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BUREAU OF CHEMISTRY AND SOILS
In cooperation with New York State College of Agriculture

SOIL SURVEY
HERKIMER COUNTY AREA
NEW YORK

BY

H. G. LEWIS, in Charge, and E. F. BROOKINS, U. S. Department of Agriculture, and F. B. HOWE and D. F. KINSMAN
New York State College of Agriculture

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CONTENTS

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COUNTY SURVEYED

Herkimer County is in the eastern part of New York, the central part of the area surveyed being directly east of Utica. The county has an area of 1,459 square miles, but the part surveyed, approximately the southern half, includes most of the agricultural lands of the county and comprises only 720 square miles, or 460,800 acres. The surveyed area is 35 or 40 miles long, about 24 miles wide along the southern boundary, and about 18 miles wide along the northern. It comprises the western part of the Mohawk River watershed. The eastern, western, and southern boundaries of the surveyed area conform to the boundaries of the county, and the northern boundary is an arbitrary line.

FIGURE 49.—Sketch map showing location of the Herkimer County area, N. Y.

Physiographically, this part of Herkimer County is a very hilly lowland belt traversed by the narrow, rather deeply cut valley of Mohawk River. It is bordered on the north and south by the southern boundary of the Adirondack Mountains and the northern edge of the Allegheny Plateau, respectively. That part of the lowland within Herkimer County consists of a dissected plain which ranges in elevation from 1,300 to 1,700 feet above sea level. The hills in the western part of the county have an elevation of about 1,700 feet, being somewhat higher than those in the eastern part. The valley of Mohawk River, which crosses the county from east to west, is little more than a narrow canyon in the eastern part of the county but widens slightly in the western part.

Through the central part of the county the relative accordance of the hilltops suggests a former extent of plain which has been seriously dissected by excavation, along with some deposition. A striking feature is the general discordance between the trend of the principal features and the direction of the streams, except Mohawk River. The courses of the smaller streams, most of which run north and south, have had little to do with the east-west trend of the principal topographic features.

South of Mohawk River is a series of low, disconnected, roughly parallel ridges and valleys, of which the main axes lie in an east-west direction. The relief is greatest in an irregular area bordering Mohawk River Valley. Most of the hills are about 100 feet higher than the surrounding country. On the south the slopes are steep or precipitous, and streams flow in deep gorges. On the north the slopes are longer and more gentle. The courses of the minor drainage ways, running around and between the hills, are determined by a preexisting relief. The topographic details have been created by stream action only in the northwestern corner of the area surveyed. There erosion has greatly modified a sandy plain of glacial deposition.

In the southeastern part of the county the relief is less pronounced. The land is undulating or rolling, and the hills are smooth and drumloidal. The general elevation of the southern part of the county ranges from 1,200 to 1,600 feet above sea level.

Mohawk River Valley ranges in width from about one-fourth mile to 2 miles. The elevation of the valley floor ranges from 320 feet above sea level at the eastern boundary to about 420 feet at the western. The valley floor is comparatively smooth, with slight slopes toward the river and in the direction of stream flow.

The part of the surveyed area north of Mohawk River is drained largely by East and West Canada Creeks and tributary streams. The interstream areas are considerably elevated and are rolling or undulating. The foothills of the Adirondack Mountains extend across the northern part of the surveyed area. Here elevations range from about 1,400 feet to more than 2,500 feet above sea level, and the surface relief is rolling, steep, and even mountainous.

The drainage of the area covered by this survey is largely into Hudson River through Mohawk River, which runs across the county from west to east through the central part. The extreme southern part of the county is a part of the Susquehanna River drainage basin.

Herkimer County was formed from Montgomery County in 1791 and was named in honor of Gen. Nicholas Herkimer. As originally laid out, the county comprised a large part of the central and northeastern sections of the State. The present boundaries were established in 1817.

The earliest settlements in what is now Herkimer County were made about 1722 by German emigrants. A company of Palatines settled near the present site of Fort Herkimer in 1723 or 1724, but the settlement was destroyed during the French and Indian War.

According to the United States census report for 1920, the population of the county is 64,962, of which only 20,964, or 32.3 per cent, are classed as rural. The density of the rural population, exclusive of villages having a population of 2,500 or more, is 14.4 persons to the square mile. The population of the county in 1880 was 42,669, of which 10,621 were classed as urban and 32,048 classed as rural.

The more thickly settled central and southern parts of the county are well supplied with railroads. The main line of the New York Central Railroad passes through Mohawk Valley, and branch lines extend along the valleys of East and West Canada Creeks. A branch

of the Delaware, Lackawanna & Western Railroad passes through the southwestern part of the county. The New York State Railways (electric) extends from Little Falls. to Utica, and the Southern New York Railway runs from Herkimer to Richfield Springs. The extreme northern part of the surveyed area is very sparsely settled and has not yet been entered by railroads. The Erie and the New York State Barge Canals follow Mohawk River Valley.

The county has an extensive system of public roads, and the principal roads leading into the larger settlements are macadam or concrete. The main roads in the rural sections are in good or fair condition, but in the more sparsely settled sections the roads are in poor condition for the larger part of the year. The more populated sections are reached by rural mail delivery and telephone lines. All of the cities and villages are lighted by electricity and maintain good grade and high schools. The manufacturing centers offer good markets for all products of the farm. The dairy products, largely milk, are shipped to New York. The splendid rail facilities place the farmers' products in reach of many of the larger centers of population.

CLIMATE

The part of Herkimer County covered by this survey has a temperate climate, without great extremes of heat and cold, but with considerable variation in temperature and precipitation. The northern part of the area is higher, representing the foothills of the Adirondack Mountains. Here the snowfall is greater and the snow remains on the ground longer than in the valley section and the southern part of the county.

The winters are rather long and severe, and snow commonly remains on the ground over the higher-lying section from December until the latter part of March. The winter months are usually cold, with some warm days. The mean annual snowfall at Little Falls is 79.4 inches. The snowfall on the higher-lying uplands is usually considerably more than this. The summers are comparatively short and pleasant.

The average date of the last killing frost at Salisbury is May 23 and at Little Falls is May 4, and that of the first at Salisbury is September 23 and at Little Falls is October 6. The average frost-free season is 123 days at Salisbury and 154 days at Little Falls. The earliest recorded killing frost at both Salisbury and Little Falls occurred on September 14; the latest at Salisbury was on June 20 and at Little Falls was on May 27. The frost-free season is short for maturing corn in some localities. Cool, wet spells in the spring and fall sometimes shorten the growing season.

The following tables, compiled from the records of the Weather Bureau stations at Salisbury and Little Falls, in Herkimer County, and at Utica are fairly representative of the weather conditions which prevail in this county. The records at Utica, in Oneida County, and at Little Falls are representative of conditions in Mohawk Valley, and the records at Salisbury are representative of the higher-lying uplands both to the north and south of the valley region.

Normal monthly, seasonal, and annual temperature and precipitation at Salisbury

[Elevation, 1,300 feet]

Month	Temperature			Precipitation		
	Mean	Absolute maximum	Absolute minimum	Mean	Total amount for the driest year (1914)	Total amount for the wettest year (1898)
	° F.	° F.	° F.	Inches	Inches	Inches
December	20.9	58	−35	3.83	2.01	4.67
January	17.5	54	−31	3.27	1.06	7.18
February	16.2	53	−33	2.89	1.59	3.08
Winter	18.2	58	−35	9.99	4.66	14.93
March	27.5	69	−16	3.56	2.04	2.63
April	40.7	83	5	3.34	6.19	4.57
May	53.1	92	20	4.33	2.18	4.83
Spring	40.4	92	−16	11.23	10.41	12.03
June	61.3	95	26	5.00	3.41	4.38
July	67.4	94	36	4.82	3.06	2.42
August	65.2	95	34	4.96	6.31	13.79
Summer	64.6	95	26	14.78	12.78	20.59
September	58.3	88	22	4.21	1.41	3.92
October	48.1	84	15	4.62	1.81	3.78
November	33.9	70	0	3.46	3.22	4.01
Fall	46.8	88	0	12.29	6.44	11.71
Year	42.5	95	−35	48.29	34.29	59.26

Normal monthly, seasonal, and annual temperature and precipitation at Little Falls

[Elevation, 890 feet]

Month	Temperature			Precipitation			
	Mean	Absolute maximum	Absolute minimum	Mean	Total amount for the driest year (1914)	Total amount for the wettest year (1905)	Snow, average depth
	° F	° F.	° F.	Inches	Inches	Inches	Inches
December	23.3	70	−28	2.71	1.69	3.76	17.2
January	19.9	62	−25	2.55	1.21	2.73	18.3
February	18.5	65	−25	2.36	1.75	.98	19.4
Winter	20.6	70	−28	7.62	4.65	7.47	54.9
March	29.5	74	−10	2.90	3.47	2.63	14.4
April	43.2	87	11	2.65	3.92	2.72	2.7
May	55.5	95	22	3.38	1.61	2.43	.2
Spring	42.7	95	−10	8.93	9.00	7.78	17.3
June	63.3	97	33	4.31	3.02	8.42	.0
July	69.4	98	41	4.14	2.05	5.18	.0
August	66.9	98	38	3.42	5.09	5.13	.0
Summer	66.5	98	33	11.87	10.16	18.73	.0
September	60.2	92	28	3.68	1.37	6.14	T.
October	49.5	87	17	3.27	1.55	3.87	.3
November	35.5	69	3	2.62	2.01	2.63	6.9
Fall	48.4	92	3	9.57	4.93	12.64	7.2
Year	44.6	98	−28	37.99	28.74	46.62	79.4

Normal monthly, seasonal, and annual precipitation at Utica, Oneida County

[Elevation, 537 feet]

Month	Precipitation		
	Mean	Total amount for the driest year (1836)	Total amount for the wettest year (1890)
	Inches	*Inches*	*Inches*
December	3.33	2.57	5.63
January	3.20	8.06	6.14
February	2.95	2.65	4.79
Winter	9.48	13.28	16.56
March	2.95	.51	4.15
April	2.67	2.60	3.56
May	3.66	4.33	8.69
Spring	9.28	7.44	16.40
June	4.15	3.00	6.19
July	4.62	1.72	3.01
August	3.64	.91	4.37
Summer	12.41	5.63	13.57
September	3.57	3.57	8.27
October	3.47	1.27	7.01
November	3.91	1.97	3.77
Fall	10.95	6.81	19.05
Year	42.12	33.16	65.58

AGRICULTURE

Before the coming of the white man, the Indians grew corn and some other crops. The early settlers grew corn, wheat, oats, vegetables, and fruits. Agriculture was the foremost and practically the only industry in the county until the latter part of the nineteenth century, when manufacturing was begun.

All of the land covered by this survey was originally forested, and the labor involved in clearing it was very great. The early markets also were very limited in capacity. With the building of the Erie Canal in 1825 and of railroads a few years later, this region was placed in direct connection with the best markets. The transportation facilities of the county as a whole have been good for many years.

According to the 1880 census there were in the county 3,266 farms, averaging 139 acres to the farm. Of the 49 per cent of the county in farms, 81.8 per cent was classified as improved land. The value of all farm property to the farm was $6,789. Of this amount, 85.6 per cent was for land and buildings, 3.1 per cent was for implements and machinery, and 11.3 per cent was for domestic animals.

According to the census of 1900, there were 3,227 farms in the county. At this time, 45.7 per cent of the county was in farms, averaging 118.7 acres to the farm. Of this area, 71 per cent was classified as improved land. The average total value of all farm property to the farm was $4,661, of which amount 45.7 per cent was for land, 32.4 per cent for buildings, 5.4 per cent for implements and machinery, and 16.5 per cent for domestic animals. The average land value was given as $17.94 an acre.

According to the 1920 census, there were 2,849 farms in the county. Thirty-five and eight-tenths per cent of the total area of the county was in farms, averaging 117.3 acres to the farm. Of this acreage, 66.1 per cent or 77.5 acres to the farm, is classified as improved land. The total value of all farm property to the farm was given as $9,465, of which amount 32.5 per cent was for land, 33.9 per cent for buildings, 9.5 per cent for implements, and 24.1 per cent for domestic animals. The land value was given as $26.30 an acre.

In 1879, 79.9 per cent of the farms were operated by owners and 20.1 per cent by tenants. In 1889, owners operated 68.8 per cent of the farms, tenants 29.7 per cent, and managers 1.5 per cent. In 1919, owners operated 70.9 per cent, tenants 26.7 per cent, and managers 2.4 per cent.

The following table, compiled from the United States census reports, gives the acreage and yield of the five principal general-farm crops of Herkimer County for 1879, 1889, 1899, 1909, and 1919.

Acreage and yield of principal crops in 1879, 1889, 1899, 1909, and 1919

Crop	1879		1889		1899		1909		1919	
	Acres	Yield	Acres	Yield	Acres	Yield	Acres	Yield	Acres	Yield
		Tons		*Tons*		*Tons*		*Tons*		*Tons*
Hay and forage	103,390	152,018	105,981	164,518	107,409	161,154	100,270	190,707	107,699	196,861
		Bushels		*Bushels*		*Bushels*		*Bushels*		*Bushels*
Oats	19,759	677,400	19,426	599,891	18,702	643,680	17,264	511,560	10,848	307,774
Potatoes	4,353	462,101	4,545	259,662	4,611	436,567	4,167	520,121	3,019	293,389
Corn	6,331	222,420	3,591	136,496	6,606	221,290	3,876	172,573	1,824	96,917
Buckwheat	2,693	49,585	1,651	35,106	1,339	19,330	1,263	26,793	1,265	22,279

The table shows that from 1879 to 1919 the total acreage of the five main crops had decreased from 136,526 to 124,655 acres, a decrease of approximately 12,000 acres. An increase in acreage was shown in the hay and forage crops, the acreage of all the other main crops having decreased in that period.

The principal sources of farm income in this county can be seen from the census report of 1920.

Income from farm products in 1919

Product	Value	Product	Value
	Dollars		*Dollars*
Cereals	689,774	Livestock products—Continued.	
Other grains and seeds	10,216	Dairy products, excluding home use	4,534,102
Hay and forage	3,355,145	Poultry and eggs	434,333
Vegetables	875,727	Wool	4,691
Fruits and nuts	119,946		
All other crops	22,446	Total value	10,046,380
Livestock products:			
Animals sold and slaughtered (not given).			

According to the crop estimates department of the New York State Department of Farms and Markets for December, 1923, the acre yields of the important crops in Herkimer County were as follows: Corn for grain, 40 bushels; corn for silage, 10 tons; oats, 35 bushels;

barley, 25 bushels; buckwheat, 17 bushels; potatoes, 127 bushels; alfalfa hay, 3 tons; and other hay 1½ tons.

Farming in this county is centered around the dairy industry. The forage crops are fed to dairy cattle, and considerable mixed feed is shipped into the county. More than 90 per cent of the dairy cattle are Holstein, but there are some Ayrshire, Guernsey, Jersey, milking Shorthorn, and grade animals on the farms. Most of the dairy cattle are in good condition, and farm conditions are good for milk production. Most of the milk is shipped to New York City.

Hay and forage crops are grown on the better soils in the southern part of the county and as far north as Spruce and Black Creeks. Little hay is grown in the extreme northern part of the county. Mixed timothy and clover are grown, and the yields are fair or good. Some timothy is grown alone. Alfalfa is grown in the southern part of the county on soils in which lime is present within a depth of 3 feet. The soils of the Honeoye and Ontario series and some of those of the Palmyra and Dunkirk series are most extensively used for this crop, although a few fields are on the Mohawk soils. At present, alfalfa occupies an acreage of more than 1,200 acres, and the plantings are being extended. Many of the soils need applications of lime to start the crop.

Oats are one of the important crops of the county and are grown on most of the soil types. The yields vary from 20 to as much as 50 bushels to the acre on some of the better soils. Oats are grown largely north of the Mohawk River Valley. The principal varieties are Swedish Select, Silvermine, Horse Mane, Wolverine, and No. 343.

Potatoes are grown, largely for home use, on the more friable loam, sandy loam, and silt loam soils. The principal potato districts are the towns of Columbia, Litchfield, Schuyler, Fairfield, Salisbury, Frankfort, and Winfield. Yields vary from 50 to 150 bushels to the acre. The principal varieties are Green Mountain, Irish Cobbler, and Rurals.

