, Saratoga, Northumberland, Wilton, and Moreau. The topography is relatively level, and drainage is prevailingly poor. Agriculture is only fairly well developed, although practically all of the type is under cultivation. Hay is the principal crop. Corn, oats, and rye are grown to a less extent. Hay yields 1 to 2 tons per acre, according to the age of the sod. Corn yields 10 to 15 bushels per acre, and oats

and rye an average of 35 and 15 bushels, respectively. The hay crop is usually sold. Land is usually left in grass four or five years, or until the stand becomes unprofitably poor. The sod is then plowed under and the land planted to corn, oats, or rye, or seeded to grass again. Corn is generally grown for ensilage and does well on the drier fields. Alsike clover gives best results on this wet, poorly drained type. Small applications of commercial fertilizer are sometimes used in growing grain crops.

Land values on the Orono silt loam vary considerably with the location, ranging from \$25 to \$75 an acre.

For the improvement of this soil, the methods suggested for the improvement of the Vergennes silt loam will be found of value.

PODUNK FINE SANDY LOAM.

The soil of the Podunk fine sandy loam consists of 6 to 9 inches of light-brown to dark brownish gray, mellow fine sandy loam. The subsoil is a mottled gray, brown, and yellow, compact fine sandy loam, in some places resting on a heavy silt loam at a depth of 30 or 32 inches. The color and texture often vary within a short distance, depending upon the state of drainage and upon the rapidity of current of the waters that deposited the material.

The Podunk fine sandy loam represents recent alluvial deposits occurring along all the larger streams. The principal areas are mapped along the Sacandaga River in the northern part of the county, and along Kayaderosseras Creek and the Hudson River. The surface is relatively flat or level and drainage is usually poor.

Most of this type is used for the growing of hay and for pasturage, but a few small areas are under cultivation, corn, oats, and buckwheat being grown on the better drained areas. These crops give good yields. Hay yields three-fourths to 1½ tons per acre.

Several small areas of this soil might be underdrained and put into cultivation. The application of some form of lime should prove beneficial.

PODUNK SILT LOAM.

The surface soil of the Podunk silt loam is a dark-brown to dark grayish brown silt loam, with an average depth of 8 inches. The subsoil is a mottled gray, drab, or yellow silt loam to silty clay loam, extending to 3 feet or more. A few small areas carry on the surface a thin layer of Muck. In places thin layers of fine sand occur throughout the 3-foot section.

The Podunk silt loam occurs as a first-bottom, alluvial soil along some of the larger streams. The largest area is mapped along the Mohawk River southeast of Vischer Ferry. Typical areas also lie along the Hudson River and Kayaderosseras Creek. The type has a

flat topography and is only slightly elevated above mean water level, so that drainage is poorly developed.

Most of the Podunk silt loam has been cleared and is now used as hay or pasture land. Cultivated crops are not grown extensively. Hay generally yields 1 to 2 tons per acre.

MUCK.

Muck consists mainly of organic matter formed from the decomposition of vegetable remains under conditions of poor drainage. As mapped in Saratoga County it varies considerably in color, depth, and drainage. The surface mass is dark brown to black. The subsoil is browner and is usually less decomposed. The depth of the organic deposit varies from a few inches to several feet.

Muck occurs in numerous areas, varying in size from less than 1 acre to tracts of several hundred acres. The largest areas lie north of Lakes Lonely and Saratoga, along Bog Meadow Brook, Spring Run, and Fish Creek. Extensive areas are mapped in the towns of Greenfield and Corinth. The type everywhere occupies relatively low positions and is naturally wet and swampy during the greater part of the year.

None of this land is under cultivation. A few small areas have been cleared and are used for pasture or to supply coarse forage or bedding material. Practically all of the original timber has been removed, leaving a second growth of cedar, hemlock, ash, and elm. Some areas support only a rank growth of sedges, cat-tails, and rushes. If this type were drained, it could be brought under cultivation and made into the most valuable soil of the region. Muck soils are especially adapted to celery, onions, cabbage, and similar crops.

ROUGH STONY LAND.

Rough stony land consists of areas that are nonagricultural on account of roughness of topography, stoniness and rock outcrops, or steepness of slope. The soil material depends largely upon the underlying formation and upon the character of the adjacent types. Most of the soil is similar to the Gloucester stony fine sandy loam. The surface soil is yellowish brown and the subsoil is yellow. The stones vary in size from small gravel to massive boulders and ledges. The principal rocks are syenite, gneiss, quartzite, granite, and sandstone.

Rough stony land is most extensively mapped through the rugged upland in the western and northwestern parts of the county. The largest areas are found in the towns of Day, Edinburg, Hadley, Corinth, Greenfield, and Providence. The topography varies from flat to steeply sloping.

None of this type is under cultivation, but some small areas are fenced, and afford scant pasturage during part of the season. All this type formerly was heavily forested with spruce, pine, and hardwoods. Indiscriminate lumbering and forest fires have left a mixed growth of pine, birch, poplar, maple, and other trees.

SUMMARY.

Saratoga County is situated in the eastern part of New York, adjoining the Hudson River. It has an area of 823 square miles, or 526,720 acres.

The topography varies from smooth plains in the eastern part to rolling uplands in the southern and southwestern portion, which in turn develop into spurs and integral parts of the Adirondack Mountains. Most of the agricultural land of the county lies between 200 and 1,000 feet above sea level. There is a range in elevation of over 2,600 feet within the county.

The county is adequately drained. Saratoga Lake is the largest body of water wholly within the county. The Sacandaga, Hudson, and Mohawk Rivers are the principal drainage ways. Water power is abundant and is extensively used.

Saratoga County was settled late in the seventeenth century. The population of the county in 1910 was 61,917, of which 56.9 per cent was rural. The rural population is gradually decreasing. The census gives the density of population as 42.8 persons per square mile. The central and southwestern parts of the county are the most thickly settled.

The climate is characterized by severe winters and short, mild summers. The average growing season is about 141 days. There is a mean temperature of 45.4° F. and a mean annual precipitation of 40.36 inches.

Dairying and general farming are the main occupations. Raw milk and butter are the chief products of the dairy. Hay, oats, corn, buckwheat, rye, and potatoes are the most important crops. Other important products are vegetables and fruits, poultry, and eggs.

Over 74 per cent of the total area of the county is in farms. The average farm consists of 108.6 acres. Approximately 79.5 per cent of the farms are operated by owners, 18.5 per cent by tenants, and 2 per cent by managers.

The soils of Saratoga County are of glacial origin. The upland consists of glacial till or of glacial sediments laid down in lakes or as outwash plains. The soils are classed in 13 series, exclusive of Rough stony land and Muck.

The Gloucester series is the most extensive in the county. It is represented by two types. These soils are found in the west-central

and northwestern parts. Agriculture in general is poorly developed, and much of the land could well be reforested.

The Whitman stony fine sandy loam and loam consist of material similar to that giving the Gloucester soils, but developed under conditions of poor drainage. Very little of these soils is under cultivation.

The Dutchess soils are derived from till of mixed crystalline and sedimentary rock origin. The loam and silt loam are fairly well developed agriculturally. Dairying and general farming are the main occupations. Land values range from \$25 to \$125 an acre.

The Honeoye soils are derived from limestone. Two types, of small extent, are mapped in the southwestern part of the county. General farming is carried on. Land values are relatively low.

The Mohawk soils are dark colored, the material coming originally from calcareous, black shales. One type, a loam, is mapped in the southwestern part of the county. General farming and dairying are carried on. Farms on this type sell for \$35 to \$125 an acre.

Soils of shallow depth, formed from glacial deposits derived from noncalcareous, light-colored shales and sandstone, are included in the Lordstown series. Two types, a stony silt loam and a shale loam, are mapped in the eastern and southeastern parts of the county. Only a small proportion of these soils is under cultivation, and yields are only moderate.

The Allis silt loam is characterized by poor drainage, a mottled subsoil, and shallow depth. It occurs in the eastern part of the county. Grass and grain are the main crops. Yields are only fair. Land values range from \$8 to \$50 an acre.

Well-drained soils derived from old alluvium composed of crystalline rock material are classified in the Merrimac series, of which six types and one phase are mapped. The texture ranges from sand to very fine sand. Drainage is well developed and in some places excessive. General and special crops are grown on a limited acreage.

The Hinckley soils represent rough morainic deposits, more or less stratified, and of prevailing sandy texture. Three types are mapped. Drainage is often excessive, and only a small percentage of this land is under cultivation. Yields and land values are low.

Brown or grayish-brown soils derived from sediments laid down in glacial lakes are classified in the Vergennes series, of which three types are mapped in Saratoga County. The silt loam and silty clay loam are extensive and are mainly devoted to grass and grain. The very fine sandy loam is used for general farming and is well developed. Land values probably average \$50 an acre.

The Suffield fine sandy loam has been derived from poorly drained lake sediments. Only a few acres are under cultivation. It is used as pasture or wood land, and land values are low.

The Orono series includes soils that are brown at the surface and gray, mottled, in the subsoil. One type, the silt loam, is mapped. It is used principally in the production of hay, corn, and oats.

Soils derived from poorly drained recent alluvial deposits are classified in the Podunk series. Two types, a fine sandy loam and silt loam, are mapped. They occur along the larger streams and are used as hay and pasture land.