Corn is grown throughout the county. It is used mainly for silage for feeding dairy cattle. Some of the cornland is manured, and the yields are fair or good. Yields of silage vary from 4 tons to the acre to more than 12 tons. The main varieties of corn are Sweepstakes, Luce's Favorite, Leaming, and Early Wonder. In some places sunflowers are grown with the corn for silage.

Buckwheat is grown largely south of Mohawk River, principally on the more poorly drained soils. Yields ranging from 15 to 25 bushels to the acre are obtained. Many of the better soils are sown to buckwheat if the season is late and other crops can not be put in. A little barley and oats are grown together with good yields, and a small acreage of rye is grown, mainly in the town of Schuyler.

The acreage devoted to wheat is insignificant. So, also, is that devoted to peas and beans. Sweet corn is grown in the towns of Schuyler and Frankfort and is sold in Utica.

The truck-crop belt is mainly in Mohawk Valley, on the gravelly and sandy loam terrace soils. The manufacturing towns, which are close at hand, afford good markets for these crops. The principal crops are sweet corn, tomatoes, cucumbers, squash, cabbage, celery, lettuce, onions, beets, and carrots. Some strawberries and raspberries are grown in the valley section, and both yields and prices are usually good.

This is not a fruit-producing county, though considerable fruit is grown for home use. A few orchards are in the vicinity of West Winfield. In these orchards apple trees of the Northern Spy, McIntosh, Baldwin, Fameuse (Snow), Wealthy, and Yellow Transparent varieties predominate.

There are in the county some horses, sheep, swine, and poultry. The principal breeds of horses are Percheron and Belgian. About 50 per cent of the sheep in the county are Shropshire. Other breeds represented are Hampshire and Southdown. Breeds of hogs are Duroc, Chester White, Poland-China, and Berkshire, named in the order of their importance. The chickens are mainly White Leghorn, but there are some Rhode Island Red, Plymouth Rock, and others.

The suitability of certain soils for certain crops is becoming better understood. The soils containing lime within a depth of 3 feet are recognized as the alfalfa or legume-crop soils. Potatoes are grown on the more friable and easily tilled soils. The grass and hay crops are grown on all soils, but some are more productive than others. The heavier-textured soils are considered good hay lands.

The agricultural practices in this county are fair or good. The seed beds are usually well prepared, and crops are thoroughly cultivated with improved farm machinery. In most cases all available manure is scattered on the soil, and some cover crops are turned under. Commercial fertilizers are used on some crops. Applications of lime are common, especially where alfalfa and legume crops are grown and on some of the better pasture lands. The question of permanent pastures is very important in this county, as numerous dairy cattle are grazed for a large part of the year. In some localities the pasture lands are rotated with cultivated crops.

Although no definite crop rotation is practiced in the county as a whole, the value of rotating crops is becoming more thoroughly understood. In some localities the land remains in hay crops until the yield begins to fail. It is then used for a cultivated crop and is again seeded to hay. The main crop rotation used by the better farmers is corn, oats, and timothy and clover hay, which is usually left for two years. In some cases the hay crop is alfalfa. Some farmers let the hay crop stand for four or five years, or even longer.

Recently farm labor has been rather scarce, as the manufacturing centers have been taking the surplus. The wages paid in the manufacturing towns have caused the price of farm labor to be high. In 1919 the amount spent for farm labor was $882,308, an average of $512.08 a farm. Day laborers are paid from $2 to $3.50. Men working by the month are paid from $45 to $60. The amount spent in 1919 for feed, principally mixed feed for dairy cattle, was $1,519,258, an average of $626.50 a farm.

The selling price of land in this county depends largely on the condition of the soil, the location, and the markets. According to the census report of 1920, the value of land was $26.30 an acre.

SOILS

The soils of Herkimer County vary widely in color, texture, structure, and in the characteristics of the soil-forming material. The texture ranges from stony gravelly loam to clay. Most of the soils of the southern part of the area are loamy in texture, whereas those

of the extreme northern and northwestern parts are more sandy. The upland soils of the central part of the area are predominantly silt loams, the terrace lands of the central part are gravelly loams, and the first-bottom lands range from fine sandy loams to silt loams.

All of the soils of this county were developed under forest cover under climatic conditions which were not favorable for the accumulation of free carbonates. The surface soils of the well-drained soils are light brown or brown, and those of the poorly drained soils are dark grayish brown or nearly black. The upper part of the subsoils of the well-drained soils is light brown or yellowish brown, and the lower part is commonly grayish brown or gray. Where the soils have developed under conditions of poor drainage the subsoils range from mottled gray, yellow, or rust brown to gray and drab. The lower part of the subsoils is commonly more compact and impervious to water movement than is that of the well-drained soils. In this area any lime lying near enough the surface to have any influence on the growth of crops is in the unleached parent material. This region is one in which soil lime does not accumulate, and the lime in the parent rock is being slowly and continually moved to greater and greater depths. The unleached glacial deposits of the region often contain considerable lime.

On the basis of the character and the processes of accumulation of the parent material, the soils of Herkimer County may be divided into 12 broad groups. These are: (1) Slightly calcareous alluvial soils. The soils of the Genesee series constitute this group. (2) Alluvial soils containing little or no lime to a depth of 3 feet. The members of the Papakating series constitute this group. (3) Soils derived from highly calcareous glacial till. The Honeoye, Ontario, Lyons, and Crosby soils belong to this group. (4) Soils, derived from thick glacial till, which contain little or no lime carbonate. The Whitman, Gloucester, and Wooster soils are included in this group. (5) Soils derived from thin glacial till underlain by more or less disintegrated country rock. Both the till and the underlying rock contain carbonate of lime. This group includes the soils of the Mohawk, Farmington, and Brookston series. (6) Soils derived from thin glacial-till material underlain by disintegrated country rock. In neither the till nor the underlying rock is carbonate of lime present. This group includes the soils of the Allis, Lordstown, Canfield, Volusia, and Lockport series. (7) Soils derived from calcareous stratified materials of kames and eskers. The soils of the Groton series are members of this group. (8) Soils derived from stratified materials, kames and eskers, in which little or no lime is present. This group includes the soils of the Otisville and Hinckley series. (9) Soils derived from calcareous lake-laid materials and occurring on terraces and outwash plains. The soils of the Palmyra, Dunkirk, and Herkimer series are included in this group. (10) Soils derived from noncalcareous lake-laid materials on terraces and outwash plains. The soils of the Chenango, Merrimac, Braceville, and Clyde series are included in this group. (11) Soils derived from an accumulation of organic matter. Muck represents this group. (12) Miscellaneous soils, including meadow, rough stony land, and steep broken land.

The soils of the third group are the most important agriculturally of any in the county, but are followed closely by the soils in the fifth and ninth groups, as well as the first-bottom soils.

Twenty-seven soil series, embracing 38 soil types, 5 phases, and 4 types of miscellaneous material, were identified in the area covered by this survey.

The Genesee soils are characterized by brown or light-brown surface soils and lighter-brown or yellowish-brown subsoils containing some gray material in the lower levels. Areas occupy the smooth, nearly level bottom lands laid down by water action. The fine sandy loam and silt loam members of the series were mapped.

The Papakating soils occupy first-bottom lands similar in relief to those on which the Genesee soils occur. The surface soils are grayish brown or dark brownish gray, and the subsoils are highly mottled gray, yellow, and rust brown. Papakating silty clay loam is mapped.

The surface soils of the Honeoye soils are light brown or brown, and the upper part of the subsoils is lighter brown, brown, or yellowish brown. This layer is underlain by grayish-brown or gray, partly weathered, calcareous, unassorted glacial till. The subsoil is slightly more compact than the surface soil. Honeoye loam, with a steep phase, and Honeoye silt loam were mapped.

The surface soils of the Ontario soils are typically light brown or brown. They are underlain by yellowish-brown or lighter-brown friable material which, in turn, is underlain by grayish-brown or gray material. The soil is friable, with little or no compactness. There is less lime in these soils to a depth of 3 feet than in the Honeoye soils. Ontario loam was mapped in this county.

The surface soils of members of the Lyons series are typically dark grayish brown. They are underlain by mottled gray, yellow, and rust-brown material which becomes more clearly gray in the lower part. The subsoil material is compact and slightly impervious to water movement. Lyons silt loam was mapped.

The surface soils of the Crosby soils are typically light grayish brown or grayish brown. The subsoils are mottled, and gray, partly lake-laid materials and glacial till are present in the lower part. Crosby silty clay loam was mapped.

The surface soils of members of the Whitman series are dark grayish brown, brownish gray, or gray when dry and in some places are nearly black. The upper part of the subsoil is highly mottled, and with depth the gray and drab become more pronounced. The subsoil material becomes more compact and plastic with depth. Whitman loam was mapped.

The surface soils of the Gloucester soils are light brown, grayish brown, yellowish brown, or of a lighter shade. They are underlain by a light-brown, yellowish-brown, or yellow layer, which, in turn, is underlain by brownish-gray or gray unassorted glacial till. The subsoil has little or no compactness. Gloucester loam and Gloucester fine sandy loam, with a stony phase, were mapped.

The surface soils of members of the Wooster series are light brown, brown, or even yellowish brown. The subsoils are yellowish brown or yellow, becoming gray with depth. Wooster silt loam was mapped.

The surface soils of the Mohawk soils are typically dark grayish brown and have a slaty appearance, owing to the presence of small, dark-colored shale fragments. The subsoils are lighter brown or grayish brown, and the lower part is dark brown or brown, owing to the abundance of small shale fragments present. The dark-colored

shale is present in many places above a depth of 3 feet, and outcrops were observed. If there is any compaction in the subsoil, it is only slight. The loam, silt loam, and silty clay loam members of the series were mapped.

The surface soils of members of the Farmington series are brown or light brown and in a few areas are reddish brown. The subsoils are lighter brown or brown and grade to grayish brown or brownish gray where the underlying rock is not present above a depth of 3 feet. The underlying limestone is in most places at or near the surface in Farmington stony loam and not far below a depth of 3 feet in Farmington silt loam. The stony loam and silt loam members of this soil series were mapped.

The surface soils of the Brookston soils are dark or nearly black. The subsoils are dark grayish-brown or mottled yellow, gray, and rust-brown material which grades to gray or drab. The lower part of the subsoil is heavy and plastic. Brookston silty clay loam was mapped in this county.

The surface soils of the members of the Allis series are typically light brown or yellowish brown. The subsoils are mottled yellow and gray, with some rust brown. The lower part of the subsoil in most places rests on the gray shale rock and has a greasy feel. Allis silt loam, with a gray phase, was mapped in this county.

The surface soils of members of the Lordstown series are light brown or yellowish brown. The subsoils are lighter-brown, yellowish-brown, or yellow, grading to grayish-brown or slightly mottled material in the lower part. The underlying shale rock in many places occurs within a depth of 3 feet. Londstown silt loam was mapped in this county.

The surface soils of the Canfield soils are light brown or yellowish brown. The subsoils are yellowish brown or yellow, grading to mottled gray, yellow, and rust brown. Canfield silt loam was mapped in Herkimer County.

The surface soils of members of the Volusia series are typically grayish brown or gray when dry. The upper part of the subsoil is highly mottled gray, yellow, and rust brown, and the lower part is mottled gray and drab plastic and compact material. Volusia silt loam was mapped.

The surface soils of the Lockport soils are typically dark grayish-brown or slightly pinkish material underlain by reddish-brown or pinkish plastic and impervious clay. Lockport silty clay loam, with a poorly drained phase, was mapped in this county.

The surface soils of members of the Groton series are light brown or brown and even yellowish brown. They are underlain by yellowish-brown or light-brown material, which in the lower part becomes grayish brown, brownish gray, or even gray. The soil is loose and friable to a depth of 3 feet. Groton gravelly loam was mapped in this county.

The surface soils of members of the Otisville series are typically light yellowish brown, yellow, or even grayish brown. The subsoils are yellow or pale yellow and gray. The soil is loose and porous to a depth of 3 feet. Otisville fine sandy loam was mapped.

The soils of the Hinckley series consist of light-brown, yellowish-brown, or yellow material underlain by yellow, pale-yellow, or gray

sand and gravel. Hinckley sand, Hinckley fine sandy loam, and Hinckley coarse sandy loam were mapped in this county.

The surface soils of members of the Palmyra series are typically brown or light brown. The subsoils are lighter brown or yellowish brown, becoming grayish brown or gray in the lower part. The soil material is friable, with little or no compactness. Palmyra gravelly loam was mapped.

The surface soils of the Dunkirk soils are typically light grayish brown, grayish brown, or gray when dry. The upper part of the subsoil is typically mottled yellow, gray, and rust brown, and the lower part is brownish gray, grayish brown, or gray. The subsoil material is compact and impervious. Dunkirk silt loam and Dunkirk silty clay loam were mapped in this county.

The surface soils of members of the Herkimer series are dark grayish brown or slate brown, owing to the color of the small shale fragments in the soil. The subsoil is grayish brown or lighter brown, and the lower part contains considerable dark-colored shale fragments. Herkimer silt loam was mapped.

The surface soils of the Chenango soils are typically light brown or yellowish brown. The upper part of the subsoils is yellowish brown or yellow, and the lower part is brownish gray or gray. There is only slight compaction in the subsoil. Chenango gravelly loam and Chenango fine sandy loam were mapped in Herkimer County.

The surface soils of the Merrimac soils are typically light grayish brown or gray when dry. They are underlain by yellow material which, in turn, is underlain by gray. The soil is loose and porous to a depth of 3 feet. Merrimac fine sand, Merrimac fine sandy loam, and Merrimac coarse sandy loam were mapped in this county.

The surface soils of members of the Braceville series are typically dark grayish brown or gray when dry, but in some areas are nearly black. The upper part of the subsoil is mottled gray, yellow, and rust brown, and the lower part is more gray or drab heavy plastic clay. Braceville silty clay loam, dark-colored phase, was mapped.

The surface soils of members of the Clyde series are typically dark grayish brown or nearly black and are underlain by gray or drab plastic, impervious, somewhat mottled clay. Clyde silty clay was mapped in Herkimer County.

The surface soil of muck, as mapped in this county, is dark-brown or nearly black, well-decomposed muck or peaty muck. Near a depth of 3 feet the material is variable. In some places the typical dark-colored muck continues to a depth of several feet, but more generally in this county it is not more than 24 inches thick. It is underlain by gray, calcareous material in the southern part of the area and by gray material in the northern part.

Meadow represents a condition rather than a definite soil type. All of this material is poorly drained.

Steep broken land represents a topographic condition, rather than a soil type. It includes the steep, broken lands.

Rough stony land includes the rougher parts of the county, where rock outcrops are common.

The following table gives the names, acreage, and proportionate extent of the soils mapped in Herkimer County, the accompanying soil map shows their distribution, and the following pages are devoted to a discussion of them.

Acreage and proportionate extent of the soils in the Herkimer County area, N.Y.

Type of soil	Acres	Per cent	Type of soil	Acres	Per cent
Genesee silt loam	6,976	1.5	Canfield silt loam	17,536	3.8
Genesee fine sandy loam	3,200	.7	Volusia silt loam	9,152	2.0
Papakating silty clay loam	1,728	.4	Groton gravelly loam	4,672	1.0
Honeoye loam	29,696	6.7	Otisville fine sandy loam	3,008	.7
Steep phase	1,216		Hinckley fine sandy loam	9,344	2.0
Honeoye silt loam	10,496	2.3	Hinckley sand	18,176	3.9
Ontario loam	14,720	3.2	Hinckley coarse sandy loam	3,008	.7
Lyons silt loam	8,512	1.8	Palmyra gravelly loam	10,752	2.3
Crosby silty clay loam	5,184	1.1	Dunkirk silty clay loam	8,320	1.8
Whitman loam	6,080	1.3	Dunkirk silt loam	896	.2
Gloucester loam	6,656	1.4	Herkimer silt loam	1,792	.4
Gloucester fine sandy loam	12,288	6.0	Chenango gravelly loam	12,416	2.7
Stony phase	14,976		Chenango fine sandy loam	1,984	.4
Wooster silt loam	2,176	.5	Merrimac fine sandy loam	11,584	2.5
Mohawk loam	8,256	1.8	Merrimac fine sand	3,712	.8
Mohawk silt loam	46,336	10.0	Merrimac coarse sandy loam	10,624	2.3
Mohawk silty clay loam	11,008	2.4	Braceville silty clay loam, dark-colored phase	320	.1
Brookston silty clay loam	3,840	.8	Clyde silty clay	768	.2
Farmington silt loam	8,256	1.8	Muck	7,488	1.6
Farmington stony loam	9,216	2.0	Meadow	22,912	5.0
Allis silt loam	10,304	2.3	Rough stony land	46,272	10.0
Gray phase	384		Steep broken land	29,376	6.4
Lockport silty clay loam	2,304	.6			
Poorly drained phase	256		Total	460,800	
Lordstown silt loam	2,624	.6			

GENESEE SILT LOAM

The surface soil of Genesee silt loam, to a depth varying from 10 to 15 inches, is typically light-brown, brown, or dark-brown friable, smooth silt loam, free from stone or gravel. The upper part of the subsoil, to a depth varying from 30 to 36 inches, is lighter-brown or slightly grayish-brown silt loam, slightly heavier than the surface soil though it is compacted only slightly or not at all. The lower part of the subsoil, to a depth of 4 or more feet, is mottled gray, yellow, and rust-brown, more compact silt loam or silty clay loam.

In areas along Mohawk River in the southwestern part of the county, the surface soil has a darker color, resulting from the influence of the wash from the upland soils of the Mohawk series. A few small shale fragments are present in these areas. The lower part of the soil consists of stream-laid deposits, including sand, silt, and gravel. In some places along West Canada Creek and smaller drainage ways, the surface soil is brown or light brown and the texture varies from smooth silt loam to fine sandy loam. Locally considerable gravel is present. Variations from typical occur along the smaller, swifter-flowing streams.

Genesee silt loam occurs along Mohawk River, the headwaters of Unadilla River in the southwestern part of the county, and Fulmer Creek and other stream bottoms, mainly in the central and southern parts of the area. It comprises the larger part of the first-bottom land in the part of the county in which it occurs.

Areas of this soil are smooth, slightly undulating, or gently sloping in the direction of stream flow. Most of the soil is subject to overflow during flood periods of the streams. Drainage, for the most part, is fair or good, except at times of flood. A few small, less well-drained areas are mapped with this soil.

Genesee silt loam was derived largely from materials that contain some lime, and lime is present near a depth of 3 feet. The surface soil is neutral or slightly acid in reaction.

Originally all of this soil supported a dense forest growth, but at present 65 or 75 per cent has been cleared and used for crop production. This is one of the best soils in the county and is productive of a large number of crops. Corn, oats, and hay are the principal crops. Corn yields from 10 to 15 tons of silage to the acre, oats from 35 to 50 bushels, and timothy and clover hay (mixed) from 2½ to 3 tons. The yields are always fair or good and are often excellent. The soil is easy to till and is fairly well supplied with organic matter.

Genesee silt loam sells at prices ranging from $40 to $100 an acre.

GENESEE FINE SANDY LOAM

The surface soil of Genesee fine sandy loam, to an average depth of 10 or 12 inches, is brown or slightly grayish-brown mellow, loose fine sandy loam. The upper part of the subsoil, to a depth of 20 or 24 inches, is grayish-brown or brownish friable, loose fine sand or fine sandy loam. The lower part of the subsoil, to a depth of 40 or more inches, is loose, friable dark grayish-brown or gray fine sand or fine sandy loam, underlain by stratified sand and gravel. The soil material is in most places free from gravel and stone.

Genesee fine sandy loam occupies first-bottom lands in close association with Genesee silt loam. The largest areas are along Mohawk River east of Herkimer and near Little Falls in the valley floor, and along West Canada Creek north of Herkimer.

Areas of this soil are smooth, gently sloping, or slightly undulating. Drainage is good or excessive, as the soil is loose and open to a depth of 3 feet.

Between 85 and 90 per cent of this soil has been cleared and is under cultivation. The forested areas support a growth of elm, sycamore, maple, alder, willow, and some poplar. Most of the soil is well suited to intensive farming. Corn, oats, potatoes, garden vegetables, and timothy and clover are grown. Truck crops and potatoes do well. Hay crops do fairly well, and corn produces from 5 to 7 tons of silage to the acre.

Well-improved and well-located areas of this soil sell at prices ranging from $50 to $100 an acre.

PAPAKATING SILTY CLAY LOAM

In cultivated fields the dry surface soil of Papakating silty clay loam, to a depth of 10 or 12 inches, is dark-brown, dark grayish-brown, brownish-gray, or gray, heavy silt loam or silty clay loam. The soil is sticky when wet. The subsoil, to a depth of 36 or more inches, is mottled gray, yellow, and rust brown in the upper part and more gray or drab in the lower. This layer grades to more plastic, impervious silty clay or clay. In most areas the lower part of the subsoil is moist or saturated. Except in the drier seasons of the year, the water table occurs at a depth of less than 3 feet. The soil material is free from stone or gravel.

Papakating silty clay loam occurs along the Mohawk River Valley, in positions from 4 to 15 feet above the level of the water. Areas are smooth, sloping gently to the stream, or are flat or nearly level. The soil is moist or wet much of the time. The largest areas are east of Little Falls in Mohawk Valley, east of Herkimer, in the town of Schuyler along the north side of Mohawk River, and elsewhere. The elevation ranges from 300 to 450 feet above sea level.

Most of this soil has been cleared and is used for pasture land or hay land. Because of the poor drainage very few cultivated crops are grown. The tree growth consists of scattered cedar, maple, and elm. Timothy, some clover, grown on the better-drained areas, and wild or swamp grass constitute the hay crops. Hay crops do well on the better-drained areas. The most poorly drained areas are used as pasture land.

This soil is badly in need of more thorough drainage. Under present conditions it is best suited for use as hay or pasture land.

HONEOYE LOAM

The surface soil of Honeoye loam, to an average depth of 8 inches, is typically brown or light-brown, friable, crumbly loam. In some places the material is dark grayish brown. The gray is more pronounced in cultivated fields, when the soil is dry. The upper part of the subsoil, to a depth varying from 20 to 25 inches, is somewhat compact light-brown, yellowish-brown, or chocolate-brown friable loam. The lower part of the subsoil, to a depth of more than 3 feet, is grayish-brown or gray partly weathered glacial till, slightly compact in places but crumbly and friable. The gray color is pronounced in the lower part. In the gray unweathered till, loam or gritty loam is admixed with the stone material, principally limestone, and the soil is calcareous at the line of contact between the better-oxidized material and the gray, lower subsoil layer. Considerable stone is scattered over the surface and through the soil but, as a rule, not in sufficient quantity to interfere with cultivation. In some places the stones have been removed. Locally the material is more sandy, and some silt loam is included in mapping.

This is one of the most extensive farming soils in the county. It occurs on the higher uplands of the southern part of the area, in the towns of Litchfield, Winfield, Columbia, and Warren.

Areas of Honeoye loam are typically gently sloping, undulating, gently rolling, or rolling. On some of the drumloid ridges or hills the slopes at the crest of the ridges are comparatively steep, the lower slopes are more gentle, and the intervening areas are undulating. A few slopes are comparatively steep or broken. As a whole, the soil is favorable in surface relief for intensive cultivation.

Drainage is good, except in a few included small swales or slight depressions, where it is only fair. Such areas really represent Lyons soils and are included with this soil only on account of their small extent. The soil is retentive of moisture, and crops seldom if ever are affected by drought.

The parent soil-forming material of Honeoye loam is thick, calcareous glacial till derived mainly from limestone. The surface soil ranges in reaction from neutral to slightly acid, but the subsoil, especially at or below a depth of 15 inches, contains an abundance of lime. Near a depth of 3 feet is partly weathered, unassorted glacial till containing an abundance of limestone rock imbedded in the till matrix. A little shale and some crystalline rocks are present in places, but these have had little or no influence on the soil.

Practically all of this soil has been cleared and is under cultivation or is used for pasture land. It is considered one of the best soils in the county for general farm crops. It is fairly rich in organic matter

and is easily tilled. It is better suited to alfalfa and other legumes than any other soil in the county, as lime is abundant above a depth of 3 feet. Applications of lime are essential on the surface soil for relieving acidity and getting the crops started.

The principal crops grown are hay, corn, potatoes, oats, and buckwheat. Hay crops do exceptionally well, yielding from 2 to 3 tons to the acre. Two or three cuttings of alfalfa are made. Corn produces from 10 to 12 tons of silage to the acre, oats from 40 to 60 bushels, potatoes from 50 to more than 100 bushels, and buckwheat from 20 to 25 bushels. The crop yields, for the most part, are higher on this soil than on any other in this county.

Farming on Honeoye loam is centered around dairying, and the crops grown are fed to dairy cattle. A large part of the soil is used for pasture. Crop rotation is practiced, and the yields as well as the general farm conditions which are far above the average of the county, show evidence of good farming methods.

This soil is held at prices ranging from $50 to more than $100 an acre, depending on the location, the farm buildings, and the general condition.

Honeoye loam, steep phase.—This phase of Honeoye loam includes the steeper and more broken areas of the soil. The dry surface soil, to a depth varying from 4 to 6 inches, is brown or grayish-brown loam. It is underlain, to a depth of 12 or 14 inches, by lighter-brown or slightly yellowish-brown, slightly more compact loam. Near a depth of 3 feet, the material is typically grayish-brown or gray, highly calcareous partly weathered glacial till. The surface soil is not so deep as that of the typical soil, the relief being more favorable to surface wash. The parent soil-forming material is similar to that in the typical soil.

Steep Honeoye loam occupies steep and broken slopes. It occurs in a few small areas, in association with Honeoye loam, in the towns of Litchfield and Columbia. Areas are steep, strongly rolling, or broken. Erosion is active, and much of the soil material has been removed.

Most of this land is used for pasture land. In its natural state it supports a good growth of grasses. In its present state it is best suited to use for pasture and to reforestation. It is sold only with typical Honeoye loam.

HONEOYE SILT LOAM

The surface soil of dry Honeoye silt loam, to a depth of 6 or 8 inches, is brown, light-brown, or grayish-brown mellow, smooth silt loam. The soil boundary between the loam and silt loam soils of this series is very arbitrary west of Jordanville. The upper part of the subsoil, to a depth of 18 or 20 inches, is lighter-brown or slightly yellowish-brown, more compact silt loam or loam which is underlain, to a depth of more than 3 feet, by grayish-brown or gray partly weathered till of silt loam texture, containing varying quantities of limestone rock. This soil, as a rule, is more free from stone than Honeoye loam. In the town of Warren and around Jordanville the material is smooth silt loam containing some grit in places.

This soil occurs principally in the town of Warren, in the southern part of the county, although some areas are in Columbia, German Flats, and Stark Towns. Drainage is good, except in a few small

included patches of the Lyons soils. The soil is fairly well supplied with organic matter. It is rich in lime in the lower part of the subsoil, but the surface soil is acid or neutral.

This soil occupies the more gently sloping, undulating, or smoother higher uplands in the southern part of the county. The surface is smoother than that of Honeoye loam. The general elevation ranges from 1,250 to 1,600 feet above sea level.

Between 90 and 95 per cent of this soil has been cleared and is used for farming. The farming methods, crops, and yields are practically the same as on Honeoye loam. Farming is centered around dairying, and the crops grown are for forage.

The current selling price of Honeoye silt loam ranges from $40 to $100 or more an acre.

ONTARIO LOAM

The surface soil of Ontario loam, to an average depth of 8 inches, is brown, friable, loose loam. When the soil is dry, the color in cultivated fields is grayish brown, the grayish cast being pronounced. When moist, the soil is brown or deep brown. The upper part of the subsoil, to a depth of 18 or 20 inches is light-brown or yellowish-brown friable loam which is but little, if any, heavier or more compact than the surface soil. This rests on grayish-brown or decidedly gray, partly weathered glacial till consisting mainly of limestone fragments and finer soil material. The gray color of the lower part of the subsoil is very pronounced. There is some slight compaction of the soil in places near a depth of 3 feet, but the material is friable and crumbly. The more nearly gray material is commonly calcareous. Considerable stone and gravel are scattered over the surface and through the soil in places but not in sufficient quantities to interfere with successful cultivation. The stone content commonly becomes larger with increasing depth.

The texture of the material is fairly uniform over large areas, but locally it is more nearly silt loam and in a very few small areas it is silty clay loam. The stone content is variable. In the towns of Frankfort and Litchfield considerable stone is on the surface, and many stones have been removed. There is more compaction in the lower part of the subsoil in the towns of Frankfort and Litchfield than in typical areas.

This soil occurs exclusively in the southern part of the area. It is mapped in the towns of Frankfort, Litchfield, German Flats, Warren, and Stark. Areas are gently sloping, undulating, or rolling. In many places the soil occupies drumloidal, elongated hills. In such areas the upper slopes are often steep, and the lower ones are smoother. The surface features are favorable, in most places, to intensive cultivation. Drainage is good.

The soil-forming material is thick, calcareous glacial till. In the towns of Frankfort and Litchfield the percentage of sandstone and shale fragments in the material is higher than elsewhere. Less lime is present in the subsoil where the sandstone material is abundant. The surface soil varies in reaction from neutral to acid. To a depth varying from 20 to 25 inches the soil is well oxidized.

The agricultural conditions on this soil compare favorably with those on the Honeoye soils, although acreage yields are usually slightly

lower. Practically all of this soil has been cleared and is used for cultivated crops or hay and pasture land. The crops grown are timothy and clover hay, alfalfa, corn, oats, potatoes, and buckwheat. Corn produces from 8 to 10 tons of silage to the acre, oats from 35 to 50 bushels, potatoes from 50 to 100 bushels, alfalfa from 1½ to more than 2 tons, and buckwheat from 18 to 25 bushels. The crop yields are good or high, in comparison with those on some of the soils of the county. Farming is centered around dairying, mainly for milk production.

Applications of manures, lime, and high-grade fertilizers would increase crop yields as well as improve the tilth of the soil.

Farms, for the most part, are in good condition, and the farmers are prosperous. This soil sells at prices ranging from $50 to $75 an acre.

LYONS SILT LOAM

The surface soil of Lyons silt loam, to an average depth of 8 or 10 inches, is typically dark grayish-brown or brownish-gray silt loam. The gray color is more pronounced when the soil is dry. In some places where drainage is very poor, the immediate surface soil is dark or nearly black. The texture is typically silt loam, though in some included areas it is more nearly silty clay loam. There are few, if any, gravel or stones in the surface soil and upper part of the subsoil. The upper part of the subsoil, to a depth of 20 or 24 inches, is mottled gray, yellow, and rust brown, the gray and rust brown being most pronounced. The texture is typically heavy silt loam or silty clay loam, and the material is slightly more compact than the surface soil. The lower part of the subsoil, to a depth of more than 3 feet, is gray or brownish-gray silty clay loam or compact silty clay. This material is unweathered glacial till consisting largely of limestone. In some places the immediate surface soil is nearly black and is much like muck or partly weathered organic matter.

This soil occupies smooth, nearly level flats, swales, or depressions and occurs in association with the Honeoye soils in the southern part of the area. It consists of poorly drained areas of the Honeoye and Ontario soils. Surface drainage is poor, because of the smoothness of the surface, and internal drainage is poor, because of the compactness and imperviousness of the subsoil. This soil is badly in need of thorough drainage. The mottled condition of the subsoil results largely from poor drainage and aeration.

The surface soil and upper part of the subsoil are acid or very acid, and the lower part of the subsoil is comparatively rich in lime. The soil is too wet, as a rule, to produce alfalfa successfully. Applications of lime would be beneficial to legume crops.

Most of this soil is used for pasture and forestry, only a very small part being used for crop production. The growth of grasses is good. Hay crops, some oats, and grass are the principal crops. Hay crops and oats do well on the better-drained areas. If better drained, this soil would be productive of hay and grain.

This land is held in conjunction with the upland soils, no farms being located entirely on it. Under present drainage conditions it is best suited to use for pasture and hay land and for forestry.

CROSBY SILTY CLAY LOAM

In cultivated fields the dry surface soil of Crosby silty clay loam, to a depth of 6 or 8 inches, is light grayish-brown, grayish-brown, brownish-gray, or decidedly gray, heavy silt loam or silty clay loam. The upper part of the subsoil, to a depth of 12 or 15 inches, is mottled gray, yellow, and rust-brown compact silty clay loam or silty clay. This is underlain, to a depth of 25 or 30 inches, by brown, grayish-brown, gray, or drab plastic and impervious clay. The lower part of the subsoil, to a depth of 3 or more feet, is mottled yellow, brown, and gray gritty, compact silty clay loam or silty clay. Some stone and gravel are present near a depth of 3 feet, the gray or drab color is commonly pronounced, and the material is commonly calcareous. Little or no stone or gravel are in the surface soil. Locally, in the less well-drained swales or depressions, the surface soil is dark brown or nearly black.

This soil occurs principally in the towns of Manheim, Newport, Little Falls, and Danube. Areas are comparatively smooth, gently sloping, or undulating. The surface features over the greater part of the soil are very favorable to farming. For the most part, surface drainage is fair or good. Internal drainage is retarded by the compactness and imperviousness of the subsoil.

The soil-forming material consists of comparatively deep glacial drift which was smoothed out by the action of ice and water. Some of the finer silt and clay resembles lake-laid materials. The lower part of the deposit contains more of the unassorted glacial drift, with bowlder clay admixed with the stone. The upper part of the subsoil contains little or no lime and is acid or very acid. The soil is very poor in organic matter, and much of it is badly in need of artificial drainage.

Practically all of this soil has been cleared and is used for pasture land, to which use it is well suited. Corn, oats, and timothy and clover hay are grown. Corn yields from 4 to 6 tons of silage to the acre, oats from 20 to 30 bushels, and hay from 1 to 1½ tons.

In the natural state this soil is best suited for use as hay and grass land. It sells at prices ranging from $20 to $40 an acre.

WHITMAN LOAM

The surface soil of Whitman loam, to a depth of 6 or 8 inches, is typically dark grayish-brown or brownish-gray loam or fine sandy loam. In many places the immediate surface material is dark-brown or nearly black silt loam or silty clay loam. The surface soil, on drying, becomes decidedly gray. Scattered over the surface and throughout the soil are numerous granitic stones, cobbles, and bowlders. The finer soil material is loam. The upper part of the subsoil, to a depth of 15 or 20 inches, is mottled gray, yellow, and rust-brown more compact and heavier loam or fine sandy loam. The lower part of the subsoil, to a depth varying from 20 to 36 inches, is grayish-brown or gray unweathered glacial till consisting largely of granite and crystalline rock. The gray color is pronounced, and the lower part is compact in place, though it is gritty and more or less friable. The soil material is unassorted and in its natural state is compact.

This soil is not uniform in texture or color, and in reality is a poorly drained soil occurring in association with the Gloucester soils in the northwestern and northern parts of the area. The texture, although typically loam, varies to very stony loam or fine sandy loam in places. The color is typically dark grayish brown, though some small patches are more nearly black. The degree of mottling in the subsoil varies. The lower, unweathered part is invariably gray in color.

Whitman loam occupies swales, depressions, or troughs, basinlike areas, or low-lying drainage divides. Seepage of water is common, and surface run-off is slow. The soil remains in a wet or saturated condition much of the time. Internal drainage is somewhat retarded by the compactness of the lower part of the subsoil. Areas are smooth, gently sloping, or nearly flat. Some small areas have been included with the associated Gloucester soils, as they were too small to be shown on the soil map.

The parent soil-forming material consists largely of igneous rocks, granites, and other crystallines. It contains little or no lime, and the soil is acid or highly acid.

Because of poor drainage, very little of this soil is under cultivation. Much of it is too stony for practical farming purposes. It supports a growth of elm, swamp maple, birch, hawthorn, spruce, balsam, and similar trees. Most of it supports a growth of wild grasses and is used for pasture land.

Whitman loam is naturally unproductive until properly drained, and it is doubtful if drainage would be warranted. It is best adapted to forestry and pasture.

GLOUCESTER LOAM

The surface soil of Gloucester loam, to a depth of 6 or 8 inches, is typically loam which, when dry, is light brown, yellowish brown, or decidedly grayish brown. The upper part of the subsoil, to a depth of 20 or 24 inches, is light-brown, yellowish-brown, brownish-yellow, or pale-yellow, friable and only slightly compact loam which, as a rule, is friable and crumbly. The yellow color predominates. The lower part of the subsoil, to a depth of 3 or more feet, is grayish-brown or gray unoxidized parent till material and is slightly compact in place but is crumbly when dug out. The gray color is decided in the lower part of the subsoil. Rock fragments and bowlders are scattered over the surface and throughout the soil to a depth of 3 feet. The boundaries between the loam and the stony phase of the fine sandy loam of the Gloucester series is often very arbitary, and areas of fine sandy loam are included with mapped areas of this soil. The larger stones have been removed from cultivated fields. Rock outcrops are not common, the stone present representing glacial drift materials.

In the virgin condition, to a depth of 1 or 2 inches, the surface soil is gray fine sandy loam. This is underlain by coffee-brown material, beneath which is yellow or pale-yellow material underlain, near a depth of 3 feet, by gray, unweathered glacial till. This soil occurs principally in the towns of Fairfield, Norway, and Salisbury, and some areas are in the town of Manheim.

The parent soil-forming material is rather deep glacial drift consisting largely of granites, syenites, quartzites, and other crystalline rock. There are few outcrops of the underlying rock. The rock material is low or lacking in lime, and the soil is acid or very acid.

Areas of this soil are prevailingly gently sloping, undulating, or rolling, but some are very steep. Most of the soil is favorable to intensive cultivation. The elevation of the land varies from 850 to 1,700 or more feet above sea level. This soil, like all the Gloucester soils, is poor in organic matter.

Surface drainage of this soil is good, and internal drainage is fair or good. In some small areas, which really represent Whitman soils but are mapped with this soil on account of their small extent, surface drainage is not so good. The land is sufficiently loamy or sandy to absorb the larger part of the rainfall.

Not more than 45 or 50 per cent of this soil has been cleared and used for farming purposes. The forest growth consists of pine, elm, maple, and some hemlock. Most of the virgin timber has been cut off for lumber, and the forest trees at present are second growth.

Farming on this soil is centered around dairying. The crops produced are principally hay and oats. The yields are only fair or low, hay yielding from 1 to 1½ tons and oats from 20 to 30 bushels to the acre. A little rye, buckwheat, and potatoes are grown with fair results. The dairy products, mainly milk, are shipped to the larger cities from the milk stations at the nearest railroad points. Little or no attention is given to crop rotation in this section.

Land values range from $20 to $35 an acre, but the less-improved areas sell for less.

GLOUCESTER FINE SANDY LOAM

The surface soil of Gloucester fine sandy loam, to a depth of 5 or 6 inches, is light brown, brown, yellowish brown, brownish gray, or even gray when it is dry. The texture is typically fine sandy loam, and the soil is fairly uniform. The surface soil is underlain, to a depth varying from 12 to 18 inches, by yellowish-brown or yellow, uncompacted, friable fine sandy loam. This, in turn, is underlain by yellowish-gray, gray, or slightly mottled yellow and gray fine sandy loam, less well oxidized than the layer above yet friable and crumbly. This layer continues to an average depth of 2 or more feet below the surface. The lower part of the subsoil, between depths ranging from 24 inches to 36 or more inches, is light brownish-gray or gray, stony and gravelly unoxidized parent till material, which is slightly more compact than the soil above. This slight compaction does not retard water movement.

In the virgin state, this soil has a decidedly brown or coffee-brown layer just below the surface. Considerable stone and angular gravel are scattered over the surface and throughout the soil to a depth of 3 feet, but these do not interfere with cultivation except in a few places.

Gloucester fine sandy loam occurs principally in the towns of Salisbury, Norway, and Ohio, in the northern and northeastern parts of the area. Areas are gently rolling, undulating, or rolling. The surface features of the larger part of the soil are favorable to intensive cultivation. The elevation ranges from 1,000 to 1,700 feet above sea level.

The parent soil-forming material is largely deep glacial drift consisting of schist, quartzite, granite, and other crystalline rocks. It contains little or no lime, and the soil is acid or very acid. The

native vegetation of weeds, paintbrush, and goldenrod shows an acid condition of the soil.

Probably not more than 50 per cent of the Gloucester fine sandy loam is under cultivation. Some of it supports a growth of beech, birch, maple, elm, cherry, balsam, spruce, and hemlock. Most of the forest growth is second growth. The cleared areas are largely used for pasture land to graze dairy cattle. The principal crops are hay, oats, a few potatoes, and a little corn.

This soil is well drained except in a few patches which really consist of poorly drained Whitman soils. The soil is easy to plow and warms up early in the spring. Timothy hay yields from 1 to 1½ tons to the acre. Corn is used as forage. Oats produce from 20 to 30 bushels to the acre. Most of the soil is located far from transportation lines in the more remote sections, and dairying is the principal type of farming.

This soil is poor in organic matter and lime. Applications of lime and manures, as well as turning under green crops, would increase productivity.

The current selling price of this land ranges from $20 to $30 an acre.

Gloucester fine sandy loam, stony phase.—The surface soil of the stony phase of Gloucester fine sandy loam, to an average depth of 6 or 8 inches, is light-brown, grayish-brown, or decidedly grayish fine sandy loam containing considerable angular gravel, stone, and large bowlders. The subsoil is similar in color, texture, and structure to that of the typical soil. In most places it would be necessary to remove the stone from the surface before the soil could be plowed with ease. In places the large bowlders and stone scattered over the surface make the land suitable only for pasture land and for timber.

Gloucester fine sandy loam, stony phase, is extensive in the northern and northeastern part of the area surveyed. The relief ranges from gently rolling to rolling and even broken or mountainous in the extreme northern and northeastern parts. The elevation varies from 1,200 to 2,000 feet above sea level.

Only a very small part of this soil, on account of its stoniness, is used for the production of crops. Small patches on the border of areas could be cultivated. Some hay, oats, and potatoes are grown. The soil is poor in organic matter and lime.

Second-growth timber occupies most of this soil, which is best suited to use for forestry. The selling price depends largely on quality of the timber growth.

WOOSTER SILT LOAM

The dry surface soil of Wooster silt loam, to a depth of 6 or 8 inches, is light-brown, brown, or grayish-brown mellow, friable silt loam. The upper part of the subsoil, to a depth of 18 or 20 inches is lighter-brown, yellowish-brown, yellow, or pale-yellow gravelly silt loam only slightly compacted, friable, and comparatively loose. The lower part of the subsoil, to a depth of more than 3 feet, is grayish-brown or brownish-gray gravelly loam or gravelly silt loam which in many places is very gray in the lower part. This layer is only slightly compacted. Well-oxidized materials continue to a depth of nearly 3 feet. Some fine, rounded or slightly angular gravel and stones are in the soil and on the surface, but not in sufficient numbers to interfere with

cultivation. Locally the texture is fine sandy loam, grading to gravelly fine sandy loam or loam. Such variations are small in extent and are included with this soil.

Wooster silt loam is not extensive in this county. The largest areas are west of Edicks along the lower slopes to Fulmer Creek, and smaller areas are southwest of Dutch Hill in the town of Frankfort, and north of Manheim Center. Areas are gently rolling, slightly morainic, and comparatively steep and broken. Drainage is good, and erosion has been active on some of the steeper slopes.

The soil-forming materials are principally shale, sandstone, and igneous rock. There is no assortment of materials, and the drift or till material is generally deep. The soil is lacking in lime and is acid or very acid. It is only fairly rich in organic matter. Although the soil is comparatively loose and friable, it is not inclined to be droughty.

Originally all of this soil was forested, but at present the larger part of it has been cleared and is used for growing hay, oats, corn, and potatoes. Hay, principally timothy and clover, yields from 1 to 1½ tons to the acre, oats from 25 to 30 bushels, and corn from 5 to 8 tons of silage. Potatoes do well but are grown only for home consumption. Grass does well and affords good grazing for dairy cattle.

Incorporation of organic matter, lime, and high-grade fertilizers will aid in increasing crop yields on this soil.

Wooster silt loam currently sells at prices ranging from $30 to $50 or more an acre.

MOHAWK LOAM

The surface soil of Mohawk loam, to a depth of 6 or 7 inches, is dark grayish-brown or grayish-brown friable, gritty loam. The gray color is pronounced in dry cultivated fields. The upper part of the subsoil, to a depth of 20 inches, is light-brown or light yellowish-brown, friable, slightly compact loam underlain, to a depth of 30 or more inches, by light grayish-brown or brownish-gray slightly mottled loam. The lower part of the subsoil, to a depth of more than 36 inches, is brownish-gray or gray silty clay loam or gritty loam. The gray color and the compactness of the lower part of the subsoil are rather pronounced. Typically, the texture is gritty loam. Considerable igneous stone is scattered over the surface. The subsoil material consists of an admixture of dark shale and limestone with some igneous rocks.

Mohawk loam is fairly extensive in this area. The principal areas are in the towns of Norway, Russia, Fairfield, Herkimer, Little Falls, and Manheim. The soil occurs on the higher uplands, in close association with the silt loam of this series, but is influenced by the materials that give rise to the Gloucester soils. The sand and gritty material come largely from the granitic rocks, similar to those in the Gloucester soils. Areas are typically gently sloping, undulating, or rolling, but some are more broken and steep. On the whole, the surface features are favorable to intensive cultivation. Drainage, for the most part, is good, but in some small swales or slight depressions conditions would be improved by artificial drainage.

The soil-forming material consists of thick glacial till. The surface material is largely derived from granitic rocks, and the soil is gritty or sandy in texture. Igneous rocks and some bowlders are common

on the surface, and some are present in the soil. The lower part of the subsoil is generally an admixture of dark-colored shale and limestone. This soil really represents an intermediate condition between the true Poland and Mohawk soils on the one side and the Gloucester soils on the other. It is calcareous in the lower part of the subsoil, but the surface soil and upper part of the subsoil are acid or very acid. The soil is easy to till, as the material is friable and loose.

Between 80 and 90 per cent of this soil has been cleared and is used for growing forage crops for dairy cattle. Most of the land is used for pasture for grazing dairy cattle. The general farm crops are the same as those grown on Mohawk silt loam, but the yields are not so good and the area of cultivated crops is not so large in proportion. The soil is poorly supplied with organic matter. Applications of manure and lime, as well as the use of high-grade fertilizers, would increase crop yields.

The current selling price of Mohawk loam ranges from $30 to $50 or more an acre.

MOHAWK SILT LOAM

The surface soil of Mohawk silt loam, to a depth of 8 or 10 inches, is dark grayish brown, brownish gray, or slate colored when dry and is dark brown or nearly black when wet or moist. The surface soil is typically smooth silt loam containing some dark-colored shale fragments in places. Locally, the texture may be as heavy as silty clay loam and loam. The surface soil, as a rule, is free from stone or gravel. The upper part of the subsoil, to a depth of 20 or 25 inches, is lighter brown, brownish gray, or grayish brown, granular and slightly heavier or a little more compact than the surface soil. The lower part of the subsoil, to a depth of 3 or more feet, is dark grayish-brown, brownish-gray, or even dark-brown compact silt loam or silty clay loam. In some places the lower part is more nearly gray, but the color is influenced by the small dark-colored shale fragments that are present in most places in the soil. The lower part of the subsoil is commonly slightly more compact but is granular and friable. Near a depth of 3 feet, the material is partly weathered glacial till consisting of dark-colored shale and limestone. The surface soil and subsoil may contain noticeable quantities of shale, limestone, and igneous gravel and stone but not in sufficient quantities to interfere with cultivation.

This soil is commonly dark colored to a depth of 3 feet. The underlying dark-colored shale is in many places less than 3 feet from the surface, and outcrops of the shale are common. In the vicinity of Barto Hill in the town of Fairfield, the texture of the soil is in many places loam or gritty loam. In a few places some limestone rocks are on the surface, as well as some igneous rocks.

Areas of this soil are typically undulating, gently sloping, gently rolling, or rolling, with rather steep slopes in places. On the whole, the surface features are very favorable to intensive cultivation. The general elevation ranges from 650 to 1,700 feet above sea level. Areas occupy the higher-lying hill lands in the towns of Herkimer, Fairfield, Manheim, and Little Falls, and some occur elsewhere. Surface drainage is good, and internal drainage is fair or good. A few small tracts are somewhat poorly drained. These small, included areas consist of Brookston silty clay loam.

The parent soil-forming material is largely residual from the underlying dark-colored shales, but some glacial-drift material is in the lower part of the subsoil. The dark, unweathered shales are slightly calcareous, and lime is present in many places in the lower part of the subsoil. The surface soil is commonly very acid. The organic-matter content of the soil is only moderate.

This soil is easy to work and if properly managed is very productive of corn, oats, and hay. About 90 per cent of it has been cleared and used for farming. A large acreage is used for pasture land, as the soil produces good grass and farming in this section is centered around dairying. The cultivated crops are fed to dairy cattle. Corn yields from 8 to 12 tons of silage to the acre, oats from 35 to 50 bushels, and hay, principally timothy and clover with some alfalfa, from 1½ to 2 tons. Some buckwheat and potatoes are grown, and the yields are fair or good. All farmers on this soil keep from 15 to 35 head of milk cows. The general appearance of buildings and farms indicates prosperity.

Deeper plowing, the incorporation of organic matter in the form of manure and cover crops, applications of lime, and the use of high-grade fertilizers will make the soil more productive.

Mohawk silt loam is considered one of the good pasture and hay soils of the county. The current selling price varies from $35 to $100 an acre, depending on the nearness to markets and on improvements.

MOHAWK SILTY CLAY LOAM

When wet or moist the surface soil of Mohawk silty clay loam, to a depth of 6 or 8 inches, is dark grayish-brown, dark slate-brown, or nearly black, heavy, sticky silt loam or silty clay loam. The texture as a rule, is heavier than silt loam. The upper part of the subsoil, to a depth of 20 or 25 inches, is brown or grayish-brown, slightly compact silty clay loam. The lower part of the subsoil is dark grayish-brown or brown silty clay loam or silty clay, slightly mottled with yellow and rust brown. It is slightly more compact than the material above and contains considerable small, fine, dark-colored shale fragments. Considerable dark-colored shale fragments and some fragments of limestone and igneous rocks are scattered over the surface in places. The stone present does not interfere with cultivation.

This soil is similar to Mohawk silt loam, the main differences being the heavier texture of the surface soil and the much greater thickness of the underlying glacial till material. Only in places does the underlying shale rock come to or near the surface.

This soil is rather extensive in the towns of Schuyler and Danube. It occurs on gently sloping or undulating and comparatively smooth slopes in the higher-lying uplands. The surface features are very favorable to cultivation in most cases. Surface drainage is good and internal drainage fair.

The soil material is derived from fairly deep, unassorted glacial till and is influenced largely by the underlying dark-colored shale. The dark-colored shales are calcareous, and near a depth of 3 feet the soil contains lime. The surface soil is acid or very acid.

The leading crops are hay, principally timothy and clover, with some alfalfa, corn, oats, potatoes, and buckwheat. Hay crops do well, producing from 1½ to 2 tons to the acre. Corn produces from 8 to 12

tons of silage, oats from 30 to 40 bushels, and potatoes from 50 to 75 bushels to the acre. Buckwheat does well. The main source of income on this soil is the sale of milk. All farming centers around dairying. Liming is essential for growing legumes.

Practically all of this soil is cleared, but a large part of it is used for pasture land for grazing dairy cattle. Most farms are in fair or good condition. The current selling price ranges from $30 to $75 an acre.

BROOKSTON SILTY CLAY LOAM

The surface soil of Brookston silty clay loam, to a depth varying from 8 to 12 or more inches, is dark-brown, dark grayish-brown, or nearly black silty clay loam or silty clay. Considerable organic matter is present, especially in the surface soil, and in some places the immediate surface soil is nearly muck. Slight mottling of rust brown occurs in the surface soil in places. The upper part of the subsoil, to a depth varying from 20 to 24 inches, is mottled gray, yellow, and rust-brown heavy silty clay loam, slightly compact and containing some small dark-colored shale fragments. The lower part of the subsoil, to a depth of 3 or more feet, is gray or drab plastic impervious clay, slightly mottled with yellow and rust brown. In many places the lower part of the subsoil contains considerable fragmental shale.

Areas of this soil are typically gently rolling, sloping, or undulating. Areas occupy the lower slopes and swales or depressions in association with the Mohawk soils. The soil occurs only in comparatively narrow and elongated areas. It is most extensive in the towns of Norway, Fairfield, Manheim, Herkimer, and Danube. Drainage, for the most part, is poor or deficient.

This soil is distinguished by its dark-colored surface soil, mottled upper subsoil layer, and compact, impervious lower subsoil layer. The soil-forming material is similar to that which gave rise to the Mohawk soils. The dark-colored shales near a depth of 3 feet are calcareous in places. The surface soil and upper subsoil layer are commonly acid.

Originally all this soil was forested, and at present there is a scattered growth of elm and maple. Hay is grown on a very small part of the soil. Drainage is not sufficient for cultivated crops, and in many places the cost of establishing proper drainage would be very high. Most of the soil supports a growth of grasses and it is used for pasture land. Hay, on the better-drained areas, produces 1½ or 2 tons to the acre.

In its present condition, this soil is best suited to use as pasture land. It is held in conjunction with the adjacent uplands and better-drained soils.

FARMINGTON SILT LOAM

The surface soil of Farmington silt loam, to a depth varying from 6 to 10 inches, is brown, slightly reddish-brown, or grayish-brown silt loam. The grayish-brown or gray color is pronounced in cultivated fields when the soil is dry. The upper part of the subsoil, to a depth varying from 20 to 25 inches, is lighter-brown, yellowish-brown, or slightly reddish-brown, slightly more compact silt loam or silty clay loam. The lower part of the subsoil varies from reddish brown to gray and is slightly more compact than the upper part. The soil

material is commonly more than 3 feet thick, though in some areas the underlying limestone is within 3 feet of the surface. In such places, the soil is residual from the underlying limestone rock. The soil is comparatively free from stones.

Although the surface soil is typically light brown or brown, in some small included areas it is reddish brown and in others it is more gray.

This soil is fairly extensive. The largest areas are in the town of Warren. Others are in the towns of Columbia, Stark, German Flats, Little Falls, Manheim, and Salisbury, and north of Herkimer along the lower slopes of West Canada Creek near Middleville and in the town of Russia.

Areas of this soil are typically gently rolling, undulating, or gently sloping and occupy comparatively broad divides or plateaulike positions. For the most part, the surface features are very favorable to cultivation. The elevation ranges from 600 to more than 1,700 feet above sea level. Drainage, in general, is good, but in some small included areas is only fair. The organic-matter content is only fair.

The soil-forming material consists of glacial till over limestone. The glacial till varies in thickness, and the underlying residual material commonly occurs within a depth of 3 feet below the surface. The glacial drift is influenced by some sandstone and igneous stones in the northern part of the county, whereas in the southern part it is more generally limestone material that has modified it. Little or no lime is present within a depth of 3 feet, though the soil mantle may rest on limestone. The surface soil is commonly slightly acid.

Corn, oats, timothy and clover, a little alfalfa, and potatoes are grown. Yields are fair or good. The soil is well suited to hay crops and to oats. Corn does well in seasons of average or high rainfall. On the shallower areas, the soil is best suited to use as pasture land and for the production of hay crops. All the farming on this soil is centered around milk production, and the crops are grown for forage.

The current selling price of this soil varies from $25 to $40 or $50 an acre.

FARMINGTON STONY LOAM

When dry, the surface soil of Farmington stony loam is typically light-brown, reddish-brown, or grayish-brown stony loam. The upper part of the subsoil is lighter-brown, slightly yellowish-brown, or reddish-brown, slightly more compact loam or silt loam. Considerable stone is present on the surface and throughout the soil. The underlying limestone rock commonly occurs within 3 feet of the surface, and outcrops are common. The soil is much shallower and stonier than the silt loam of this series.

This soil is rather extensive in the southern and southwestern parts of the county. It occupies flat, plateaulike areas. The surface ranges from nearly level and smooth to steep and broken. In the towns of Winfield, Litchfield, and Columbia this soil occupies high, rolling ridges. The soil mantle is very thin on the steeper slopes.

The soil material of this soil is similar in origin to that of the silt loam of the series. Drainage is rather poor.

On account of the steep or irregular relief of much of this soil and its shallowness and stoniness, it is not considered very well adapted to farming. It can best be used for grazing land and for forestry.

ALLIS SILT LOAM

The dry surface soil of Allis silt loam, to a depth varying from 4 to 6 inches, is light-brown, yellowish-brown, or grayish-brown smooth silt loam. In a few areas the material is heavy silt loam and in patches it approaches silty clay loam in texture. Small shale fragments occur over the surface and throughout the soil. The upper part of the subsoil, to a depth of 10 or 12 inches, is light-brown or yellowish-brown slightly compact silt loam containing some small shale fragments. It is fairly well weathered and oxidized. The lower part of the subsoil, to a depth varying from 24 to 30 or more inches, is highly mottled gray, yellow, and rust-brown compact clay loam or clay with a high content of shale fragments. The gray color becomes more pronounced with depth, and the underlying light-colored shale is commonly present within a foot or less of the surface. Outcrops are common on the steeper slopes. Much of the finer soil material has a greasy or slick feel, if considerable fine shale fragments are present.

The soil material of Allis silt loam is largely residual from the underlying shale rock, though the immediate surface is influenced by glacial drift. The change from the till to the residual material is very abrupt, and the soil becomes compact, heavy, and impenetrable to the soil auger. The true soil material is comparatively shallow. The material to a depth of 3 feet is acid or very acid.

This soil is extensive in the towns of Danube and Stark and occurs in the towns of Little Falls, German Flats, Frankfort, Schuyler, and Herkimer, and to some extent elsewhere. Areas are prevailingly gently rolling, rolling, or comparatively steep and broken. In some places the soil occupies the smoother, more gentle slopes on the ridge crests or divides. The elevation varies from 1,000 to 1,700 feet above sea level. Surface drainage is generally good or excessive, as the slope allows rapid run-off of rain water. Internal drainage is retarded by the compact, impervious subsoil or substratum.

Approximately 65 or 75 per cent of this soil is cleared and used for pasture land or for the production of crops. The principal crops are hay, oats, and a little corn. Farming on this soil is centered around milk production, and the crops grown are used for forage for dairy cattle. Hay, principally timothy and clover, yields from 1 to 1½ tons to the acre, oats from 25 to 30 bushels, and corn from 4 to 6 tons of silage.

Deeper plowing, the incorporation of organic matter, and the application of lime would tend to make the soil more productive. In general, it is well suited to use as pasture land.

Allis silt loam, gray phase.—The dry surface soil of gray Allis silt loam, to a depth of 4 or 6 inches, is light brown, brownish gray, or decidedly gray. It contains some gritty material or fine sandy loam. The upper part of the subsoil, to a depth of 15 or 20 inches, is grayish brown, brownish gray, or gray mottled with yellow and rust brown. The texture is silt loam or silty clay, and the material is more compact than the surface soil. The lower part of the subsoil is more nearly gray and is rather compact and impervious in place, and the underlying gray shale or sandy shale is within 3 feet of the surface. Outcrops are common. This soil is more nearly gray than the typical soil, and the residual country rock is gray shale or sandy

shale. Near a depth of 3 feet, the material is slightly calcareous, owing to the presence of lime in the underlying rock.

This soil is not extensive, occurring in comparatively narrow strips on the steeper slopes in the town of Stark. It is not important from the viewpoint of farming. The crops grown are the same as on Allis silt loam. Yields may be slightly higher than on the typical soil.

Drainage and surface conditions of this soil are very similar to those of typical Allis silt loam.

LOCKPORT SILTY CLAY LOAM

The surface soil of Lockport silty clay loam, to a depth of 6 or 8 inches, is light reddish-brown or decidedly pinkish heavy silt loam or silty clay loam. The surface soil has a grayish cast when dry. The upper part of the subsoil, to a depth varying from 15 to 18 inches, is reddish brown or pinkish in color, and the material is heavy, compact silty clay or clay. The lower part of the subsoil, to a depth of 3 or more feet, is reddish-brown or pink heavy clay mottled with gray and yellow. A few fragments of the underlying shale rock occur in places, and the material near a depth of 3 feet rests on the shale. A few quartzite and igneous rocks are scattered over the surface. Outcrops of the gray and pinkish shale rocks are common.

This soil occurs in a narrow area south of Mohawk Valley. Its general elevation is about 1,200 feet. Areas are north of the main belt of Honeoye soils and are more closely associated with the Canfield and Volusia soils. Although this soil is not extensive, rather conspicuous areas are on the north-facing slopes in the town of Frankfort, near Spinnerville and Denison Corners, in the towns of German Flats and Columbia, and locally in the town of Stark. Areas are prevailingly gently sloping or rolling and even steep and broken in the vicinity of some of the streams. The relief, for the most part, is favorable for farming. Surface drainage is good or excessive, but internal drainage is retarded by the compact, impervious subsoil.

The soil-forming material consists largely of the underlying gray and pinkish shales and partly of glacial drift. The soil is acid or very acid throughout and is comparatively poor in organic matter.

About 75 or 80 per cent of this soil is used for the production of hay crops and for pasture land. The remainder supports a growth of elm, maple, and other forest trees. Only a small acreage is used for cultivated crops, as the soil is too heavy and hard to cultivate. It clods badly if plowed when either too wet or too dry. Hay, principally timothy with some clover, gives good yields.

During seasons of heavy rainfall, this soil remains wet much of the time, and during extended dry spells it dries, bakes, and cracks badly. Deeper plowing, the incorporation of organic matter, and the application of lime would be beneficial to this soil.

Lockport silty clay loam, poorly drained phase.—The surface soil of poorly drained Lockport silty clay loam, to a depth of 5 or 7 inches, is dark-brown or nearly black silty clay or clay. In a few places the surface has a pinkish cast. The typical dark color results from the accumulation of organic matter. The upper part of the subsoil, to a depth of 20 or 24 inches, is red, pinkish-red, or brick-red heavy, compact, impervious clay slightly mottled in the lower part. The lower part of the subsoil, to a depth varying from 30 to 36 inches, is

red, compact clay somewhat mottled with gray and yellow and containing small fragments of partly weathered shale. The bedrock or shale occurs in most places within a depth of 3 feet from the surface.

This soil occurs in swales, depressions, and flat areas in association with typical Lockport silty clay loam. Drainage is poor.

Little or none of this soil is used for cultivated crops, as it is poorly drained and is very heavy and hard to cultivate. Fair or good yields of hay are obtained on the better-drained areas. Most of the soil supports a growth of wild grasses and is used for pasture land.

LORDSTOWN SILT LOAM

The surface soil of Lordstown silt loam, to an average depth of 6 inches, is light-brown or yellowish-brown, mellow, friable silt loam which has a decidedly grayish cast when dry. The upper part of the subsoil, to a depth varying from 20 to 24 inches, is light yellowish-brown, pale-yellow, or yellow friable silt loam. The structure is slightly more compact than that of the surface. The lower part of the subsoil, to a depth of more than 36 inches, is grayish-brown, brownish-gray, or gray material mottled with gray, yellow, and rust brown near a depth of 3 feet. The texture is commonly silt loam or loam, and the material is less well oxidized and really represents partly weathered till and residual material. The lower part of the subsoil is slightly more compact than the soil above but is friable and crumbly. Scattered small shale fragments occur near a depth of 3 feet.

Locally, areas of lighter-textured material were included with this soil in mapping. These variations are too small to be separated on the soil map. In some places some small stone and angular gravel are present, and the subsoil material contains some shale fragments. The underlying shale rock occurs in many places within a depth of 3 feet, but outcrops are uncommon. The soil material is well weathered and oxidized to a depth varying from 24 to 30 inches, but the underlying material is only partly weathered and has a decidedly grayish color or is slightly mottled.

Lordstown silt loam occurs in the higher-lying hill lands of the county, at elevations ranging from 900 to 1,700 feet above sea level. The larger areas are in the towns of Schuyler, Winfield, Frankfort, and Herkimer, and smaller ones are in Warren Town and elsewhere in the county. Drainage is good in typical areas but in a few included areas is not adequate. In such areas, the subsoil is more compact than typical, mottling is more pronounced, and the soil closely resembles the Volusia soils. These variations occur on the smoother or flatter "seepy areas" where internal and surface drainage are retarded or poor because of lack of relief or of compactness of the subsoil. Such areas are small and occur largely on the flat ridge tops in the towns of Schuyler and Herkimer, northwest of Herkimer.

The parent material of this soil is comparatively shallow glacial till derived mainly from sandstone and light-colored shale. The underlying rocks are often within 3 feet of the surface. The parent materials carried little or no lime, and the soil is very acid to a depth of 3 feet.

Areas of this soil are typically gently rolling or rolling but in some places are rather steep and broken. In general the surface features are favorable to cultivation.

Between 70 and 80 per cent of this soil has been cleared and is used for growing crops and for pasture lands. The principal crops are hay, oats, corn, potatoes, and buckwheat. Hay crops, principally timothy and clover mixed, yield from 1 to 2 tons to the acre. Corn yields from 5 to 6 tons of silage, oats from 20 to 30 bushels, and potatoes from 60 to 100 bushels to the acre. The yields on this soil are higher than on the Volusia soils. The larger acreage is used for hay and pasture land. Farming on this, as on associated soils, is centered around milk production, and the crops are used for forage.

Demand for lands of this kind or for associated hill lands is not great, and values are comparatively low. Much of this soil is remote from villages and is not so desirable for general farming as the more favorably located lands.

CANFIELD SILT LOAM

The surface soil of Canfield silt loam, to a depth of 6 or 8 inches, is light-brown, yellowish-brown, or grayish-brown mellow, friable silt loam. The soil in some places is mellow, open, and granular. The upper part of the subsoil, to a depth varying from 15 to 18 inches and in some places continuing to a depth as great as 20 inches, is yellowish-brown or grayish-yellow slightly more compact silt loam which grades to highly mottled gray, yellow, and rust-brown compact silt loam or silty clay loam. The surface soil and upper subsoil layer are commonly well weathered and well oxidized, but near a depth of 3 feet the material is compact, highly mottled, and unweathered and resembles that of the Volusia soils. The surface soil resembles that of the Wooster soils. The gray color is more pronounced with depth, and the material becomes more compact and often is silty clay loam or silty clay.

This soil occurs in close association with the Volusia and Wooster soils and really represents an intermediate condition between the soils of those series. Canfield silt loam is mapped principally in the towns of Frankfort, Schuyler, German Flats, Danube, and Stark, but some smaller areas are elsewhere. Areas of this soil range from comparatively smooth, gently sloping, and undulating to hilly and steep, but most of them are gently rolling or gently sloping. Some small areas of nearly level and less well-drained land are included in mapping, but these really are Volusia soils included because of their small extent. The elevation is from 600 to 1,500 feet above sea level.

The parent material of Canfield silt loam is largely an admixture of glacial till with some residual material from the underlying shale or sandstone. The till varies in thickness from shallow to comparatively thick deposits. For the most part, the soil is deep and the underlying rocks have had little or no effect on the soil formation. Some stone and gravel are scattered over the surface, but these do not interfere with cultivation. The parent material contained little or no lime, and the soil is acid or very acid. Drainage, for the most part, is good, though a few small tracts would be improved by artificial drainage. Underdrainage is somewhat retarded by the compact, heavy

subsoil. This soil is far better drained than the associated Volusia soils.

Between 80 and 90 per cent of this soil has been cleared and is used for crop production or for pasture land. The principal crops are hay, chiefly timothy and clover, corn, oats, and potatoes. Hay yields from 1 to 1½ tons and oats from 25 to 30 bushels to the acre. Corn yields from 4 to 7 tons of silage, and potatoes do fairly well. All the crops grown are used for feeding dairy cattle.

This soil is comparatively poor in organic matter. The use of manures, the application of lime, and the turning under of green cover crops would prove beneficial. Pastures are fairly good.

VOLUSIA SILT LOAM

The surface soil of Volusia silt loam, to a depth varying from 5 to 8 inches, is typically grayish-brown, brownish-gray, or gray smooth silt loam, comparatively free from stone or gravel. The upper part of the subsoil, to a depth varying from 12 to 15 inches, is highly mottled gray, yellow, and rust brown. Locally the brown color may predominate. The material is typically compact silt loam or silty clay loam. The lower part of the subsoil, between depths of 15 and 36 or more inches, is typically gray or slightly brownish-gray compact and impervious silty clay in which the gray color is very pronounced. The mottled condition of the soil and the gray color of the lower part of the subsoil are evidence of poor drainage and poor aeration. The lower part of the subsoil is very compact. Some stones and gravel are present in the lower part of the soil, and in some places the underlying shale or sandstone is within 3 feet of the surface.

Although the texture of this soil is typically silt loam, some areas of loam or silty clay loam are included. The heavier material ordinarily occurs in the more poorly drained areas. In such places the immediate surface soil is darker in color and resembles muck. Agricultural adaptations of these soils are similar to those of the typical soil.

This soil is distinguished by its mottled, compact, unoxidized subsoil and its poor or deficient drainage. It is rather extensive on the slopes from the southern uplands to the Mohawk River Valley in the towns of Frankfort, German Flats, Little Falls, Danube, Stark, and Winfield. Areas occur in the towns of Schuyler and Herkimer, north of Mohawk River. Areas are small and scattered. The surface is typically smooth or gently sloping. In places the soil occupies flat or broad plateaulike areas, depressions, or swales in association with the better-drained upland soils, and some areas are on the lower slopes where seepage waters are common. The relief does not permit rapid run-off of surface waters, and the compact, impervious subsoil retards internal drainage. Much of the soil remains in a moist or saturated condition most of the year. During the wet season, the water table is near the surface. The compact, impervious lower subsoil layer is often referred to as hardpan.

The parent material is largely a rather thin mantle of glacial till influenced by the underlying shales or sandstones. The soil-forming material carried little or no lime, and the soil is acid or very acid. It contains little organic matter.

Between 75 and 80 per cent of this soil has been cleared and used for pasture land. Cultivated crops are grown on some of the better-drained areas. The leading crop is hay, principally timothy or timothy and clover mixed. Hay yields from one-half to 1 ton to the acre. Oats and corn return only fair or light yields. A little buckwheat is grown, and the yields are fair or good. The larger part of this soil is best adapted to use for pasture and to reforestation.

Volusia silt loam, for the most part, is not held at a very high price. If it were properly drained and enriched in organic matter, crops of hay and oats could be more successfully grown.

GROTON GRAVELLY LOAM

The surface soil of Groton gravelly loam, to a depth varying from 7 to 9 inches, is typically light-brown, brown, or slightly grayish-brown gravelly loam. The gravel is rounded and waterworn and, locally, is present in large quantities. The upper part of the subsoil, to a depth varying from 12 to 18 or more inches, is lighter brown or grayish brown but is brown when moist. This material is gravelly loam and is underlain, to a depth of more than 3 feet, by stratified gravel and sand containing some fine soil material. The color becomes more nearly gray with depth. The soil is commonly well oxidized to a depth varying from 20 to 25 inches, but the lower part is less well weathered. The parent material consists largely of rounded gravel and sand which in most places continues to a depth of several feet. The soil is very uniform in texture, though in some areas the surface soil is gravelly fine sandy loam.

The parent materials are glacial outwash deposits consisting largely of limestone, with admixtures of sandstone, shale, and some crystallines. Near a depth of 3 feet, no lime is present. The upper part of the soil is neutral or slightly acid, owing to the leaching of the lime downward. The organic-matter content is fair or good.

Originally all of this soil was forested, but at present the larger part has been cleared and is used for the growing of corn, oats, timothy and clover, alfalfa, and potatoes, and for pasture land. Corn yields from 6 to 10 tons of silage, oats from 30 to 40 bushels, potatoes from 75 to 90 bushels, timothy and clover from 1½ to 2 tons, and alfalfa 2 or more tons to the acre. The soil is well suited to truck crops where it is well located with reference to markets.

Applications of manures or the plowing under of green cover crops and light applications of lime would be beneficial to this soil.

This soil is held largely in conjunction with associated soils.

OTISVILLE FINE SANDY LOAM

The dry surface soil of Otisville fine sandy loam, to a depth of 6 or 8 inches, is light-brown, yellowish-brown, or grayish-brown fine sandy loam. Locally the texture is fine sand or very fine sandy loam. The upper part of the subsoil, to a depth of 15 or 20 inches, is typically yellowish-brown friable and mellow fine sandy loam. The lower part of the subsoil, to a depth of 30 or 36 inches, is yellowish-brown or grayish-brown fine sandy loam in which the gray color becomes more pronounced with depth. The substratum, below a depth of 3 feet, consists of unweathered gravel and sand. The soil is free from stone or gravel and is loose and friable to a depth of 3 feet.

Otisville fine sandy loam occupies rolling, kamy, or knobby areas, and some of the slopes are very steep and broken. The smoother areas can be farmed. The soil is rather extensive along the south side of Mohawk Valley, the largest areas occurring south and east of Ilion and southeast of Herkimer.

Surface drainage is good or excessive, as the slopes are steep, but the larger part of the water is taken up by the soil. During the drier seasons the soil is inclined to be droughty.

The parent material is water-laid sandstone and shale, with a little limestone. The soil is deficient in lime and is acid or very acid to a depth of 3 feet. The supply of organic matter is comparatively low.

Approximately 50 per cent of this soil has been cleared and is cultivated to hay, corn, potatoes, and vegetables. Some of the steep and broken areas do not lend themselves to intensive farming and are best suited to use for pasture land and to reforestation. Erosion is active on the steeper slopes, and deep gullies are common. Hay, principally timothy, yields from 1 to 1½ tons to the acre, and corn for silage produces from 5 to 7 tons. This soil is well suited to vegetables, and these are grown in the vicinity of Ilion.

The better-improved areas of this soil sell for $50 or more an acre.

HINCKLEY FINE SANDY LOAM

The surface soil of Hinckley fine sandy loam, to a depth of about 8 inches, is light-brown, grayish-brown, or yellowish-brown light-textured fine sandy loam. Locally, the surface soil carries large quantities of waterworn gravel. The upper part of the subsoil, to a depth of 18 or 20 inches, is yellowish-brown, yellowish-gray, or yellow friable fine sandy loam. The lower part of the subsoil, to an average depth of about 30 inches, is brownish-gray or gray fine sandy loam or fine sand. Stratified gravel is, locally, very abundant. The structure of this deeper layer varies from very loose to moderately compact. The substratum, below a depth of about 30 inches, consists of stratified beds of waterworn gravel and sand.

This soil occurs largely on kames, where the surface slopes are slightly rolling or steeply sloping and broken. Erosion is locally very active. The steeper slopes are too steep for cultivation. The soil is well or excessively drained, and crops often suffer from a lack of moisture during dry seasons.

The parent material consists of stratified water-laid sediments. The surface soil and subsoil are noncalcareous and have an acid reaction.

A large part of this soil has been cleared and is used either for pasture or for the growing of hay, oats, corn, and potatoes. Hay yields from one-half to one ton to the acre; oats from 20 to 30 bushels; and corn from 4 to 5 tons of silage. Potatoes do well. The uncleared areas of the soil support a scrubby growth of forest trees.

Steep slopes and excessive drainage make much of this soil poorly adapted to cultivation and of little value except for reforestation. Where slopes are not too steep and where the moisture conditions are not too unfavorable, it is well adapted to the production of truck crops. The incorporation of organic matter and the application of lime are considered necessary for the improvement of the soil.

This soil seldom constitutes an entire farm and is sold in connection with adjacent soils.

HINCKLEY SAND

The dry surface soil of Hinckley sand, to a depth of 5 or 6 inches, is yellowish-brown, light-brown, brownish-gray, or gray fine sand. The upper part of the subsoil, to a depth of 18 or 20 inches, is yellowish-brown, yellowish-gray, or pale-yellow loose fine sand. The lower part of the subsoil, to a depth varying from 30 to 36 inches, is brownish-gray or gray loose fine sand or medium sand. The substratum consists of stratified beds of sand and rounded gravel.

This soil is extensive in the towns of Newport, Norway, Russia, and Ohio in the northern part of the area surveyed. It comprises the rough, knobby, or kamy parts of these sections. The relief, for the most part, is steep, and the slopes and rounded knobs are too steep and broken for cultivation.

The soil material represents kames and stratified water deposits. In some of the deeper eroded gullies, the lower-lying stratified gravel occasionally contains considerable limestone. In such places this material is calcareous. The soil, to a depth of more than 3 feet, is very acid. It is poor in organic matter. It is well or excessively drained, owing to the steep surface relief and the looseness and porosity of the soil. It is inclined to be very droughty.

Only a very small part of this soil is used for farming, as the relief is unfavorable and the soil is inclined to be droughty. A few small tracts of corn, hay, and potatoes are grown, but the yields are comparatively light. Grass, daisies, moss, and paintbrush thrive. Part of the soil supports a growth of pine, aspen, and other forest trees. It is best suited to reforestation and possibly to use for grazing land.

HINCKLEY COARSE SANDY LOAM

The surface soil of Hinckley coarse sandy loam, to a depth of about 8 inches, is light-brown, grayish-brown, yellowish-brown, or decidedly gray coarse sandy loam or gravelly coarse sandy loam. The subsoil is yellowish-brown, grayish-brown, or yellow loose, porous coarse sandy loam underlain, to a depth of 3 feet, by grayish-brown or gray fine sand or coarse sand beneath which is stratified gravel and sand. Considerable rounded gravel is present in places on the surface and throughout the soil. The lower part of the subsoil or the substratum is rich in gravel. The gray color becomes more pronounced with depth. The soil is porous and loose to a depth of 3 feet, and drainage is good or excessive. The material is acid or very acid.

This soil is fairly extensive in the northern part of the area surveyed. The relief is kamy, knobby, steep, and broken. Much of the soil occupies the breaks from the nearly level Merrimac soils to the drainage ways. The soil material consists of stratified sand and gravel laid down by water action.

This soil is poor in organic matter and, owing to the surface relief, is not well suited to farming. Little or none of it is cultivated. The original timber growth has been removed, but considerable second growth is appearing. The soil is best suited to reforestation and, possibly, to use for pasture land. Its agricultural value is very low, and it is valued principally for the timber.

PALMYRA GRAVELLY LOAM

In cultivated fields the surface soil of Palmyra gravelly loam, to an average depth of 8 inches, is brown, light-brown, or grayish-brown, mellow, friable gravelly loam. The gravel content is high. The subsoil, to a depth of 18 or 20 inches, is yellowish-brown or light-brown well-oxidized and friable gravelly loam. This is underlain by grayish-brown or brownish-gray less oxidized gravelly loam. The lower part is grayer in color and is less weathered. The substratum consists of stratified beds of gravel and sand. Lime is abundant in the lower part, and when the gravel is exposed the lime acts as cementing material and forms a gravelly hardpan. White coatings of lime are common on the rounded gravel in the lower part of the subsoil, and the materials are highly calcareous. The material is friable and crumbly to a depth of 3 feet.

All of this soil is gravelly and locally rounded stones are present in large quantities. The gravel and stone do not interfere with cultivation. In a few areas the material is more sandy. Some areas north of Herkimer and near Poland and elsewhere in that section contain considerable fine sandy material, representing the wash from the adjacent fine sandy loam soils.

This soil is extensive and is considered one of the best in the county for general farming. It occurs on the broad terraces or outwash plains at the headwaters of Unadilla River in the southwestern corner of the county, on some small areas of terrace lands in the towns of Columbia, Warren, Stark, Danube, Little Falls, German Flats, Litchfield, bordering Mohawk River near Herkimer, and north of Herkimer along West Canada Creek and some of its tributaries. The largest areas are in the towns of Winfield, Herkimer, German Flats, Fairfield, and Newport.

Areas of this soil are generally smooth, gently sloping, or undulating and practically all are favorable to intensive cultivation. The elevation ranges from 450 to 1,300 feet above sea level. Surface drainage is fair or good, and internal drainage is good, owing to the friability of the subsoil.

The parent material consists largely of limestone, influenced somewhat by shale and sandstone. The surface soil is neutral or slightly acid, but considerable lime is present at a depth of 20 or 30 inches, and the stratified gravel is rich in lime. The soil is only fairly rich in organic matter. Palmyra gravelly loam is the most extensive of the terrace soils of the area and is considered one of the most productive of various crops. It is fairly well located with reference to markets. Considering the friability of the surface soil and subsoil, it is fairly retentive of soil moisture. Crops do not suffer from lack of moisture.

Between 90 and 95 per cent of this soil is under cultivation or is used for pasture land. A small part is forested. The principal crops are corn, potatoes, timothy and clover, alfalfa, oats, cabbage, peas, and truck crops. Corn yields from 8 to 12 tons of silage to the acre, oats from 35 to 60 bushels, hay 2 or more tons, and cabbage, potatoes, and truck crops return good yields. Most of the farms are well cared for, and the farmers are apparently prosperous. Crops of corn, oats, potatoes, and hay are rotated on this soil. All available manure is applied, and some farmers use lime for alfalfa.

The current selling price of this soil is from $75 to $100 or more an acre, depending on improvements and location with reference to markets.

DUNKIRK SILTY CLAY LOAM

The surface soil of Dunkirk silty clay loam, to a depth of 6 or 8 inches, is light brown or grayish brown, the gray color being very pronounced when the soil is dry. The texture is typically silty clay loam, though in places it is heavy silt loam or silty clay. The material varies from smooth to granular and is commonly very sticky when it is wet or moist. The upper part of the subsoil, to a depth of 18 or 20 inches, is mottled gray and rust brown, with a little yellow. It is granular and more compact silty clay loam or silty clay. The mottled layer may be thinner than typical and is underlain, to a depth of more than 3 feet, by grayish-brown, gray, or slightly bluish and pinkish, heavy, plastic, compact, impervious clay. In the lower part of the layer there are some white streaks or accretions of lime. Near a depth of 3 feet the soil is calcareous. The underlying substratum consists of stratified beds of clay, silt, and fine sand.

As a whole, this soil is very uniform in texture, though a few patches of silt loam are included. The soil is extensive in Mohawk Valley, in the towns of Manheim, Little Falls, Fairfield, and Herkimer, and some areas are in Danube and Stark Towns. The largest areas are east of Little Falls in Mohawk Valley, and north and northeast of Herkimer.

Areas of this soil are typically undulating or gently rolling, but some slopes near streams are steep and broken, owing to erosion. Some areas occupy smooth or nearly level old lake plains or bench-like land in which the slope is very gradual. The elevation ranges from 450 to 900 feet above sea level. Surface drainage is fair or good, but internal drainage is retarded by the compact, impervious lower subsoil layer. Some of the soil would be improved by more thorough drainage.

The parent materials consist of water-stratified deposits of silt, clay, and fine sand. They are comparatively rich in lime, as is also the lower part of the subsoil. The surface soil and the mottled layer are very acid.

Dunkirk silty clay loam is one of the extensive soils in the Mohawk Valley region and is important agriculturally. It is well located with reference to markets and roads, and most of it is well adapted to intensive cultivation. It is heavy and can not be cultivated under a wide range of moisture conditions, as it tends to bake and clod if plowed when either too dry or too wet.

Probably 90 per cent or more of this soil has been cleared and is under cultivation. The remainder includes steep slopes, eroded gullies, and second-growth forest. The principal crops, mentioned in the order of their importance, are hay, principally timothy and clover with some alfalfa, oats, corn, and some buckwheat. The hay crops do well, producing from 1½ to 2 tons or more to the acre. Oats produce from 35 to 50 or more bushels to the acre and corn from 8 to 10 tons of silage. Buckwheat yields from 20 to 25 bushels to the acre. Some potatoes are raised for home use. The heavy texture and compact structure of this soil make it unsuitable for growing potatoes.

A large part of the soil is used for pasture land, and grasses do well. All the farming is centered around dairying.

As a whole, the farmers located on this soil are prosperous. Deeper plowing, the use of all stable manures, better drainage in some places, and the use of high-grade fertilizers and lime will prove beneficial.

The current selling price of this soil varies from $50 to more than $100 an acre, depending on the location and the condition of the farm and equipment.

DUNKIRK SILT LOAM

The surface soil of Dunkirk silt loam, to a depth varying from 5 to 7 inches, is light brown, light grayish brown, or decidedly grayish in dry cultivated fields. The material is smooth, friable silt loam that is slightly sticky when wet. The upper part of the subsoil, to a depth varying from 10 to 15 inches, is light brown or mottled brown, gray, yellow, and rust brown. The material is slightly more compact, being heavy silt loam or silty clay loam. The lower part of the subsoil, to a depth of more than 3 feet, is light brown, gray, or slightly mottled gray and yellow. Some gray streaks or lime accretions are present near a depth of 3 feet. The lower substratum consists of stratified deposits of silt, clay, and fine sand. The soil is free from stone or gravel.

Dunkirk silt loam is not so heavy, sticky, and plastic as Dunkirk silty clay loam. The relief is gently rolling, undulating, or comparatively steep and broken along some of the drainage ways. Most of the soil is favorable in relief to intensive cultivation. Areas occur at an elevation of about 500 feet.

This soil is not so extensive as Dunkirk silty clay loam. It occurs principally northwest of Herkimer and near Mohawk. The farming practices are similar on the two soils, and the yields are comparable.

The same general statements in regard to the improvement of Dunkirk silty clay loam apply to this soil. The silt loam can be worked under a wider range of moisture conditions than can the silty clay loam of the series.

HERKIMER SILT LOAM

The surface soil of Herkimer silt loam, to a depth of 10 or 12 inches, is dark-brown, dark grayish-brown, or dark slate-colored silt loam containing some fine dark-colored shale fragments. The upper part of the subsoil, to a depth varying from 20 to 24 inches, is slightly lighter-brown or grayish-brown slightly compact silt loam. Between depths of 20 and 30 inches the upper part of the subsoil is grayish-brown friable silt loam containing considerable fine shale. The lower part of the subsoil, to a depth of more than 3 feet, is slightly more compact silt loam containing considerable fine dark-colored shale. This layer is friable and crumbly and is slightly calcareous in most places. The texture is typically silt loam though in places shaly silt loam has been included in mapping. The color of the soil material results largely from the fine shale fragments present.

Herkimer silt loam occurs in several small areas. It is found in the towns of German Flats, Herkimer, and Winfield, and along Mohawk River in the town of Manheim. A few small areas occur elsewhere.

Herkimer silt loam occupies gently sloping terraces or alluvial fans, where the smaller streams have carried materials from the uplands

and built up fan-shaped terraces in the valley. Areas are smooth, gently sloping, or undulating. The general elevation ranges from 400 feet above sea level along Mohawk Valley to about 700 feet near Starkville and to more than 1,200 feet in the town of Winfield.

The parent material is commonly dark-colored calcareous shale. The soil material in most places contains lime near a depth of 3 feet. The surface soil is neutral or slightly acid. The materials are only slightly assorted near a depth of 3 feet. Drainage is generally good, but some patches at the base of upland slopes are inclined to be seepy and wet.

This soil is easy to cultivate, the relief is favorable to intensive cultivation, and 90 per cent or more of it is farmed. The principal crops are corn, oats, timothy, clover, and alfalfa. The farming is centered around dairying, and the crops produced are used as feed for dairy cattle. Corn for silage yields from 8 to 12 tons, oats from 35 to 50 bushels, and hay 2 tons or more to the acre. Some potatoes are grown for home use and the yields are good.

This soil is highly prized for crop production and is held at prices ranging from $40 to $75 or more an acre, depending on the location and condition of the farm.

CHENANGO GRAVELLY LOAM

The surface soil of Chenango gravelly loam, to a depth varying from 6 to 10 inches but averaging about 8 inches, is light brown, brown, yellowish brown, or decidedly grayish brown in dry cultivated fields. The texture is gravelly loam, though in some small areas it is more fine sandy loam. The surface soil is friable and loose. Scattered over the surface and throughout the soil are numerous rounded waterworn gravel and some rounded stones. The gravel and stone do not interfere with cultivation. The subsoil, to a depth varying from 12 to 15 inches, is yellowish-brown or yellow, friable, well-oxidized gravelly loam. Beneath this layer is lighter-brown, yellowish-brown, or grayish-brown less well-oxidized slightly compacted gravelly loam. The lower part of the subsoil, to a depth varying from 30 to 36 inches, is brownish-gray or gray partly weathered stratified gravel and sand which continues to a depth of many feet. This material is little weathered, contains gravel in places, and is commonly very gray in color. The soil is porous and friable to a depth of 3 feet.

A few variations occur in Chenango gravelly loam. Where the small streams flow from the adjacent uplands of Mohawk soils, some of the dark-colored shale fragments have been mingled with this soil. A few small areas in swales and depressions are more poorly drained, and the soil is slightly mottled. Such areas represent the Braceville soils but are included with this soil on account of their small extent.

Chenango gravelly loam is extensive in Herkimer County, the larger areas occurring on the terrace along Mohawk River in the western part of the county, in the towns of Schuyler and Frankfort. A small area is in the town of Stark, and others occur elsewhere. The elevation ranges from 400 to 700 feet above sea level.

Areas of Chenango gravelly loam are typically gently sloping, undulating, or smooth and nearly level, becoming steeper and broken near some stream courses and breaks from the bench lands to the first bottom lands. The broader terraces slope gradually from the first bottom lands back to the foothills of the adjacent uplands.

Most of the soil is favorably located for intensive farming. Surface drainage is good, and internal drainage is good or excessive because of the loose, open structure of the subsoil. The soil is inclined to be droughty during the drier seasons.

The parent material consists of water-laid stratified gravel and sand. The gravel, sand, and stone are largely from sandstone, shale, igneous and crystalline rocks, and limestone. The materials contain little or no lime, and the soil is deficient or lacking in lime. The supply of organic matter is low.

Between 85 and 90 per cent of this soil is cultivated or used for pasture land. The principal crops are corn, oats, hay, beans, potatoes, cabbage, and truck crops. Corn yields from 10 to 12 tons of silage to the acre. Oats yield from 25 to 40 bushels, potatoes from 50 to 100 bushels, and hay, principally timothy and clover, from 1 to 2 tons to the acre. Beans, cabbage, tomatoes, and other vegetables are successfully grown.

A considerable part of this soil is used for pasture land, and some supports a forest growth. It would be improved by the use of more manure, lime, and high-grade fertilizers, and by the plowing under of cover crops. The soil is easily tilled and can be plowed under a wide range of moisture conditions.

The current selling price of this soil ranges from $50 to $100 an acre. Most of it is only a few miles east of Utica and is well located with reference to roads and markets.

CHENANGO FINE SANDY LOAM

The surface soil of Chenango fine sandy loam, to a depth varying from 8 to 12 or more inches, is brown, light-brown, or grayish-brown fine sandy loam or very fine sandy loam. The material, to a depth of 3 feet, is practically free from stone or gravel. The subsoil, to a depth of 25 or 30 inches, is brownish-gray, yellowish-brown, yellow, or almost gray loose, friable fine sandy loam. The lower part of the subsoil, to a depth of 40 or more inches, is brownish-gray or gray fine sandy loam or fine sand. The substratum consists of stratified beds of sand and gravel. This soil is loose and friable and is well oxidized to a depth of 25 or 30 inches.

Chenango fine sandy loam occupies higher-lying bottom lands or terraces and old bench lands along stream courses. It is mapped principally along West Canada Creek north of Herkimer and near Middleville, but some areas are east of Utica, along the county line. Areas are smooth, gently sloping, or undulating. All of the soil is adapted to intensive cultivation. Its elevation ranges from 450 to 600 feet above sea level. Drainage is largely internal. The soil dries out badly during the drier seasons of the year.

Between 85 and 90 per cent of this soil is under cultivation to corn, oats, potatoes, and timothy and clover, and some truck crops are grown near Utica. Yields are only fair or good. The soil is adapted to the production of truck crops and potatoes. It is deficient in lime and organic matter. Applications of manure and the plowing under of green cover crops would probably prove beneficial.

The current selling price of this soil varies from $25 to $50 an acre, depending on the location and improvements.

MERRIMAC FINE SANDY LOAM

The surface soil of Merrimac fine sandy loam, to a depth of 6 or 8 inches, is brown, light-brown, or yellowish-brown friable fine sandy loam. The upper part of the subsoil is typically yellowish-brown or yellow fine sandy loam which, at a depth varying from 15 to 20 inches, is underlain by brownish-yellow, brownish-gray, or gray fine sandy loam or fine sand. The gray color is pronounced near a depth of 3 feet. The soil is loose and friable throughout. A few small, rounded gravel are on the surface and in the soil. The substratum consists of stratified sand and gravel and thin layers of clay. The soil is easily tilled and and can be cultivated under a wide range of moisture conditions.

Merrimac fine sandy loam occurs principally on terraces, bench lands, or high outwash plains, in the towns of Manheim, Salisbury, Norway, Newport, Russia, and Ohio, in the northern and northeastern parts of the area surveyed. It occurs in close association with the upland Gloucester and Hinckley soils. Areas are typically smooth, nearly level, undulating, or gently sloping and are very favorable to cultivation.

The parent material consists of stratified water deposits, mainly of granitic and crystalline rocks. It contains little or no lime, and the soil is acid or very acid. Drainage is mainly internal and, owing to the looseness and porosity of the soil, is good or excessive.

Originally all of this soil was forested with pine, spruce, hemlock, and some hardwoods. The timber has been largely removed but in places there is some second growth of pine, spruce, and poplar. Some of the steeper slopes and breaks are best suited to reforestation.

The larger part of this soil is farmed to crops of hay, corn, oats, and potatoes. A few small areas of truck crops are raised. Corn gives comparatively low yields, oats only fair, and hay, principally timothy and clover or redtop, light. Potatoes do well, but only enough for home use are grown.

This soil is poor in organic matter, and all available manures and green manures should be plowed under. It is suited to use for forestry and for pasture land.

Land values vary from a few dollars an acre to as much as $25 or $35 an acre.

MERRIMAC FINE SAND

The surface soil of Merrimac fine sand, to a depth of 4 or 5 inches, is light-brown, grayish-brown, or yellowish-brown fine sand. Some areas of slightly coarser texture are included. The soil, to a depth of 10 or 12 inches, is brown or coffee-brown loamy fine sand. The upper part of the subsoil, to a depth varying from 20 to 25 inches, is yellowish-brown or yellow fine sand or coarse sand. Near a depth of 3 feet the material is yellowish-gray or gray coarse sand. The soil is loose and porous to a depth of 3 feet. The substratum consists of stratified sand and gravel.

Areas of this soil are similar in relief to areas of the fine sandy loam of the series, being smooth, nearly level, or slightly undulating. The soil occupies terraces, bench lands, or high outwash plains. The parent material is mainly crystalline rocks, and the soil is very acid.

Little or none of this soil is farmed. The virgin timber has been removed, but a second growth of pine, beech, and maple is coming

up. Some of the land is being reforested. Mosses, horse sorrel, paintbrush, and daisies thrive on it.

Merrimac fine sand is poor in organic matter, and farm manures and commercial fertilizers are necessary for crop production. Truck crops would perhaps do well, but the areas of the soil are very remote from markets. Some of the land would produce fair crops of hay and grass. Most of the soil seems best adapted to reforestation.

This land sells at prices ranging from $3 to $15 an acre.

MERRIMAC COARSE SANDY LOAM

The surface soil of Merrimac coarse sandy loam, to a depth of 4 or 5 inches, is light-brown, grayish-brown, or brownish-gray loose, porous coarse sandy loam which is underlain, to a depth of 10 or 12 inches, by chocolate-brown or coffee-brown coarse sandy loam or coarse sand. The upper part of the subsoil, to a depth of 18 or 20 inches, is yellowish-brown or yellow coarse sandy loam or coarse sand. The lower part of the subsoil, to a depth of more than 36 inches, is gray or white coarse sand. The substratum is stratified sand and gravel to a depth of many feet. The soil is very loose and porous throughout.

Merrimac coarse sandy loam occupies the high terraces and outwash plains in the northern part of the area surveyed, occurring principally in the towns of Ohio and Russia. The origin of the soil is similar to that of the other Merrimac soils. The material is poor in organic matter and is very acid.

Little or none of this soil is cultivated. Some of it is used for pasture land and some is being reforested. It is very droughty, owing to the looseness and porosity of the material.

This soil is held principally for pasture land and for timber.

BRACEVILLE SILTY CLAY LOAM, DARK-COLORED PHASE

The surface soil of Braceville silty clay loam, dark-colored phase, to a depth of 6 or 8 inches, is dark grayish-brown or nearly black silty clay loam or silty clay. The upper part of the subsoil, to a depth varying from 15 to 18 inches, is highly mottled grayish-yellow and rust-brown, somewhat more compact and heavy silty clay or clay. Near a depth of 3 feet the material is typically gray or drab, plastic, impervious clay containing some yellowish-gray or gray stratified layers of fine sand, silt, or clay. The lower part is stratified beds of silt, sand, and clay. As a whole, the soil is free from stone and gravel, though locally it is stony or gravelly.

This soil is mapped in a few comparatively small areas in association with Chenango gravelly loam in the western part of Mohawk Valley. The principal areas are in the towns of Frankfort and Schuyler.

This soil occupies comparatively smooth or gently sloping terraces or bench lands in association with the Chenango soils. The elevation varies from 500 to 600 feet above sea level. Drainage is poor or deficient. There was little or no lime in the parent material, and the soil is acid or very acid to a depth of 3 feet.

Not more than 50 per cent of this soil has been cleared and used for farming. Some of the better-drained areas are used for growing corn, oats, and hay, principally timothy, clover, and redtop. In the drier years some of the better-drained land produces fair yields of

oats and corn, but commonly yields are only fair. Hay crops do better than cultivated crops. The forested areas support a growth of elm, cedar, maple, and water oaks. Most of the soil is best suited for use as pasture land or hay land.

The soil is badly in need of more thorough drainage. Applications of manures and lime would also be beneficial.

CLYDE SILTY CLAY

The surface soil of Clyde silty clay, to a depth of 6 or 8 inches and locally to a depth of as much as 10 inches, is dark grayish-brown or nearly black silty clay or clay. The lower part of the subsoil, to a depth varying from 30 to 36 inches, is gray or drab, plastic, impervious clay mottled somewhat with yellow and rust brown. The mottles often increase with depth. The surface soil is typically darker colored than that of Crosby silty clay loam. The lower part of the subsoil is typically gray, drab, or even bluish, compact, impervious clay.

This soil is distinguished by its dark-colored surface material and plastic, impervious clay subsoil.

Clyde silty clay is not extensive in this county, the principal areas being mapped in the towns of Newport and Danube, and a few smaller areas being mapped elsewhere. The soil occupies flat or poorly drained areas in close association with Crosby silty clay loam. Areas are smooth, nearly level, or flat. Some areas occur along the headwaters of small drainage ways.

The parent material consists of lake-laid deposits containing some glacial till material in the lower part in places. The soil material, for the most part, is free from stone or gravel. It differs from that of the Crosby soils principally in that the material is darker colored or nearly black and consists more largely of lake-laid deposits of silt and clay. In a few places the lower part of the subsoil contains some lime, but as a whole the soil is acid.

Surface drainage is poor or deficient, because of the flat, smooth surface, and internal drainage is slow or deficient because of the plasticity and imperviousness of the subsoil. The soil is fairly rich in organic matter. Areas are badly in need of drainage, which in many places would be very expensive to establish because of the lack of a suitable outlet for ditches. The soil bakes and cracks badly if it is cultivated when too dry and clods if it is plowed too wet.

The larger part of this soil has been cleared, but very little of it is cultivated, on account of the poor drainage. It is used for pasture land, to which use it is well suited. A little hay is grown. A few scattered trees are present.

MUCK

In this county muck is variable in depth, color, and character of material. The thickness of the deposit varies from a few inches to 3 or more feet.

As it is mapped in the southern part of the county, it is blackish, carbonized, granular, woody peat to a depth of a few inches. This grades to dark-brown, granular, woody, fragmental material containing roots of vegetation. This layer, at a depth varying from 12 to 24 inches, is underlain by dark-brown woody material, clayey and silty at lower levels and having a brownish-gray color. This rests

on gray, coarse, gritty, gravelly material. The material below a depth of 2 feet is more nearly gray, is gritty or sandy, and contains gravel and cobbles. It effervesces at the contact point between the layer of organic matter and the mineral subsoil, showing the presence of lime. In some places the surface soil, to a depth varying from 12 to 15 inches, is dark-brown or nearly black woody muck which rests on dark-brown, more decomposed muck continuing to a depth of 20 or 24 inches. This layer rests on marl or travertine.

The description given above applies to the muck deposits in the Cedarville swamp area in the southwestern part of the county. South and southwest of Jerusalem in the town of Litchfield, the muck is deeper, is more completely decomposed, and is in many places as much as 3 feet thick. The underlying mineral material is rich in lime, as is shown by its effervescence with acid.

Near Jordanville, the material differs somewhat from that in the Cedarville swamp area. The surface soil, to a depth of 1 foot, is dark brown and contains woody or fibrous material from the surface vegetation. Between depths of 1 and 2 feet is a layer of brown material grading to gray silty clay, 3 or 4 inches thick. This material contains organic matter and rests on brown, granular, fine, fibrous peat derived from sedges. Between depths of 2 and 3 feet, the material is compact, brown, fibrous peat containing woody fragments from roots. Between depths of 3 and 4 feet is greenish-brown or light olive-green finely divided peat containing some small roots, which grades to gray shells and travertine or marl deposits. Between depths of 4 and 5 feet is heavy, plastic, bluish-gray clay which effervesces freely with hydrochloric acid.

The muck mapped in the southern part of the area is, as a whole, not well decomposed and is somewhat woody and fibrous in places. The thickness of the deposit is variable, commonly being from 20 to 24 inches. The muck rests on gray mineral matter, marl or travertine deposits, containing lime.

The muck in the northern and northeastern parts of the area surveyed is similar, to a depth of 2 feet, to that in the areas in the southern part. However, the mineral matter does not contain any lime to a depth of 3 feet, and it rests on gravel and stone and mottled gray and brown gritty clay. These areas occur in association with the Gloucester soils.

The largest areas of muck in this area are in the southern part, in association with the Honeoye and Ontario soils. A large area is mapped along Spruce Creek in the northeastern part of the area. Muck occupies swales or depressions where natural drainage is poor. The water table is commonly within a few inches of the surface, and the soil remains in a moist or saturated condition much of the time. The surface is flat or nearly level and does not favor run-off of surface waters.

In its natural state muck supports a growth of cedar, maple, elm, ironwood, alder, dogwood, white pine, tamarack, grasses, and other water-loving vegetation. Practically none of the muck in this county has been cleared for cultivation. Some has been cut over and used for pasture land. In its present state, it has little or no agricultural value. All of it is badly in need of proper drainage.

There is no active demand for lands of this class.

MEADOW

Meadow is a miscellaneous classification of soil representing a poorly drained condition rather than a definite soil type.

Meadow, where it occurs in association with the Honeoye and Ontario soils, is more poorly drained than the Lyons soils and remains wet or moist much of the time. The dry surface soil is commonly dark brown, brownish gray, grayish brown, or gray, and the texture is commonly silty clay loam or silty clay. In some places the color is nearly black, and the immediate surface soil is much like peat or well-decomposed muck. The subsoil is highly mottled gray, yellow, and rust brown. The gray becomes more pronounced with depth. Near a depth of 3 feet the material is compact mottled silty clay or clay.

Where this soil occurs in association with the Gloucester, Merrimac, and Whitman soils, the surface soil is dark-brown or nearly black loam or clay loam. The subsoil is highly mottled gray, yellow, and rust brown, and near a depth of 3 feet the material is more gray or drab. The structure is usually open, and the texture approaches sandy loam or sandy clay loam. There is little compaction in the deeper material.

Meadow occurs in association with the Lordstown, Volusia, and Canfield soils. The material somewhat resembles that of the Chippewa soils. The surface soil is commonly dark-brown or nearly black silty clay. The subsoil is highly mottled, the gray becoming more pronounced with depth and the material becoming heavier and more plastic silty clay or clay.

Areas of this soil are smooth or nearly level and occupy depressions or swales in association with the more rolling uplands. The drainage is poor or deficient. Seepage is common, and the ground is usually wet or boggy much of the year.

In the northern part of the area surveyed the narrow first-bottom lands are low and subject to frequent overflow and are wet or seepy much of the time. Such areas have been included with meadow in mapping. The material consists of stream wash from the adjacent uplands and is commonly very dark to a considerable depth. Near a depth of 3 feet the material is highly mottled and shows the effects of poor drainage. The finer soil material ranges from smooth silt loam to fine sandy loam in texture. These bottom lands are commonly very narrow and extend along the streams.

Very little of the meadow is under cultivation, largely because of its poorly drained condition. Some of the areas are forested with cedar, elm, swamp maple, poplar, spruce, birch, willow, ash, and other swamp vegetation. Grasses do well during the summer months and much of the land is used for pasture. This class of land is badly in need of drainage. Most of the areas are small.

In its present condition meadow is best suited to use for forestry and for pasture.

ROUGH STONY LAND

This classification of soil includes the rougher and more stony areas that have little or no agricultural value. Outcrops of rock are common, and in some places cliffs, bluffs, or steep precipices occur. The soil material is similar to that of the Farmington soils in the

southern part of the county and is residual, principally from limestone. In the northern part of the county the material is similar to that of the Gloucester soils, being derived from igneous rocks.

This classification of soil is extensive and occurs as comparatively narrow areas along outcrops of the underlying rock and the steeper and more broken land on both sides of the narrow gorge along Mohawk River at Little Falls. In the northern and northeastern parts of the area surveyed, it occupies the steep, broken ridges where rock outcrops are common.

Little or none of this land has been cleared. Some areas support a stunted growth of trees and virgin timber of pines, oaks, and hemlock. Some small patches of the soil might be cultivated.

This class of land has little or no value for the production of crops. It is best suited to use for forestry, but some areas have some value for grazing.

STEEP BROKEN LAND

This class of land represents a condition of surface relief. Its outstanding feature is its steep and broken surface. It occurs along streams that have carved deep gorges in the uplands. Areas are in the gorge along Gulf Stream south of Ilion, along Moyer Creek southwest of Frankfort, along Fulmer Creek, Nowadaga Creek, East Canada Creek near Ingham Mills, Sterling Creek in the town of Schuyler, and elsewhere throughout the area. Some areas occupy steep broken slopes between the uplands or terrace lands and the lower-lying bottom lands. The material is variable but in the main is similar to that in association with which it occurs.

This class of land has little or no agricultural value, owing to its steep, broken surface. It is best suited to use for forestry. Erosion has been very active and is still going on. It is essential to keep such areas covered with timber or grass to retard erosion.

SUMMARY

Herkimer County is in the east-central part of New York along the Mohawk River Valley. The area surveyed covers 720 square miles or 460,800 acres. All of the county was not covered in this survey, as the northern part is in the Adirondack State Park and is largely forested and State-owned land.

The relief of the area surveyed varies from flat and nearly level to steep, broken, and even mountainous. The elevation varies from less than 320 feet above sea level to more than 2,000 feet above.

Mohawk River and its tributaries drain the larger part of the area into Hudson River. Some areas are badly in need of more thorough drainage.

The population of the county was 64,962 in 1920, and only 32.3 per cent of this number were classed as rural.

Railroad and transportation facilities are good for most of the area. The public-road system is extensive, and the main roads connecting the principal towns are improved.

Marketing conditions are good. The manufacturing centers consume a large percentage of the crops, and dairy products, mainly milk, are shipped to New York City.

The climate is characterized by long, rather severe winters, and short, pleasant summers. The precipitation is rather evenly distributed throughout the year. The length of the frost-free season varies from 123 days at Salisbury, which is representative of much of the higher-lying uplands, to 154 days at Little Falls, which is representative of the valley section.

The first settlers came into Mohawk Valley in 1722. Agriculture was the most important industry for many years.

The farming carried on in Herkimer County is centered around dairying, mainly for milk production. According to the 1920 census, the leading crops, in the order named, in 1919 were: Hay and forage crops, oats, potatoes, corn, buckwheat, barley, and rye. Other crops are of minor importance. Garden vegetables are grown near the manufacturing centers, and some fruit is grown for home use.

There is a general recognition of the adaptability of soils to certain crops, and crop rotation is carried on to some extent. The use of manures, fertilizers, and lime is common and cultural practices are good. General prosperity is fair or high.

Land values range from $2 to $5 for the poorer land to more than $100 for the better farming land. The census report of 1920 gave the average land value as $26.30 an acre.

The soils of the area vary widely in color, texture, structure, character of parent-forming material, and other characteristics. The soils are divided into 12 main groups on the basis of the mode of formation, lime content, and such factors. There were 27 soil series, embracing 38 soil types, 5 phases, and 4 types of miscellaneous material mapped in this area.

The Papakating soils are poorly drained and are used only for hay and pasture land. The Palmyra and Herkimer soils are well drained and productive. The Dunkirk soils are fairly well drained on the surface, but internal drainage is slow. They are well adapted to the production of hay and oats. The Chenango soils are productive of all crops except legumes. The Braceville soils are too poorly drained to be good farming soils. The Merrimac soils are poor in organic matter and have, in general, a low agricultural value. The Clyde soils are poorly drained and are used almost wholly for pasture land. The Honeoye soils are the important alfalfa soils in the county, and are well drained. The Ontario soils are utilized largely for the production of hay and forage crops. The Lyons soils are poorly drained and are used largely for pasture land. The Crosby soils are well drained and are used largely for hay land.

Members of the Lordstown series are well drained and produce fair or good crops. The Volusia soils are badly in need of drainage in most cases and are best adapted to hay crops. Soils of the Canfield series are fairly well drained and are used for the production of hay and oats.

The Allis soils are shallow and are used for pasture land and for the production of hay. The Lockport soils are best adapted to use for hay and pasture land. Soils of the Mohawk series are well drained and are used largely for growing crops. They give fair or good yields. The Brookston soils are poorly drained and are used largely for pasture land. Good crops are raised on the Farmington soils, unless the underlying stone is too near the surface. The Wooster soils are deep and are productive of hay and oats. The

Gloucester soils are poor in organic matter but, where not too stony, give fair yields of oats, potatoes, and hay. The Whitman soils are poorly drained and are used exclusively for pasture land. The Groton soils are well drained and where not too broken are good farming soils. The members of the Otisville series are well drained and are well adapted to truck crops where the relief is not too steep. The Hinckley soils are loose and porous, are inclined to be droughty, and are not considered very productive.

Muck is poorly drained, and little or none of it is used except for pasture land.

The miscellaneous classes of soil are steep broken land, rough stony land, and meadow.

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[PUBLIC RESOLUTION—No. 9]

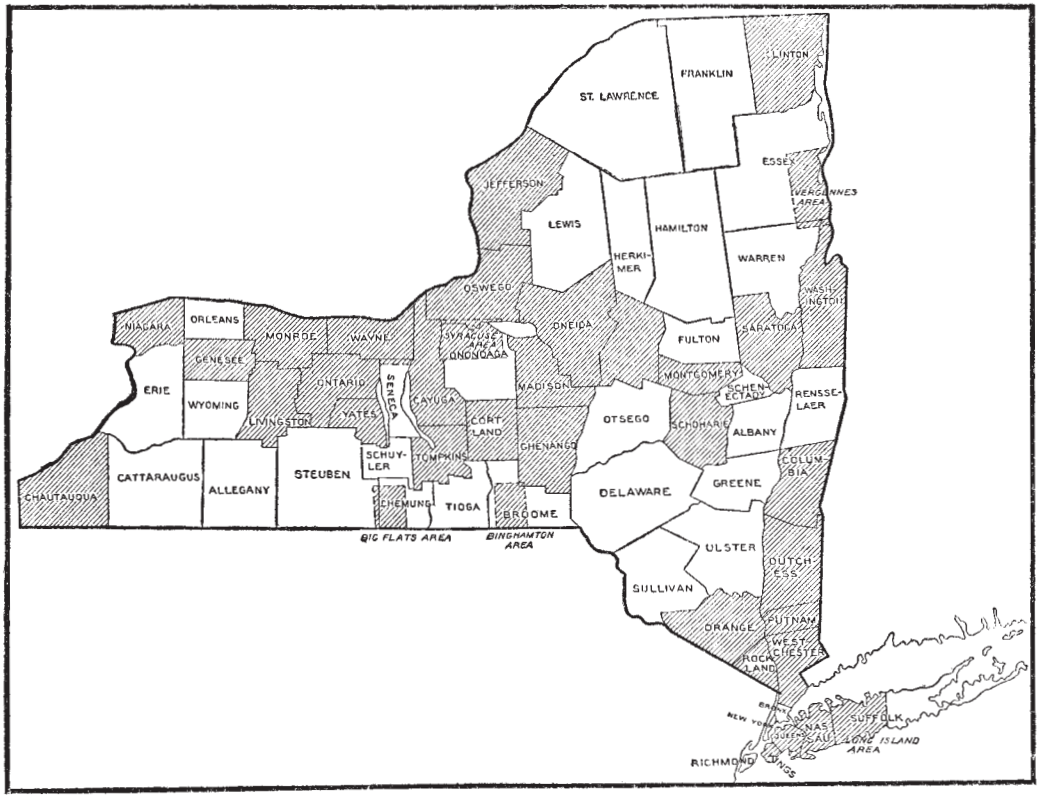
JOINT RESOLUTION Amending public resolution numbered eight, Fifty-sixth Congress, second session, approved February twenty-third, nineteen hundred and one, "providing for the printing annually of the report on field operations of the Division of Soils, Department of Agriculture."

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, and on July 1, 1927, the Bureau of Soils became a unit of the Bureau of Chemistry and Soils.]



Areas surveyed in New York, shown by shading

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