Muck is mainly an accumulation of organic matter under conditions of poor drainage. None of the Muck in this county is under cultivation.

Rough stony land includes areas too rough or too stony for cultivation. Much of this land is forested, but some of it is used for pasture.



[PUBLIC RESOLUTION—No. 9.]

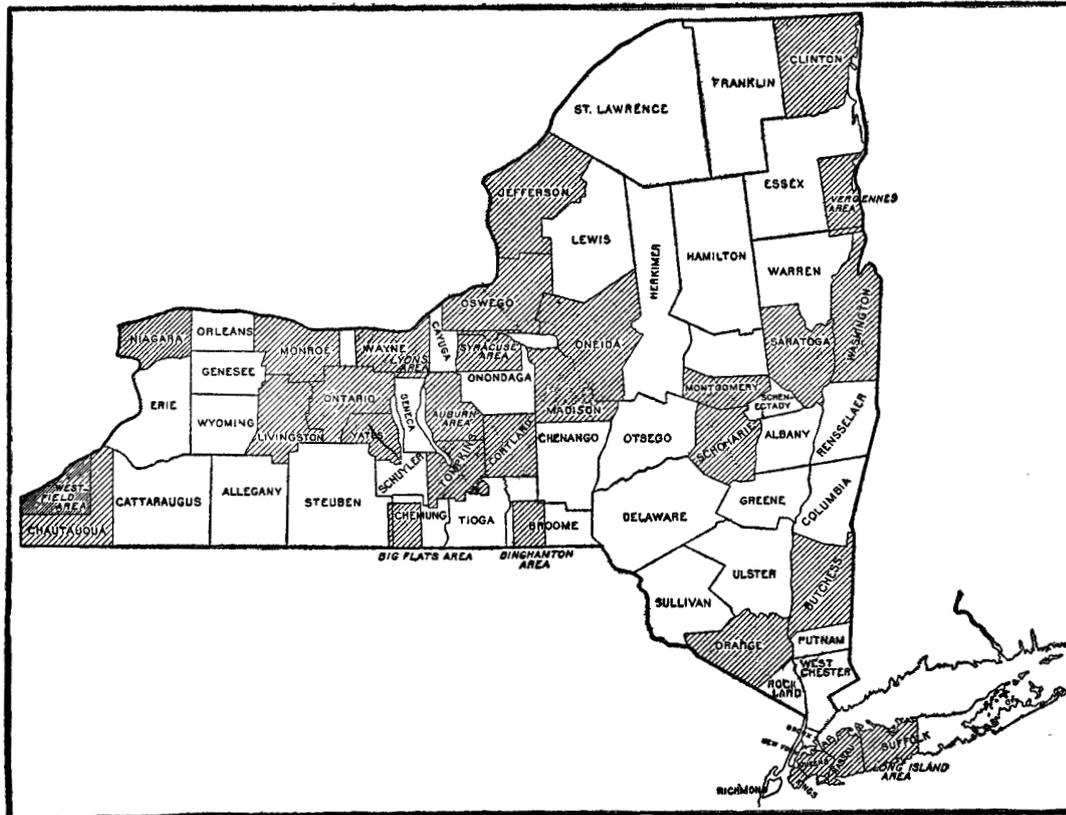
JOINT RESOLUTION Amending public resolution numbered eight, Fifty-sixth Congress, second session, approved February twenty-third, nineteen hundred and one, "providing for the printing annually of the report on field operations of the Division of Soils, Department of Agriculture."

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.

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 (800) 457-3642 or by e-mail at 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 against its customers. If you believe you experienced discrimination when obtaining services from USDA, participating in a USDA program, or participating in a program that receives financial assistance from USDA, you may file a complaint with USDA. Information about how to file a discrimination complaint is available from the Office of the Assistant Secretary for Civil Rights. USDA prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex (including gender identity and expression), marital status, familial status, parental status, religion, sexual orientation, political beliefs, genetic information, reprisal, or because all or part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.)

To file a complaint of discrimination, complete, sign, and mail a program discrimination complaint form, available at any USDA office location or online at www.ascr.usda.gov, or write to:

USDA
Office of the Assistant Secretary for Civil Rights
1400 Independence Avenue, S.W.
Washington, DC 20250-9410

Or call toll free at (866) 632-9992 (voice) to obtain additional information, the appropriate office or to request documents. Individuals who are deaf, hard of hearing, or have speech disabilities may contact USDA through the Federal Relay service at (800) 877-8339 or (800) 845-6136 (in Spanish). USDA is an equal opportunity provider, employer, and lender.

Persons with disabilities who require alternative means for communication of program information (e.g., Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD).