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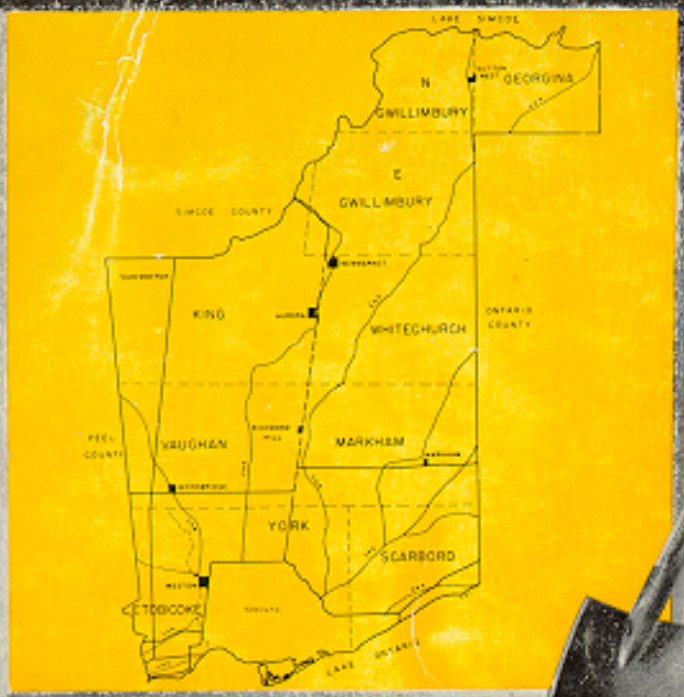

SOIL SURVEY OF YORK COUNTY

REPORT NO. 19 OF THE ONTARIO SOIL SURVEY

Experimental Farms Service, Canada Department of Agriculture and the Ontario Agricultural College

SOIL SURVEY OF YORK COUNTY

by

D. W. HOFFMAN

Experimental Farms Service

and

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GUELPH, ONTARIO

March, 1955

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Experimental Farms Service, Canada Department of Agriculture and the Ontario Agricultural College

PREFACE

The soils of York County were surveyed during the summer of 1950.

Other counties and districts surveyed and maps published are as follows:

1. *Norfolk* ..... *Map only*
2. *Elgin* ..... *Map only*
3. *Kent* ..... *Map only*
4. *Haldimand* ..... *Map only*
5. *Welland* ..... *Map only*
6. *Middlesex* ..... *Map only*
7. *Carleton* ..... *Map and Report*
8. *Parts of Northwestern Ontario* ..... *Map and Report*
9. *Durham* ..... *Map and Report*
10. *Prince Edward* ..... *Map and Report*
11. *Essex* ..... *Map and Report*
12. *Grenville* ..... *Map and Report*
13. *Huron* ..... *Map and Report*
14. *Dundas* ..... *Map and Report*
15. *Perth* ..... *Map and Report*
16. *Bruce* ..... *Map and Report*
17. *Grey* ..... *Map and Report*
18. *Peel* ..... *Map and Report*
20. *Stormont* ..... *Map and Report*

ACKNOWLEDGEMENTS

The final copy of the Soil Map for lithographing was prepared by the Cartographic Section of the Division of Field Husbandry, Soils and Agricultural Engineering, Central Experimental Farm, Ottawa. The Canada Department of Mines and Technical Surveys, supplied the base maps.

Helpful suggestions pertaining to classification and correlation, and assistance in critically reviewing the manuscript came from Dr. A. Leahey, and Dr. P. C. Stobbe, Canada Department of Agriculture. Thanks are also due to Mr. R. E. Wicklund, Supervisor of Soil Surveys in Ontario, for assistance in the preparation of this report.

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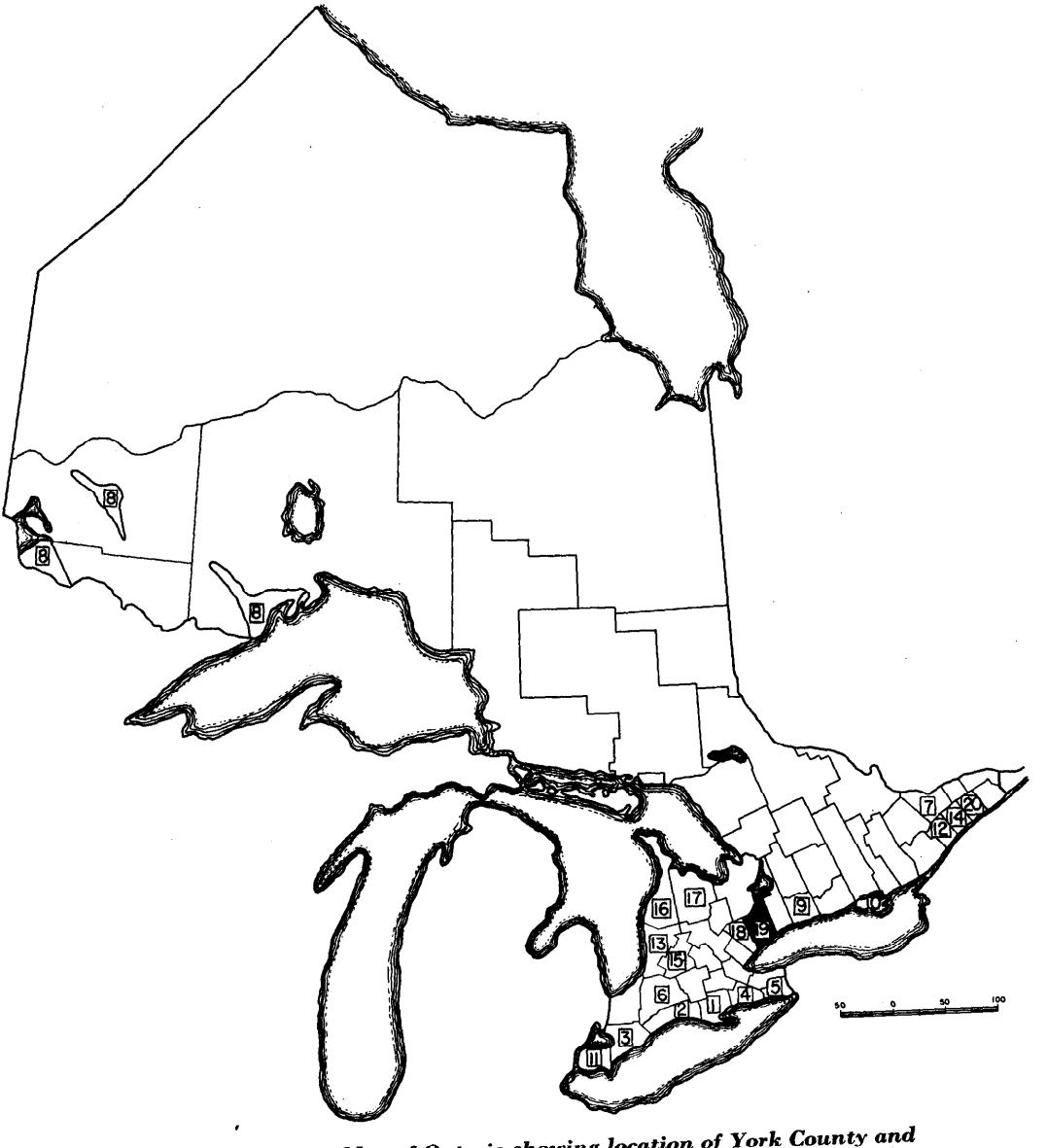


FIG. 1—Outline Map of Ontario showing location of York County and other areas for which soil maps have been published.

Soil Survey Report of York County, Ontario

by

D. W. HOFFMAN *and* N. R. RICHARDS

INTRODUCTION

The soils of York County have been classified and described. The map and report presented herewith records the inventory of the soil resources of the County. In seeking information regarding the soils of the County, both the map and report should be used.

The Map

The map presents all the natural features of the County such as cities, towns, railways, roads, post offices, schools, lakes, rivers as well as the soils information. The different soil areas are separated by solid black boundary lines and the kind of soil is identified on the map by the use of colours, letter combinations and symbols, the key for which appears at the bottom of the map. The lot numbers and concession numbers are recorded on the map making it possible to locate the farm boundaries accurately. In studying the map, it should be kept in mind that the scale of the map (one inch to the mile) prohibits the presentation of sufficient detail to show soil variations of very small acreages (i.e. — less than twenty acres).

The Report

The report is divided into several sections, the copies of which are listed in the table of contents. Information gathered and observations made during the survey are recorded. The formation, capabilities and limitations of the different soils are discussed.

The map and report, when properly used, can provide information of valuable assistance in estimating the productivity of the soils encountered in an area.

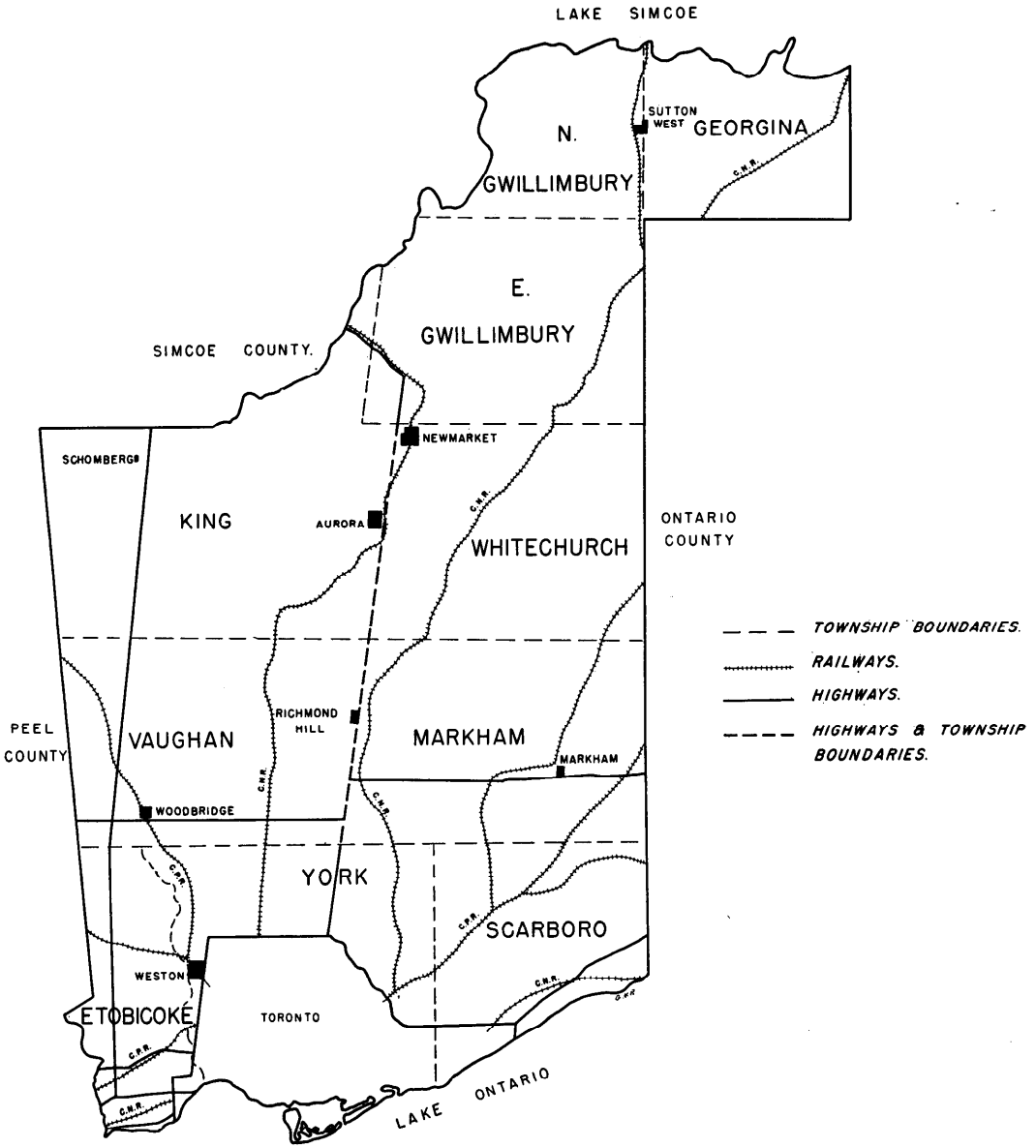


FIG. 2—Outline Map of York County showing townships, towns, railways, etc.

PART I

GENERAL DESCRIPTION OF THE AREA

Location and Area

York County lies in south-central Ontario and is bounded on the south by Lake Ontario, on the east by Ontario County, on the north by Lake Simcoe and Simcoe County, and on the west by Peel County. Toronto, the capital of the Province of Ontario, is situated on the shores of Lake Ontario and occupies a large section of the southern part of the County.

According to the 1951 Census the total land area is 564,480 acres or 882 square miles. Of this, 403,304 acres, or approximately 71 per cent, is occupied farm land, the remainder being taken up by roads, centres of population, etc.

County Seat and Principal Towns

The city of Toronto, a large industrial centre, is a fine marketing place for all agricultural products and has excellent facilities for distributing farm goods. With a population in excess of 696,000* persons, Toronto is a leader in the fields of education, arts and science.

Bordering the city of Toronto are the towns of Leaside (16,233), Mimico (11,342), New Toronto (11,194) and Weston (8,677) and the villages of Forest Hill (15,305), Long Branch (8,727), and Swansea (8,072). These centres are expanding in size and all are industrially active.

Newmarket (5,356) is the County seat and it is here that the office of the Agricultural Representative is situated. Located within the town are creameries, planing mills and furniture factories, etc., which provide work for many of the town's inhabitants.

Other towns and villages, namely Aurora (3,358), Markham (1,606), Richmond Hill (2,164), Stouffville (1,695) and Sutton (1,168) provide transportation facilities for agricultural products and play an important part in the life of the rural areas.

Population and Racial Origin

The total population of the County according to the 1951 census is 1,176,622. Approximately 4 per cent (42,106) of the people are rural dwellers while 96 per cent (1,134,516) are classified as urban population.

Since 1881 there has been a rapid increase in the population of York County, due to a large extent, to the growth of many large industries in the southern part of the County. The trend in population is shown graphically in Figure 3.

Although a large proportion of the population of York County is of British origin other racial origins are well represented. The following table shows the proportion of population in the County according to racial origin:

* Population figures from 1951 Cenus of Canada.

POPULATION, 1951 CENSUS

Total Population	1,176,622	100%
Canadians of British origin	861,019	74%
Canadians of French origin	33,252	3%
Canadians of German origin	21,888	2%
Canadians of Italian origin	28,428	2%
Canadians of Jewish origin	59,506	5%
Canadians of Netherland origin	14,953	1%
Canadians of Polish origin	27,387	2%
Canadians of Ukrainian origin	29,724	3%
Other origins	100,462	8%

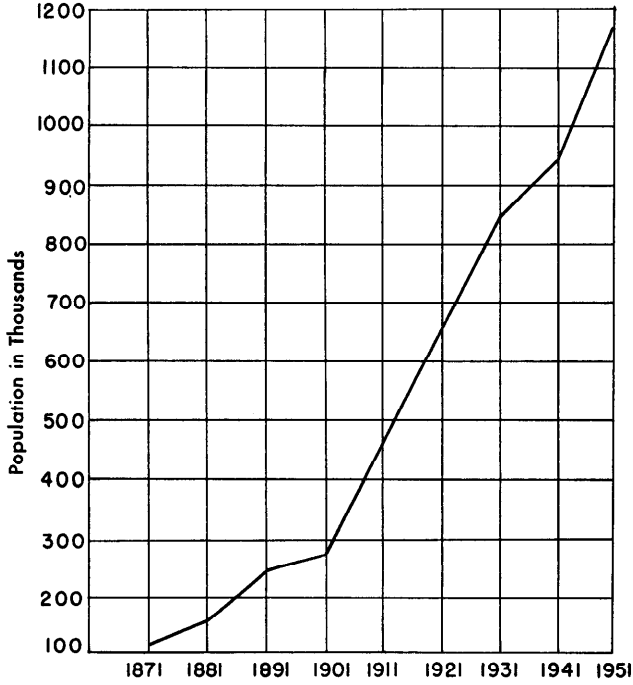


FIG. 3—Trends in population for York County.

Transportation and Markets

The city of Toronto provides one of the largest markets for agricultural produce in Canada and consequently most of the farm products from the surveyed area are marketed there.

Railways, highways, secondary roads and the Great Lakes offer first class transportation. The main lines of the Canadian National and Canadian Pacific railways pass through the area. Besides the main through traffic, many local trains provide travelling and shipping facilities within the County.

The main highways to Hamilton on the west and Montreal on the east, pass through the southern part of the County. Numerous highways and County roads in York County carry the thousands who seek rest and recreation in Ontario's vacation land to the north.

Transportation by water is available since the harbour at Toronto provides shipping facilities. With the development of the St. Lawrence Seaway it is expected Toronto harbour will assume even greater importance as a shipping centre.

PART II

FACTORS AFFECTING THE FORMATION OF YORK COUNTY SOILS

The soil is a natural body found at the surface of the earth. It occupies a layer varying in depth from a few inches to several feet and consists of a mixture of minerals, water, air and organic matter which occur in varying proportions. Soils are formed through the action of climate and organisms on disintegrated rock particles. Within a climatic zone differences in soil development occur due to local environmental factors such as soil parent material, drainage and differences in vegetation. The length of time a soil has been in the process of development will also account for differences. The action of these factors results in a soil which exhibits a number of well defined horizons. The cumulative effect of all environmental factors is reflected in the soil profile.

Soil Materials

The underlying bedrock formations in York County include the Trenton limestone and the Billings, Dundas and Meaford shales of Ordovician age. In some localities rock exposures are so infrequent that mapping of the boundaries of bedrock formations is uncertain. For this reason the boundary between the Billings and Dundas formations has not been established. The composition of the geological formation is shown in Table 1.

TABLE 1

GEOLOGICAL FORMATIONS IN YORK COUNTY

	Rock Formation	Composition
Paleozoic — Ordovician	Trenton	Limestone
	Billings	Shale
	Dundas	Shale, limestone
	Meaford	Shale, limestone calcareous sandstone, arenaceous shale

Drift deposited by the melting ice during the Wisconsin glaciation covers a large part of the County. The depth of drift is variable but is usually thick. The deposits contain a fairly large proportion of fragments derived from the underlying bedrock.

The unsorted material deposited by ice is generally referred to as till and is an accumulation of particles of all sizes, from clay and silt to stones and boulders of varying sizes. Loam textured till occurs most commonly in Scarborough and Markham Townships and the area north of the Town of Newmarket. In Scarborough and Markham Townships the till consists largely of shale with smaller amounts of limestone, while in the northern part of the County, limestone predominates. Clay loam and clay textured tills occur in King and Vaughan Townships. Those in King Township consist largely of limestone materials with shale intermixed while those in Vaughan Township consist largely of shale with limestone intermixed. The till materials occur in smooth gently sloping to irregular steeply sloping plains. On the loam textured materials drumlinoid features predominate.

Fluvio-glacial deposits are found in the middle of the County and consist of a poorly sorted mixture of sand, gravel and till in which sand is the dominant component. Pockets of gravel or till usually occur in the sandy materials. The fluvio-glacial materials have irregular steeply sloping topography and are calcareous.

Stonefree outwash sands occupy large areas in the northern and southern parts of the County. Ranging in topography from smooth very gently sloping to smooth moderately sloping, they are usually calcareous, coarse textured, and stonefree. Frequently these deposits are underlain by clay at depths of three feet and less. The depth to free carbonates is greater in the sandy materials occurring in the southern part of the County than in those occurring in the central and northern part of the County.

The stonefree outwash materials are used effectively for building and construction purposes.

Stonefree clay deposits are often found close to rivers, streams and other bodies of water. Such areas occur near Aurora and Newmarket and range in topography from smooth gently sloping to smooth moderately sloping. The materials effervesce freely with dilute acid.

The material found in a part of Vaughan and Markham Townships consists of three feet and less of lacustrine clay underlain by calcareous clay till. The lacustrine deposits usually contain a small amount of grit.

Organic materials occur in fairly large areas, particularly in the northern part of York County. They are largely the remains of decayed trees, herbs and mosses. The chemical composition of the organic materials varies depending on the state of decomposition and the origin of the materials. They may be divided into two classes, peat and muck. The muck occurs in areas where decomposition has been rapid and is the only organic material mapped in York County.

The distribution of the soil materials of York County is shown in Figure 4.

SOIL MATERIALS

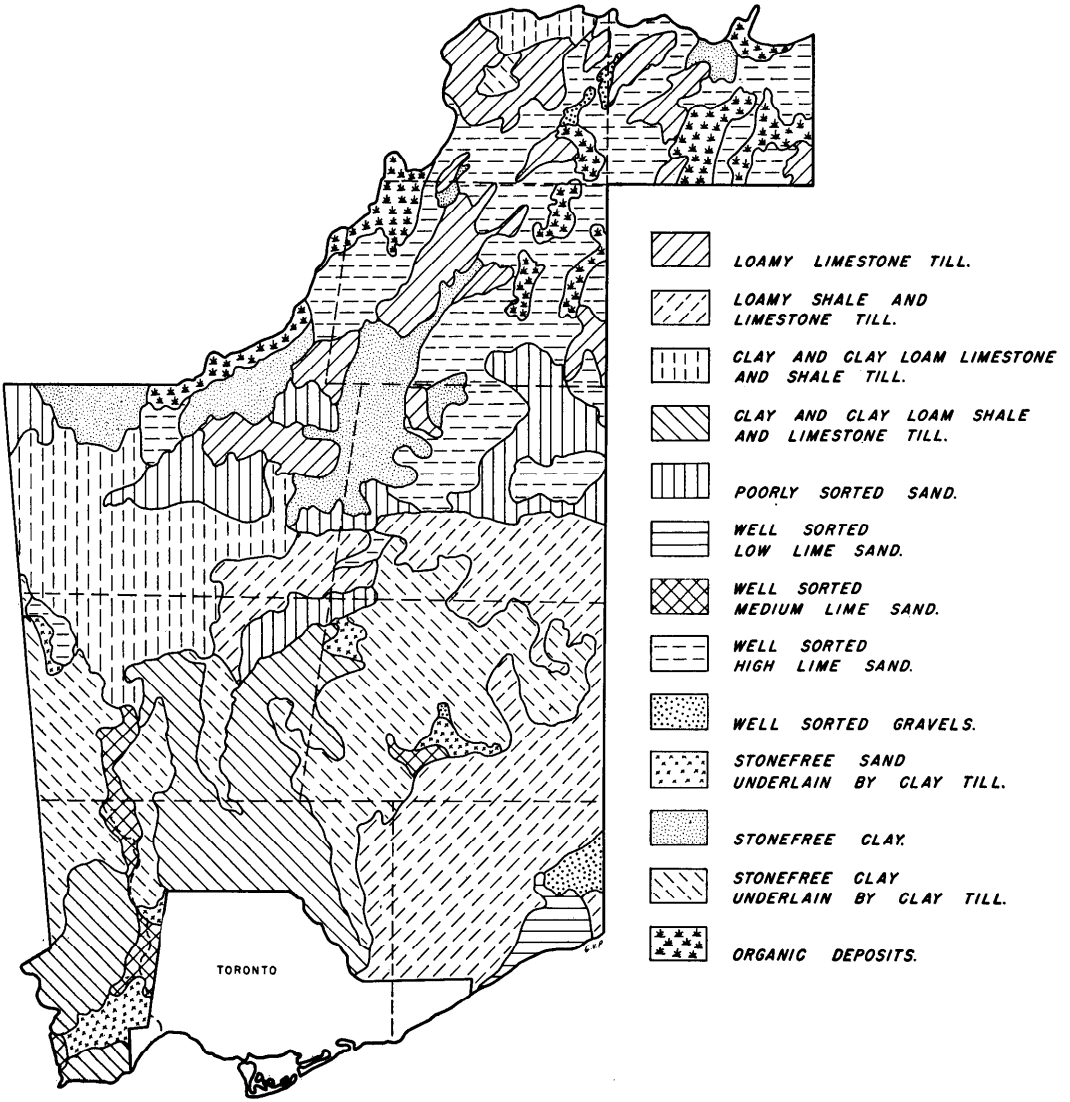


FIG. 4—Outline Map of York County showing distribution of soil materials.

NATURAL VEGETATION

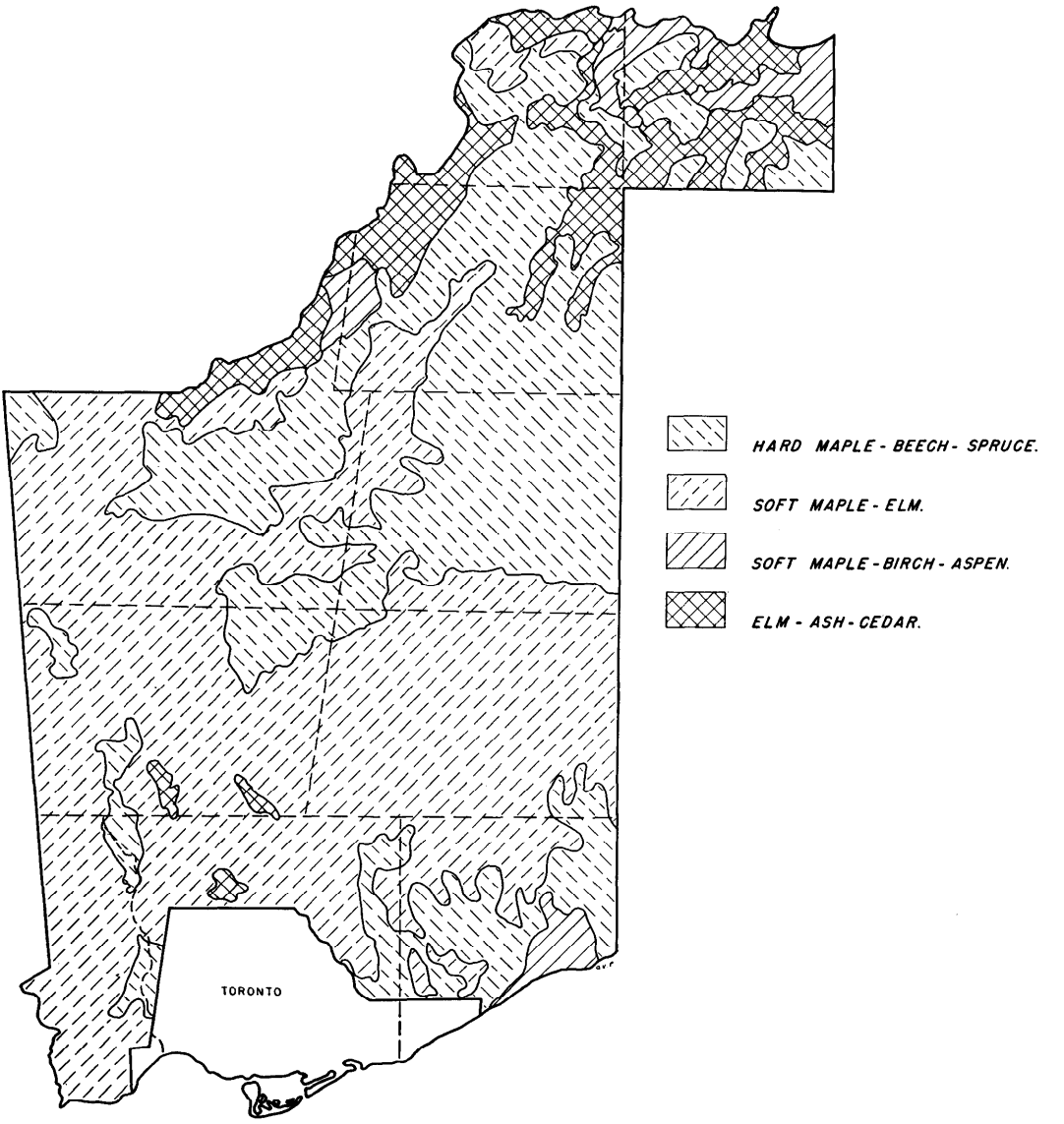


FIG. 5—Outline Map of York County showing distribution of tree associations.

Natural Forest Vegetation

Soil and climate determine the type of vegetation found in an area. Once established the vegetation affects soil development.

Before settlement, York County was covered with deciduous and coniferous trees. Since that time most of the County has been cleared making it difficult to reconstruct the original vegetative cover. Where woodlots remain, deciduous trees predominate with coniferous trees occurring to a lesser extent.

According to Halliday*, York County is situated within the Huron-Ontario section of the Great Lakes-St. Lawrence Region. No attempt is made in this survey report to list the different species of trees found in the area. There are, however, certain combinations of species that occur more frequently on some soils than on others. Those combinations that are found most frequently are discussed below and their distribution is shown in Figure 5.

Maple and beech are the dominant trees occurring on the well-drained soils.

Sugar Maple - Beech - Spruce

This association occurs on the well drained medium and coarse textured soils. Sugar maple and beech occur most frequently, spruce being found more often on the sandy soils. Other species included in the association are basswood, white ash, and some oak. Pine occasionally occurs on the light textured soils.

Soft Maple - Elm

The soft maple, elm association appears most frequently on the heavy textured well drained soils and on all imperfectly drained soils. This association is most commonly found in the central and southern parts of the County.

* Halliday, W. E. D. — A Forest Classification for Canada; Canada Dept. of Mines and Resources Forest Service, Bulletin No. 89, 1937.

Elm - Ash - Cedar

The poorly drained soils of York County support a vegetative cover that is chiefly made up of elm, ash, and cedar. Other species that are included in this association are silver maple and an occasional hemlock.

Soft Maple - Birch - Aspen

This association is commonly found on the imperfectly drained soils, developed on well sorted sandy outwash materials. The aspen and birch are often part of a secondary association that occurred after the original forest was removed.

Climate

The physical, chemical and biological relationships in the soil are affected by climate. Temperature influences the speed of chemical reactions and

TABLE 2

MEAN MONTHLY TEMPERATURE FOR TORONTO, OAK RIDGES AND OTHER SELECTED POINTS

Month	Temperature in Degrees F.					
	Toronto (105)*	Oak Ridges (19)	Lindsay (57)	Kapuskasing (19)	Huntsville (30)	Brantford (51)
December	27	23	21	6	19	26
January	23	19	16	2	14	22
February	22	18	16	2	12	20
Winter	24	19	18	3	15	23
March	30	28	26	14	24	31
April	42	40	41	31	39	43
May	53	53	54	46	52	55
Spring	42	40	40	30	38	43
June	63	63	64	57	61	65
July	69	68	68	62	66	70
August	67	66	66	60	64	67
Summer	66	66	66	60	64	67
September	60	60	59	51	57	61
October	48	47	46	39	45	48
November	37	34	34	22	32	37
Fall	48	47	46	37	45	49
ANNUAL	45	43	42	32	41	45
May 1 to Oct. 1	62	62	62	55	60	64

* Years observed.

affects the weathering of mineral particles. The water that percolates through the soil material is an important factor in soil weathering and soil development. Climate influences the growth of plants and is often a controlling factor in determining the kind of crops which can be grown satisfactorily and the yields that are obtained.

York County is located in the Lake Ontario Shore, South Slopes, and Simcoe and Kawartha Lakes regions as designated by Putnam and Chapman*. There are two meteorological stations in the County. The station situated in Toronto is representative of the Lake Ontario shore while that at Oak Ridges represents the South Slopes region. In order to check the climate for the Simcoe and Kawartha Lake region the records from Lindsay are used. The data from Brantford represent the southern hardwood zone while

TABLE 3

MEAN MONTHLY PRECIPITATION FOR TORONTO, OAK RIDGES AND OTHER SELECTED POINTS

Month	Precipitation in Inches					
	Toronto (105)†	Oak Ridges (19)	Lindsay (57)	Kapuskasing (19)	Huntsville (30)	Brantford (51)
December	2.63	1.75	2.60	1.90	3.28	2.24
January	2.71	1.67	2.94	2.00	3.09	2.61
February	2.43	1.74	2.39	1.06	2.45	2.12
Winter	7.77	5.16	7.93	4.96	8.82	6.97
March	2.58	1.64	2.42	1.56	2.78	2.16
April	2.48	2.44	2.24	1.82	2.09	2.54
May	2.91	2.58	2.85	2.12	2.85	2.90
Spring	7.97	6.66	7.51	6.50	7.72	7.60
June	2.67	3.02	2.91	2.33	3.69	2.65
July	2.95	3.69	3.07	3.43	2.96	3.05
August	2.73	2.35	2.81	2.94	2.70	2.93
Summer	8.35	9.06	8.79	8.70	9.35	8.63
September	2.90	2.87	3.06	3.54	3.84	2.63
October	2.43	2.22	2.68	2.50	3.44	2.47
November	2.76	2.36	2.86	2.39	3.24	2.40
Fall	8.09	7.45	8.60	8.43	10.52	7.50
ANNUAL	32.18	28.33	32.83	27.59	36.41	30.70
May 1 to Oct. 1	14.16	14.51	14.70	14.36	16.04	14.16

† Years observed.

* Putnam, D. F., and Chapman, L. J. — The Climate of Southern Ontario, Sci. Agr. Vol. XVIII, No. 8, April 1938.

Huntsville is in the transitional zone between hardwood and conifers. Kapuskasing is representative of the coniferous zone. The mean monthly temperatures for these stations is presented in Table 2.

The mean annual temperature varies slightly from one climatic region to the other. The part of the County in the Lake Ontario shore region has a mean annual temperature of 45 degrees F. while that in the South Slopes and Simcoe and Kawartha Lakes regions is 43 to 42 degrees respectively. The winters in the South Slopes and Simcoe and Kawartha Lakes regions are cold with a mean temperature of about 18 degrees F. while those of the Lake Ontario shore are somewhat warmer having a mean temperature of 24 degrees. The summers are warm with a mean temperature of 66 degrees F. for each climatic region. The mean temperature for the growing season for each region is 62 degrees.

The frost-free period for the part of the County in the Lake Ontario shore region is approximately 150 days long while that of the South Slopes region ranges from 133 to 147 days. The part of the County in the Simcoe and Kawartha Lakes region has a frost-free period ranging from 126 to 140 days. The growing season for the Lake Ontario shore has an average length of 197 days while that of the South Slopes and Simcoe and Kawartha Lakes regions varies from 189 to 196 days.

The average annual precipitation at Toronto is 32.2 inches, at Oak Ridges is 28.3 inches, and at Lindsay is 32.8 inches while the mean precipitation during the growing season is 14.1, 14.5 and 14.7 inches respectively. Precipitation is greatest during the summer and fall seasons.

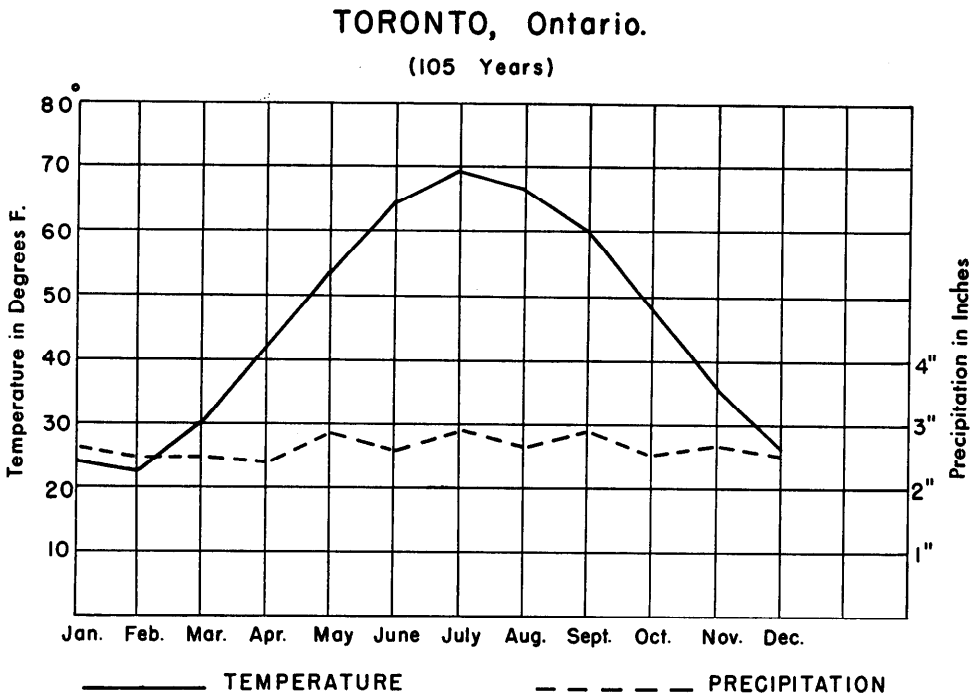


FIG. 6—Mean monthly temperature and precipitation, Toronto, Ontario.

A considerable amount of the 28 to 32 inches of precipitation which falls in the area is transpired by plants or is lost by evaporation, while the remainder, or surplus water, percolates through the soil or runs off the surface. According to calculations made by Marie Sanderson* for some meteorological stations in Southern Ontario, it may be estimated that there is from 7 to 11 inches of surplus water in the York County area which percolates through the soil or runs off the surface. This surplus water, especially the water which percolates through the soil, has a great influence on the development of the soil profile.

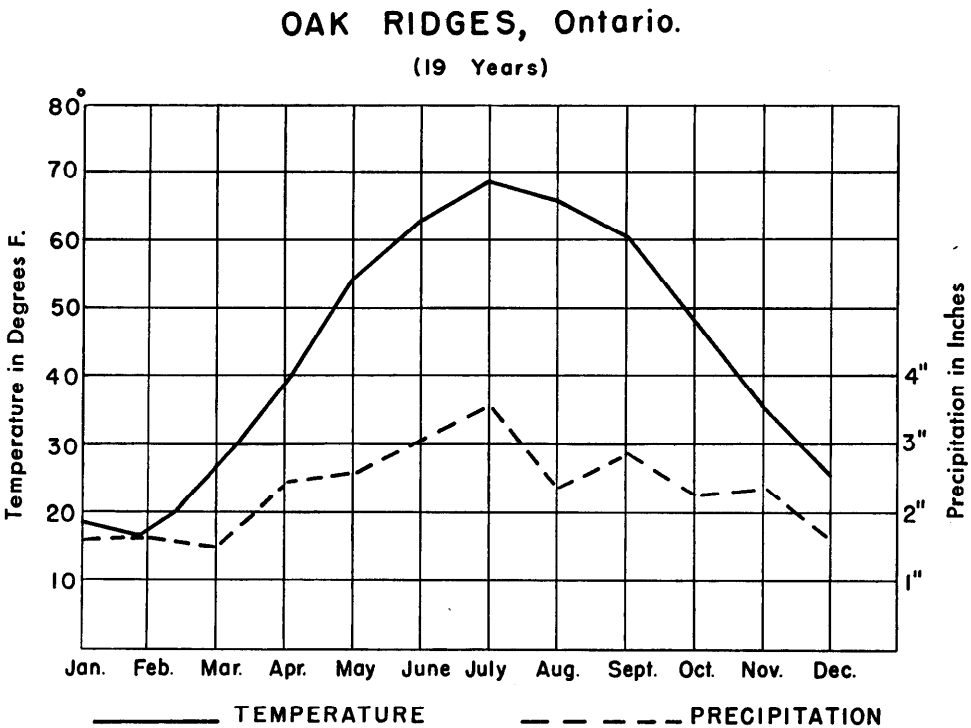


FIG. 7—Mean monthly temperature and precipitation, Oak Ridges, Ontario.

TABLE 4

CLIMATIC DIFFERENCES IN YORK COUNTY

	Lake Ontario Shore	South Slopes Region	Simcoe and Kawartha Lakes
Mean Annual Precipitation	30–32 inches	28–30 inches	28–30 inches
Mean Annual Temperature	45 degrees	43–45 degrees	42–43 degrees
Length of Growing Season	197 days	189–196 days	189–196 days
Frost-Free Period	150 days	133–147 days	126–140 days

As shown in Table 4, the amount of rainfall should be satisfactory for general farm crops, provided it is distributed satisfactorily during the growing season. In general the temperatures for York County are similar to those of the rest of agricultural Southern Ontario. The winter is not too cold to prevent

* Sanderson, Marie — The Climate of Canada According to the New Thornthwaite Classification, Sci. Agr., Vol. 28: 501–517, 1948.

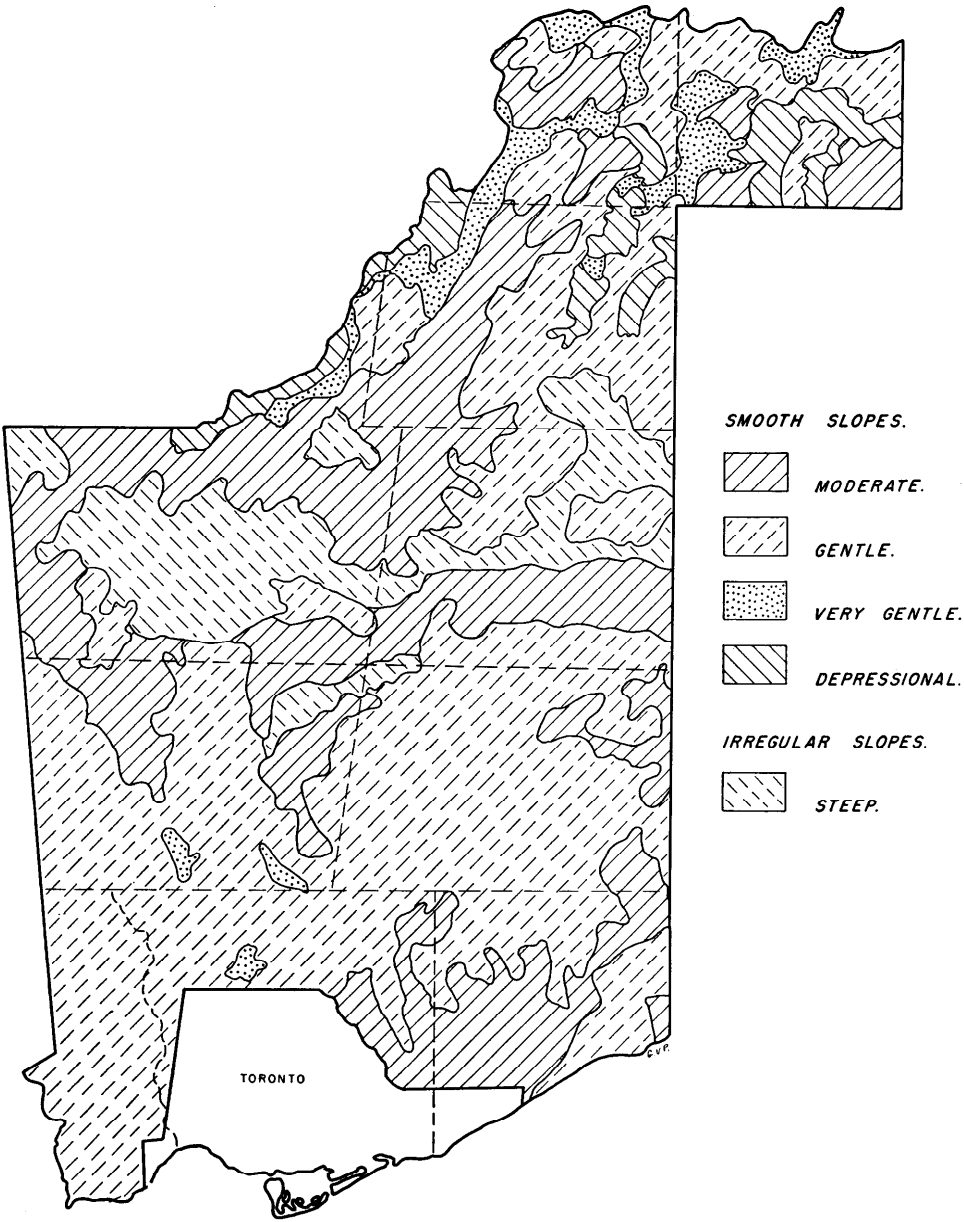


FIG. 8—Outline Map of York County showing distribution of topographic classes.

DRAINAGE SYSTEM

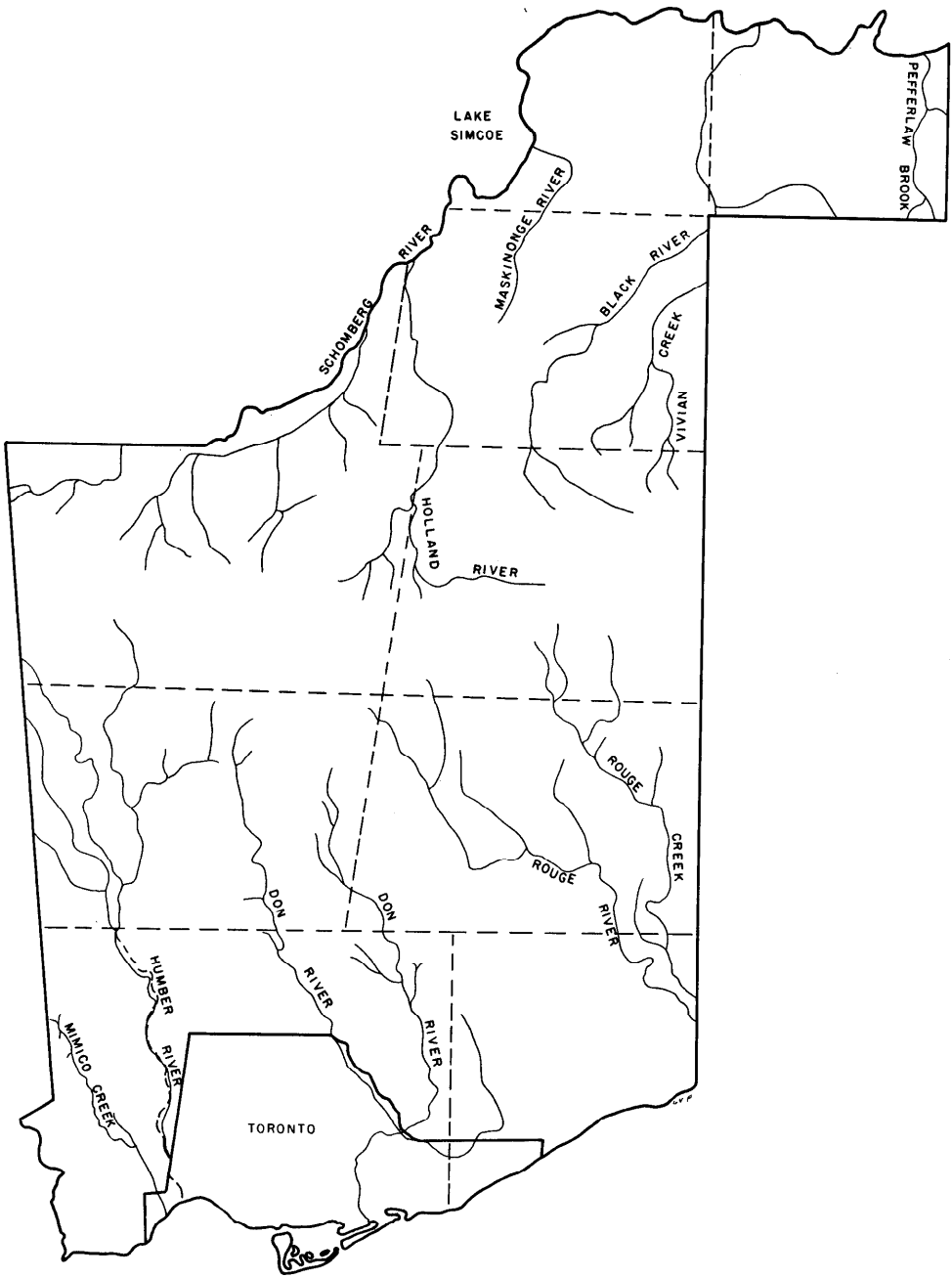


FIG. 9—Outline Map of York County showing main drainage system.

the growth of winter wheat and the growing season is long enough to permit the growth of most farm crops.

Relief

The relief varies considerably and can be described as level to steeply sloping. The southern part of the County is made up of gently to moderately sloping plains which are severely dissected by the stream courses. Steeply sloping plains occur in the central portion of the County. The northern part of the County consists mainly of gently sloping plains broken by several depressional bog areas. The distribution of the various topographic classes is shown in Figure 8.

The altitude ranges from 250 feet at the Lake Ontario shore to 1,100 feet in the higher parts of King and Whitchurch Townships. There is a gradual drop from this height of land to Lake Simcoe where the altitude is about 750 feet.

Drainage

The southern part of York County, including the portion of the County from the height of land in King and Whitchurch Townships to the Lake Ontario shore, is drained by the Rouge, Don, and Humber Rivers and Highland and Etobicoke Creeks. These rivers, emptying into Lake Ontario, overflow their banks and flood many urban and rural districts.

The northern part of the County is drained by the Schomberg, Holland, Black, Maskinonge, and Pefferlaw Rivers which empty into Lake Simcoe. The Schomberg and Holland Rivers provide drainage and irrigation for the large market garden area south of the town of Bradford. The location of these streams is shown in Figure 9.

PART III

THE CLASSIFICATION AND DESCRIPTION OF YORK COUNTY SOILS

The soil is a complex body which is the product of the action of weathering and development forces on the various geologic materials discussed in Part II of this report. The characteristics of the soil are the result of the interaction of (1) the climate and vegetation under which the parent material has existed, (2) the physical and mineral composition of the material, (3) the relief and drainage of the material, (4) the animal life in and on the soil, (5) the length of time that the above soil forming factors have been active, and (6) the effects of cultivation or the work of man. During formation, different layers develop in the soil which can be observed in a vertical cross-section of the soil to a depth of about three feet. This cross-section, including part of the underlying parent material, is generally referred to as the soil profile, and the individual layers are called the horizons of the profile. In York County the kind and number of the horizons found in the soil profile vary greatly among the different soils.

The majority of the soils in the surveyed area fall into one of three Great Soil Groups namely Grey-Brown Podzolic, Brown Forest and Dark Grey Gleisolic.

The Grey-Brown Podzolic soils have developed from calcareous materials and have the following characteristics. Under forest they may have a layer of partially decomposed litter formed from leaves of deciduous trees. The surface soil (A_1 horizon) which is generally 3 to 4 inches thick, is dark greyish brown to very dark greyish brown in colour, moderately friable, slightly to moderately acid and moderately high in organic matter. This horizon consists of an intimate mixture of mineral and organic material. The surface or A_1 horizon is underlain by a yellowish brown, pale brown or brownish grey A_2 horizon which is comparatively low in organic matter and slightly to moderately acid in reaction. The thickness of the A_2 horizons may vary considerably in different soils. In the medium and coarse textured soils the upper part of the A_2 horizon is more intensely coloured and it is designated as the A_{21} horizon, while the lower, more greyish part is designated as the A_{22} horizon.

Under the A_2 horizons lies the B horizon. This layer is darker brown in colour than the A_2 and it contains more clay and sesquioxides than any other horizon in the profile. It is generally slightly acid to neutral in reaction. The B horizon may be subdivided into a transitional subhorizon to the A_2 which is designated as the B_1 horizon, the main or B_2 horizon and a transitional horizon to the C which is designated as the B_3 horizon. The B horizon contains most of the clay and sesquioxides which have been leached from the A horizons. The B horizon rests upon the unaltered or only slightly weathered calcareous parent material. The following is a generalized profile description of a Grey-Brown Podzolic soil:

A_0 — Thin layer of partially decomposed leaves, twigs, etc.

A_1 — Dark greyish brown to very dark brown mineralized humus layer.

A_{21}—Dark yellow-brown layer.

A_{22}—Pale brown layer.

B_2 —Dark brown layer.

C —Light greyish brown calcareous parent material.

This profile exhibits the characteristics of the Grey-Brown Podzolic Great Soil Group.

In many of the Grey-Brown Podzolic soils of Ontario, a secondary profile has developed in the A horizon of the Grey-Brown Podsolic soil. Generally this secondary development is evidenced by the establishment of a definite leaf mat or A_0 horizon, a thinning of the dark coloured A_1 horizon and the development of a distinct brownish colour in the upper part of the A_2 horizon. This secondary profile in the upper part of the soil resembles the Brown Podzolic soils in its morphological characteristics. However in areas where the profile has not been disturbed a distinct light grey A_2 horizon similar to those found in Podzol soils, occurs below the thin A_1 or A_0 horizon. These secondary profiles can best be observed under virgin conditions, as the distinguishing features are readily destroyed on cultivation.

The A_2 and B horizons of the imperfectly drained Grey-Brown Podzolic soils are not as well defined as those of the well drained soils.

The occurrence of Brown Forest soils in the County may be due to the character of the parent material, or to climatic environment. These soils are found in the northern part of the County. The well drained Brown Forest soils in the area have a thin organic mat (A_0 horizon) on the surface consisting of leaf litter and semi-decomposed organic material. The A_1 horizon is usually 3 to 4 inches thick and is underlain by a brown B horizon which gradually grades into the pale brown parent material. In many instances the Brown Forest profiles in York County show indications of slight Grey-Brown Podzolic development. The depth of the organic A_0 horizon is somewhat thicker than is usual for Brown Forest soils and there is an increase in the clay content of the B_2 horizon which is not characteristic of modal Brown Forest soils. Since it is evident that certain Grey-Brown Podzolic characteristics are present in the Brown Forest soils it would appear that the Brown Forest soils of York County are best correlated as Brown Forest — Grey-Brown Podzolic Intergrades. A generalised description of a Brown Forest soil follows:

A_0—Accumulated layer of partially decomposed litter from deciduous trees.

A_1—Dark brown to very dark greyish brown mineralized humus layer.

B —Dark brown layer.
Grey to pale brown calcareous parent material.

C —Grey to pale brown calcareous parent material.

Soils of the Brown Forest Great Soil Group exhibit shallow profiles and a brownish colour in the subsoil.

Small areas of imperfectly to poorly drained coarse textured soils occur in the northern part of the County that are characteristic of the Ground-Water Podzol Great Soil Group. These soils have a thin A_1 horizon overlying a highly leached grey A_2 horizon. The B_2 horizon is indurated and the B_3 horizon is very mottled. For a more complete description of a Ground-Water Podzol, the reader is referred to the description of the Rubicon series.

Many of the soils in the surveyed area have developed under poorly drained conditions. The poorly drained soils of York County are representative of the following Great Soil Groups: Dark Grey Gleisolic, Bog and Alluvial (young).

The Dark Grey Gleisolic soils have a dark, friable, granular surface layer which is underlain by a mottled brownish grey subsoil that gradually grades into parent material. In comparison to the well drained soils that have uniformly brownish or yellowish brown subsoils the poorly drained soils have rusty specks and streaks and bluish grey colours in the subsoil. The discolouration or mottling of the subsoil is one of the distinguishing features of poorly drained soils. The Dark Grey Gleisolic soils generally do not have a marked leached layer or layer of accumulation. The following is a generalized description of a Dark Grey Gleisolic soil:

A_0 — Accumulated layer of partially decomposed litter from deciduous trees.

A_1 — Dark grey to very dark grey mineralized humus layer.

G — Brownish grey layer.

C — Greyish brown calcareous parent material.

The Bog soils have developed from plant remains and swamp or marsh types of vegetation. The organic accumulation is usually three feet or more in depth and may differ according to the degree of decomposition of the organic materials. Bog soils are very poorly drained and frequently occupy depressional areas which receive considerable seepage.

The Alluvial soils consist of recently deposited material which has not been in place long enough for definite soil horizons to develop. However, layers differing in texture, as a result of periodic flooding, can frequently be observed in the profile of these young alluvial soils.

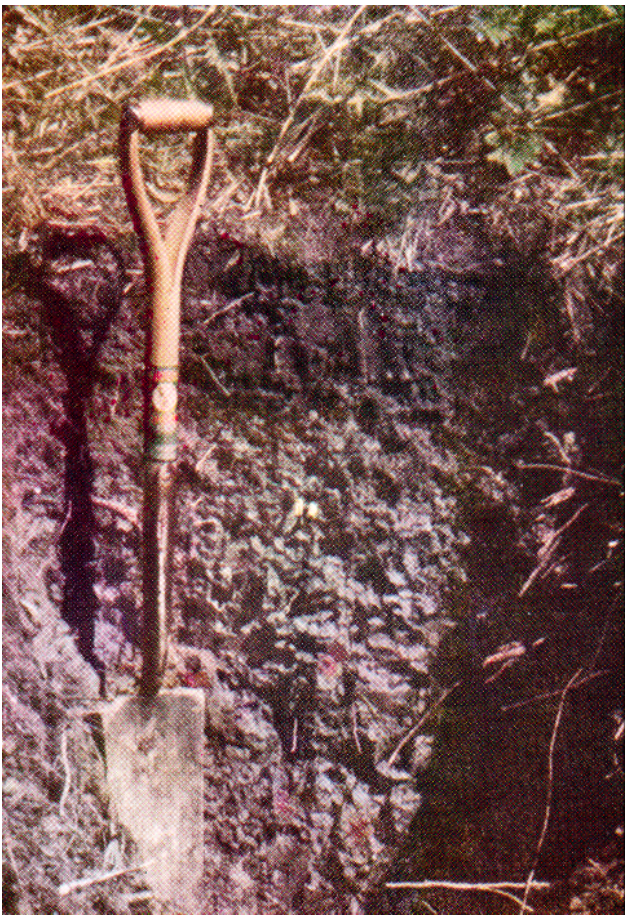
System of Classification

Besides being classified into Great Soil Groups the soils of York County have been classified into the more specific series, type and phase categories. A series includes all the soils which are developed from similar parent material under the same climatic and drainage conditions and show the same genetic horizons in the profile. Each soil series is designated by the name of a town or important geographical unit which occurs near to where the soil was first found.

Texture of the surface or plough layer is the basis for differentiating series into types. The soil type is the principal unit of mapping. The types of a series are restricted to a narrow range of textural classes. Where only one type is recognized the series and type are identical.

The phase is a subdivision of the soil type. Phases are separated within a soil type on the basis of characteristics which, although significant to use of the soil by man, have little or no significance in the genesis of the soil. Such features as variations in slope, stoniness, or erosion are customarily used to separate phases within a soil type.

The soil series developed on similar parent material, but differing in characteristics of the solum due to differences in relief or drainage are included in the soil catena. The catenary relationship of the soils of York County is indicated in this report.



Note profile characteristics of a Dark Grey Gleisolic soil—surface soil is dark grey colour; subsoil, a drab grey with reddish brown mottling.

KEY TO THE SOILS OF YORK COUNTY

A. Soils Developed on Glacial Till

	ACREAGE	% OF TOTAL
Medium textured shale and limestone till		
(a) Good Drainage		
(1) Woburn loam (G.B.P.)	34,800	6.3
(2) Woburn sandy loam (G.B.P.)	12,600	2.2
(b) Imperfect drainage		
(1) Milliken loam (G.B.P.)	34,900	6.4
(2) Milliken sandy loam (G.B.P.)	400	**0.1**
(c) Poor drainage		
(1) Lyons loam (D.G.G.)	3,500	0.6

2. Medium textured limestone till

(a) Good drainage		
(1) Bondhead sandy loam (G.B.P.)	6,300	1.3
(2) Bondhead loam (G.B.P.)	13,100	2.3
(3) Otonabee loam (B.F.–G.B.P.)	6,000	1.1
(4) Otonabee sandy loam (B.F.–G.B.P.)	4,800	0.8
(b) Imperfect drainage		
(1) Guerin sandy loam (G.B.P.)	1,600	0.3
(2) Guerin loam (G.B.P.)	500	0.1
(3) Emily loam (B.F.–G.B.P.)	4,600	0.8

3. Heavy textured shale and limestone till

(a) Good drainage		
(1) Oneida clay loam (G.B.P.)	12,500	2.2
(b) Imperfect drainage		
(1) Chinguacousy clay loam (G.B.P.)	37,200	6.7
(c) Poor drainage		
(1) Jeddo clay loam (D.G.G.)	5,000	0.9

4. Heavy textured limestone till

(a) Good drainage		
(1) King clay loam (G.B.P.)	18,900	3.1
(2) King silt loam (G.B.P.)	600	0.1
(3) King clay loam — steep phase (G.B.P.)	11,100	2.0
(b) Imperfect drainage		
(1) Monaghan clay loam (G.B.P.)	9,200	1.6
(2) Monaghan silt loam (G.B.P.)	3,600	0.6

B. Soils Developed on Outwash Materials

1. Poorly sorted sandy outwash

(a) Good drainage		
(1) Pontypool sandy loam (G.B.P.)	21,200	3.9
(2) Pontypool sand (G.B.P.)	14,000	2.4

2. Well sorted sandy outwash

(a) Good drainage		
(1) Brighton sandy loam (G.B.P.)	24,800	4.5
(2) Brighton sandy loam over gravel (G.B.P.)	4,000	0.7
(3) Fox sandy loam (G.B.P.)	11,800	2.1
(4) Percy fine sandy loam (G.B.P.)	10,200	1.8
(5) Tioga sandy loam (P.–G.B.P.)	300	0.1
(b) Imperfect drainage		
(1) Tecumseth sandy loam (G.B.P.)	15,200	2.7
(2) Tecumseth sandy loam over gravel (G.B.P.)	500	0.1
(3) Brady sandy loam (G.B.P.)	1,500	0.3
(4) Rubicon sandy loam (G.–W.P.)	400	0.1
(c) Poor drainage		
(1) Granby sandy loam (D.G.G.)	15,200	2.7

3. Well sorted gravelly outwash

(a) Well drained		
(1) Burford loam (G.B.P.)	400	0.1
(2) Sargent sandy loam (B.F.–G.B.P.)	1,200	0.2
(b) Imperfect drainage		
(1) Gwillimbury sandy loam (B.F.–G.B.P.)	400	0.1
(c) Poor drainage		
(1) Gilford loam (D.G.G.)	500	0.1

C. Soils Developed on Sands Underlain by Loamy Limestone Till

(a) Good drainage		
(1) Dundonald sandy loam (G.B.P.)	1,000	0.2

D. Soils Developed on Sands Underlain by Clay Till		
(a) Good drainage		
(1) Bookton sandy loam (G.B.P.)	3,100	0.5
(b) Imperfect drainage		
(1) Berrien sandy loam (G.B.P.)	7,900	1.4
(c) Poor drainage		
(1) Wauseon sandy loam (D.G.G.)	800	0.2
E. Soils Developed on Lacustrine Clay		
(a) Good drainage		
(1) Schomberg silt loam (G.B.P.)	5,100	1.0
(2) Schomberg clay loam (G.B.P.)	16,800	3.0
(3) Schomberg clay loam — steep phase	4,300	0.7
(b) Imperfect drainage		
(1) Smithfield clay loam (G.B.P.)	3,900	0.7
(c) Poor drainage		
(1) Simcoe clay loam (D.G.G.)	4,600	0.8
(2) Simcoe silt loam (D.G.G.)	4,000	0.7
F. Soils Developed on Lacustrine Clay Underlain by Clay Till		
(a) Good drainage		
(1) Cashel clay (G.B.P.)	11,600	2.1
(b) Imperfect drainage		
(1) Peel clay (G.B.P.)	51,000	9.2
(c) Poor drainage		
(1) Malton clay (D.G.G.)	31,100	0.5
G. Organic Soils		
(a) Very poor drainage		
(1) Muck (B)	27,800	5.0
H. Recently Deposited Alluvium along Valley Floors		
(a) Variable drainage		
(1) Bottom land (A)	36,000	6.4
I. Miscellaneous Soils		
(a) Excessive drainage		
(1) Bridgman sand (D)	600	0.1

GREAT SOIL GROUP

A — Azonal Soils
B.F.-G.B.P. — Brown Forest-Grey-Brown Podzolic Soils
G.B.P. — Grey-Brown Podzolic Soils
D. — Dry Sands
B. — Bog Soils
G.W.P. — Ground-Water Podzol Soils
D.G.G. — Dark Grey Gleisolic Soils

SOILS DEVELOPED ON MEDIUM TEXTURED SHALE AND LIMESTONE TILL

The materials are dominantly shale with varying amounts of limestone present. Soils, developed from these materials have a tendency to be slightly more acid than those developed from predominantly limestone materials. Free carbonates are present, and the materials are brownish in colour.

Three series were mapped in York County. The Woburn series is the well drained member, the Milliken series is the imperfectly drained member, and the Lyons series is the poorly drained member of the Woburn catena.

(a) Good Drainage

Woburn loam (34,800 acres)

Found in the central and southern portions of the eastern half of York County, Woburn loam occurs on smooth moderately sloping topography. It is classified as a Grey-Brown Podzolic soil and is described as follows:

A_0—Thin layer of partially decomposed leaves, twigs, etc.

A_1—0-4 inches loam; very dark greyish brown (10 YR 3/2); fine granular structure; friable consistency; few stones; pH—6.1.

A_{21}—4-14 inches loam; yellowish brown (10 YR 5/4); weak platy structure; friable consistency; few stones; pH—5.8.

A_{22}—14-17 inches sandy loam; reddish yellow (7.5 YR 6/6); weak platy structure; very friable consistency; few stones; pH—5.7.

B_2—17-25 inches clay loam; dark brown (7.5 YR 4/4); coarse nuciform structure; hard consistency; few stones; pH—6.6.

B_3—25-37 inches clay loam; brown (10 YR 5/3); coarse nuciform structure; hard consistency; few stones; pH—6.8.

C —Loam till; brown (7.5 YR 5/4); medium nuciform structure; hard consistency; stony; calcareous; pH—7.8.

Soil erosion can be serious on the Woburn loam.

Although the topography of the Woburn loam is usually moderately sloping, steep slopes occur in some localities. The type is susceptible to sheet erosion and has suffered noticeably where slopes are steep. Both external and internal

drainage is good. Much of the Woburn loam has been cleared and present forested areas are usually confined to small woodlots. Beech and hard maple occur in the largest numbers with basswood, ironwood, and soft maple occurring in lesser amounts.

Agriculture

Woburn loam is well suited to cereal grain, corn and legumes and is used chiefly for general farming.

The porous parent material and the consequent good drainage permit early cultivation. The greatest hazard to cultivation is the danger of erosion.

The type is fairly well supplied with lime and is suited to the growing of legumes. Short rotations should be discouraged since too frequent cultivation would increase the erosion hazard and impair soil structure. Additions of mineral fertilizer are required to build up the low phosphate levels and to maintain the level of potash. Organic matter content should be maintained by frequent additions of manure. The materials and drainage make this type ideal for building sites.

Woburn sandy loam (12,600 acres)

Woburn sandy loam differs from the Woburn loam only in the texture of the surface horizons. Although this type has a slightly lower level of natural fertility than the Woburn loam its use and management are similar.

(*b*) *Imperfect Drainage*

Milliken loam (34,900 acres)

The Milliken is the imperfectly to moderately well drained member of the Woburn catena. A common Milliken profile exhibits the following characteristics:

A_0 — Thin layer of partially decomposed leaves, twigs, etc.

A_1 — 0–5 inches loam; very dark greyish brown (10 YR 3/2); fine granular structure; friable consistency; few stones; pH — 6.5.

A_2 — 5–13 inches loam; yellowish brown (10 YR 5/4); very slightly mottled; weak platy structure; friable consistency; few stones; pH — 6.2.

B_2 — 13–24 inches clay loam; dark brown (7.5 YR 4/4); slightly mottled; coarse nuciform structure; hard consistency; few stones; pH — 6.8.

B_3 — 24–31 inches clay loam; brown (10 YR 5/3); medium nuciform structure; friable consistency; few stones; pH — 7.0.

C — Loam till; brown (7.5 YR 5/4); medium nuciform structure; hard consistency; stony; calcareous; pH — 7.8.

The topography of the Milliken loam ranges from smooth gently sloping to smooth moderately sloping. Little erosion occurs on this type except where moderate slopes cause rapid runoff. Both external and internal drainage is moderately good.

Tree cover in existing woodlots is made up of dominantly elm and soft maple. Basswood, ash and a few hard maple are also common.

Agriculture

In York County this type is used chiefly for general farming and dairying. It is suited to the growth of cereal grains, corn and hay and is used for growing vegetable crops where climate permits. Some fairly large acreages of fruits and vegetables are grown in Scarborough and Markham Townships where the climate is moderated by Lake Ontario. Good crops of alfalfa can be grown even though the soil is only moderately well drained.

The Milliken soils are among the best in the surveyed area and for this reason most of the land is under cultivation. They are most productive in moderately dry years.

Under natural conditions the Milliken soils possess good physical properties. The maintenance of organic matter should not be neglected and commercial fertilizers, particularly those high in phosphorus, should be used if satisfactory yields are to be obtained. Some crops such as apples, onions and potatoes, etc., require large amounts of potassium for good growth.

Milliken sandy loam (400 acres)

Milliken sandy loam has a somewhat lower level of natural fertility than the Milliken loam. It is fairly well adapted to the growth of cereal grains, fruits and vegetables.

(c) *Poor Drainage*

Lyons loam (3,500 acres)

Lyons loam is mapped in association with Milliken and Woburn soils and is the poorly drained member of the Woburn catena. The profile belongs to the Dark Grey Gleisolic Great Soil Group and exhibits the following characteristics:

A_0 — Thin layer of partially decomposed leaves, twigs, etc.

A_1 — 0–7 inches loam; very dark greyish brown (10 YR 3/2); fine granular structure; friable consistency; pH — 6.8.

G — 7–15 inches loam; greyish brown (10 YR 5/2); mottled; medium nuciform structure; friable consistency; few stones; pH — 7.0.

C — Brown (10 YR 5/3) calcareous till; stony; pH — 7.8.

The topography is smooth very gently sloping and erosion presents no problem. Because of its topographic position the natural drainage is poor.

A large proportion of the Lyons loam remains in woodland where the most frequently occurring trees are elm, ash, cedar, willow, soft maple and hemlock.

Agriculture

Areas not in woodland are often used as pasture. The production of most crops is limited by poor drainage. However, crop production can be improved by the installation of tile drains where economically feasible. It is very doubtful if the cost of draining would be warranted for pasture crops.

Timothy, hay and buckwheat do fairly well but the soil is poorly suited to the production of legumes because of poor drainage.

2. MEDIUM TEXTURED LIMESTONE TILL

The soils developed on the limestone till appear to have a higher content of free carbonates than those developed on the shale and limestone till. As a result the surface reaction of these soils is generally higher than that of the soils of the Woburn catena. The materials are calcareous and grey in colour.

The Bondhead and Otonabee catenas have developed on these materials. The Bondhead catena consists of the well drained Bondhead series, the imperfectly drained Guerin series, and the poorly drained Lyons series. The well drained Otonabee series, the imperfectly drained Emily series and the poorly drained Lyons series are members of the Otonabee catena. The Bondhead series exhibits the characteristics of the Grey-Brown Podzolic soils whereas the Otonabee soils are more characteristic of the Brown Forest soils, having thinner weathered profiles and higher surface reactions than those of the Bondhead soils. The Otonabee series is considered to be a Brown Forest — Grey-Brown Podzolic Intergrade.

Since the poorly drained members of catenas developed on loamy textured till have similar characteristics they are all included in the same series, Lyons.

(*a*) *Good Drainage*

Bondhead sandy loam (6,300 acres)

Occurring chiefly in East Gwillimbury Township, Bondhead sandy loam is a Grey-Brown Podzolic soil. The open nature of the materials and the smooth moderately sloping topography provide good drainage. Sheet erosion is harmful but can usually be controlled by careful management. The following is a profile description of Bondhead sandy loam developed under tree cover:

A_0 — Thin layer of partially decomposed leaves, twigs, etc.

A_1 — 0–4 inches sandy loam; dark greyish brown (10 YR 4/2); fine crumb structure; friable consistency; few stones; pH — 6.8.

A_{21}— 4–14 inches sandy loam; yellowish brown (10 YR 5/4); weak platy structure; friable consistency; few stones; pH — 6.6.

A_{22}— 14–17 inches sandy loam; light yellowish brown (10 YR 6/4); weak platy structure; friable consistency; few stones; pH — 6.6.

B_2 — 17–24 inches clay loam; dark brown (10 YR 4/3); medium nuciform structure; firm consistency; stony; pH — 7.0.

C — Loam; grey (10 YR 5/1); calcareous; stony and bouldery; pH — 8.0.

The tree cover on the virgin soils is made up largely of sugar maple and beech with some basswood, ironwood, and hemlock. The surface stones occurring in the fields can be easily removed so that they no longer interfere with cultivation.

The type is medium to low in natural fertility, being low in phosphorus, medium in potassium, and medium to low in organic matter.

Agriculture

Bondhead sandy loam is used chiefly for general farming. It is well suited for growing cereal grains, hay and pasture. Provided climatic conditions are satisfactory, canning crops and tree fruits are grown with fair success.

Maintenance of organic matter, phosphorus, and potassium are the main fertility needs. Most crops respond when applications of superphosphate or a fertilizer mix high in phosphate are used. The type is susceptible to both sheet and gully erosion and it is advisable to leave the steeper slopes in hay, pasture or tree cover as long as possible to control soil loss.

Bondhead loam (13,100 acres)

The sandy loam and loam types of the Bondhead series have the same profile characteristics except for texture of the surface horizons and depth to free carbonates. The depth to free carbonates is usually deeper on the sandy loam than the loam.

Otonabee loam (6,000 acres)

Otonabee loam has developed on high lime parent materials derived largely from Trenton limestone. Although the materials are similar to those from which the Bondhead soils are formed the depth of weathered profile is shallower and the pH of the A and B horizons are higher in the Otonabee series than in the Bondhead. A profile description of Otonabee loam developed under tree cover follows:

A_0 — Thin layer of partially decomposed leaves, twigs, etc.

A_1 — 0–3 inches loam; dark greyish brown (10 YR 4/2); medium crumb structure; friable consistency; stony; pH — 7.2.

B_2 — 3–16 inches loam; dark brown (10 YR 4/3); medium nuciform structure; friable consistency; stony; pH — 7.6.

C — Loam till; grey (10 YR 5/1); calcareous; stony and bouldery; pH — 8.0.

Occasionally a thin A_2 horizon occurs and the profile appears to be a weakly developed Grey-Brown Podzolic soil. Occurring on drumlinized till plains,

the type has a smooth moderately sloping to hilly topography. The soil is well drained due to free percolation and good runoff. The natural vegetation consists chiefly of sugar maple and beech. Spruce, elm and ash occur much less frequently.

Agriculture

Most of the land has been cleared and is used principally for general farming, although dairying and livestock raising provide a large part of the farm income in some areas. Cereal grains, hay, clover, ensilage corn and pasture are the crops most commonly grown.

When used for the growing of cultivated crops, the need for erosion control is great. The soil is susceptible to sheet erosion, especially on the steeper slopes. A permanent cover of grass or trees should be used to control soil loss. The natural fertility of the soil is medium to low and crop response is usually good when fertilizers high in phosphate and potash are applied. Applications of barnyard manure are required to maintain soil structure.

On the Otonabee soils where sound soil management practices are followed, yields of cereal grains and hay considerably in excess of the County averages are obtained.

Otonabee sandy loam (4,800 acres)

Similar to Otonabee loam except for texture of the surface horizons, Otonabee sandy loam has a somewhat lower level of natural fertility. The agriculture differs little from that occurring on the Otonabee loam.

(*b*) *Imperfect Drainage*

Guerin sandy loam (1,600 acres)

Guerin sandy loam occurs most frequently in the northern part of the County where small isolated areas have been mapped in association with the Bondhead soils. The series is the imperfectly drained member of the Bondhead catena and has Grey-Brown Podzolic characteristics. The profile horizons are less distinct than in the well drained soils because of the imperfect drainage. A profile description of Guerin sandy loam follows:

A_0 — Thin layer of partially decomposed leaves, twigs, etc.

A_1 — 0–4 inches sandy loam; very dark greyish brown (10 YR 3/2); fine crumb structure; friable consistency; few stones; pH — 7.0.

A_2 — 4–9 inches sandy loam; yellowish brown (10 YR 5/4); mottled; weak platy structure; friable consistency; few stones; pH — 6.9.

B_2 — 9–18 inches clay loam; dark brown (10 YR 4/3); mottled; medium nuciform structure; firm consistency; stony; pH — 7.4.

C — Loam; grey (10 YR 5/1); calcareous; stony and bouldery; pH — 8.0.

The topography is smooth gently sloping and erosion is slight. The inadequate drainage may be due to the compaction of the parent material. Trees occurring in existing woodlots consist mainly of soft maple and elm. The natural fertility is medium to low. The content of potash and organic matter is medium while that of phosphate is low.

Agriculture

Under present farming conditions Guerin sandy loam is used chiefly for general farming and is fairly well suited to the growing of oats, hay and pasture. Drainage improvement would permit the growing of a wider range of crops but tile drains may be hard to install because of the difficulty in obtaining suitable outlets and to the stony nature of the underlying materials.

Where cultivated crops are grown, fertility levels should be maintained by additions of potassic and phosphatic fertilizers. Pastures undoubtedly, will respond to good management practices which include the use of fertilizer and manure.

Guerin loam (500 acres)

The land use and soil management problems for Guerin loam are similar to those of the Guerin sandy loam. This type has a slightly higher level of natural fertility than the sandy loam.

Emily loam (4,600 acres)

The Emily series is the imperfectly drained member of the Otonabee catena and profiles having both Brown Forest and Grey-Brown Podzolic characteristics are common. Emily loam is the only type mapped in York County and occurs in North Gwillimbury and Georgina Townships. A description of Emily loam is given below:

A_0 — Thin layer of partially decomposed leaves and twigs.

A_1 — 0–4 inches loam; very dark grey-brown (10 YR 3/2); fine granular structure; friable consistency; few stones; pH — 7.4.

B_2 — 4–13 inches clay loam; dark brown (10 YR 4/3); mottled; medium nuciform structure; firm consistency; stony; pH — 7.6.

C — Loam till; grey (10 YR 5/1); calcareous; stony and bouldery; pH — 8.0.

Because of the high lime content of the parent material and the shallowness of the solum, free carbonates are often present throughout the profile. Although water percolation is moderate, run-off is slow, resulting in an imperfectly drained soil. The natural vegetation consists chiefly of soft maple and elm. Big stones often occur on the surface but they are not too numerous and are easily removed.

Agriculture

The type is used chiefly for general farming and a large part of the area occurring in the County supports pasture growth. Fairly good crops of oats,

red clover, alsike, and timothy are produced but the soil is unreliable for alfalfa.

Low phosphorus levels are frequently found on the Emily loam. The erosion hazard is less and during the summer months, moisture relationships in the soil are better than on the Otonabee loam, making this soil better suited for pasture purposes.

3. HEAVY TEXTURED SHALE AND LIMESTONE TILL

A large proportion of the southern part of the County is made up of soils developed on heavy textured shale and limestone materials. The materials consist of large amounts of shale with limestone intermixed. The till is stony and calcareous.

The Oneida catena consists of the well drained Oneida series, the imperfectly drained Chinguacousy series and the poorly drained Jeddo series.

(a) Good Drainage

Oneida clay loam (12,500 acres)

Occuring in the southern section of York County, Oneida clay loam is characterized by smooth moderately sloping topography. The type is characteristic of the Grey-Brown Podzolic Great Soil Group as shown by the following profile description:

A_0 — Thin layer of partially decomposed leaves, twigs, etc.

A_1 — 0–5 inches clay loam; very dark greyish brown (10 YR 3/2); fine granular structure; friable consistency; stonefree; pH — 5.8.

A_{21}— 5–12 inches clay loam; yellowish brown (10 YR 5/4); weak platy structure; friable consistency; stonefree; pH — 5.4.

A_{22}— 12–15 inches clay loam; brownish yellow (10 YR 6/6); weak platy structure; friable consistency; stonefree; pH — 5.5.

B_2 — 15–29 inches clay; dark brown (10 YR 4/3); coarse blocky structure; hard consistency when dry, plastic when wet; few stones; pH — 6.4.

C — Clay shale till; pale brown (10 YR 6/3); prismatic structure; hard consistency when dry, plastic when wet; calcareous; stony; pH — 7.4.

Dissection by stream courses produces the smooth moderately rolling topography of the Oneida clay loam. Although percolation of moisture through the profile is slow, run-off is rapid, creating a well drained soil. The type is susceptible to erosion.

Oak, sugar maple, pine, beech, and elm are the tree species most commonly found in the woodlots. Elm occurs particularly at the bottom of the slopes.

Agriculture

Most of the Oneida clay loam is used for dairying and general farming. The soil is well adapted to cereal grains, hay and pasture.

The internal drainage and supply of plant nutrients are sufficiently good to permit the growing of alfalfa and other legumes. Areas may exist where liming is needed before satisfactory crops of alfalfa can be grown. Where dairy farming is practised the growing of forage crops permit the use of barnyard manure as the basis for an excellent soil management program.

The type is usually low in organic matter which should be built up and maintained by frequent additions of barnyard manure. Phosphate, potash and nitrogen levels should be maintained with additions of mineral fertilizer.

(*b*) *Imperfect Drainage*

Chinguacousy clay loam (37,200 acres)

The Chinguacousy series is the imperfectly drained member of the Oneida catena. The parent material is fairly high in limestone but shale is present in such a quantity that it has a pronounced effect on the profile developed. A typical profile developed under woodlot vegetation exhibits the following characteristics:

A_0 — Thin layer of partially decomposed leaves, twigs, etc.

A_1 — 0–6 inches clay loam; dark grey (10 YR 4/1); medium granular structure; friable consistency; few stones; pH — 6.0.

A_2 — 6–12 inches clay loam; yellowish brown (10 YR 5/4); mottled; weak platy structure; friable consistency; stonefree; pH — 5.6.

B_2 — 12–24 inches clay; dark brown (10 YR 4/3); mottled; coarse blocky structure; hard consistency when dry, plastic when wet; few stones; pH — 6.5.

C — Clay; pale brown (10 YR 6/3); prismatic structure; hard consistency when dry, plastic when wet; calcareous; few stones; pH — 7.4.

The topography is smooth gently sloping and erosion is slight. Because of low run-off and slow percolation drainage is imperfect.

The natural vegetation consists mainly of elm and soft maple with ash and oak also occurring.

Agriculture

Much of the Chinguacousy series is used for dairy farming. The soil is well suited to the growth of cereal grains and forage crops although the growth of alfalfa may be limited by inadequate drainage and the acid reaction. In addition to the crops commonly grown in a dairy system of farming, cash crops such as wheat, corn, beans, and tomatoes can be grown where climate permits.

Inherently the Chinguacousy series is low in organic matter, phosphorus and calcium and only moderately well supplied with potassium. Liming should be beneficial in most areas and fertility levels should be further maintained with additions of mineral fertilizer and barnyard manure. Drainage

improvement increases the capability of these soils and this can possibly be achieved most effectively through removal of surface water by ditches.

(c) Poor Drainage

Jeddo clay loam (5,000 acres)

Small areas of Jeddo clay loam occur in the southern part of the County. The series is the poorly drained member of the Oneida catena and is characteristic of the Dark Grey Gleisolic Great Soil Group. In some areas the till has been intermixed with lacustrine material.

Chinguacousy clay loam has smooth gently sloping topography. It is well suited for the growing of general farm crops.

The following is a profile description of Jeddo clay loam developed under woodlot growth:

A_0—Thin layer of partially decomposed leaves, twigs, etc.

A_1—0-8 inches clay loam; very dark brown (10 YR 2/2; medium granular structure; friable consistency; stonefree; pH—6.5.

G_1—8-16 inches clay; dark greyish brown (10 YR 4/2); mottled; medium nuciform structure; plastic consistency when wet, hard when dry; stonefree; pH—6.8.

G_2—16-37 inches clay; yellowish brown (10 YR 5/4); mottled; coarse blocky structure; plastic consistency when wet, hard when dry; stonefree; pH—7.0.

C —Clay till; pale brown (10 YR 6/3); prismatic structure; plastic consistency when wet, hard when dry; calcareous; few stones and grit; pH—7.4.

The Jeddo clay loam has smooth very gently sloping topography and is poorly drained. The natural vegetation in the woodlots consists mainly of elm, ash, and cedar.

Agriculture

Crop growth on the Jeddo clay loam is limited by poor drainage. In its natural state the soil is best used for hay and pasture, but a wider range of crops can be grown when drainage is improved.

The type is medium to high in organic matter and potash. Phosphate levels are medium to low. Liming is not generally required on these soils.

SOILS DEVELOPED ON HEAVY TEXTURED LIMESTONE AND SHALE TILL

In King Township, a fairly broad expanse of heavy textured soils occur, developed on materials consisting of limestone and shale till intermixed with lacustrine materials. The presence of the till materials allows for fairly free movement of water through the profile and has facilitated internal drainage. The soils are well supplied with lime, free carbonates occurring in the underlying till.

Two series were mapped in this group, the King and Monaghan. The King series is the well drained member of the King catena and the Monaghan is the imperfectly drained member.

(a) Good Drainage

King clay loam (18,900 acres)

Found in King and Vaughan Townships, the King clay loam occurs on smooth moderately sloping topography. Formed from till deposits, intermixed with lacustrine materials, the type exhibits Grey-Brown Podzolic characteristics. A King clay loam profile exhibits the following characteristics:

A_0 — Thin layer of partially decomposed leaves, twigs, etc.

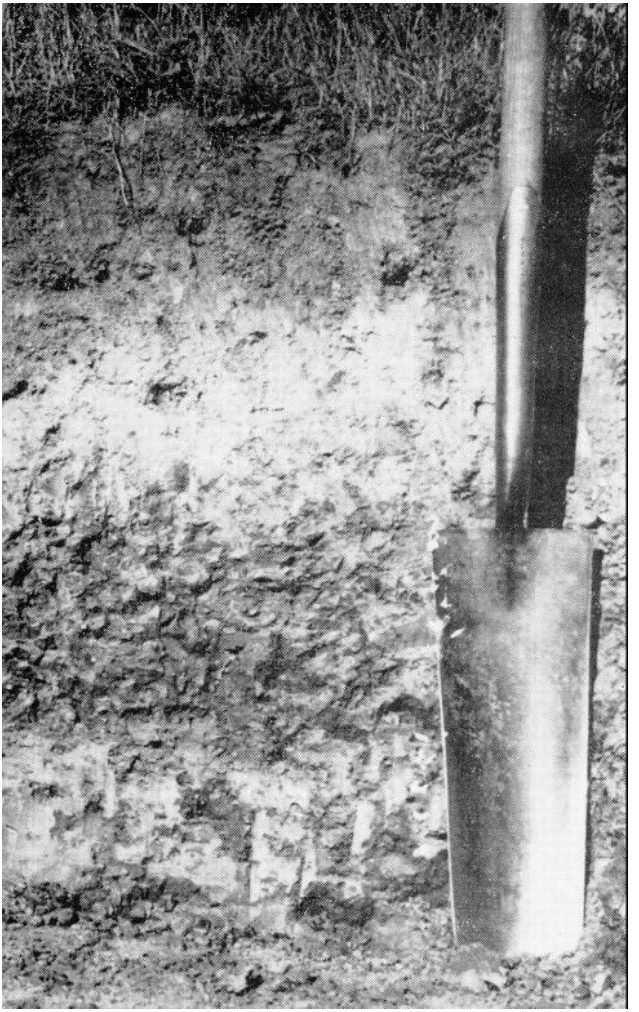
A_1 — 0–5 inches clay loam; greyish brown (10 YR 5/2); medium granular structure; friable consistency; stonefree; pH — 6.8.

A_{21}— 5–11 inches clay loam; brown (10 YR 5/3); weak platy structure; friable consistency; stonefree; pH — 6.5.

A_{22} —11–13 inches clay loam; light yellowish brown (10 YR 6/4); weak platy structure; friable consistency; stonefree; pH — 6.4.

B_2 — 13–30 inches clay; dark brown (10 YR 4/3); coarse blocky structure; hard consistency when dry, plastic when wet; stonefree; pH — 7.0.

C — Clay till; brown (10 YR 5/3); prismatic structure; hard consistency when dry, plastic when wet; calcareous; few stones; pH — 7.8.



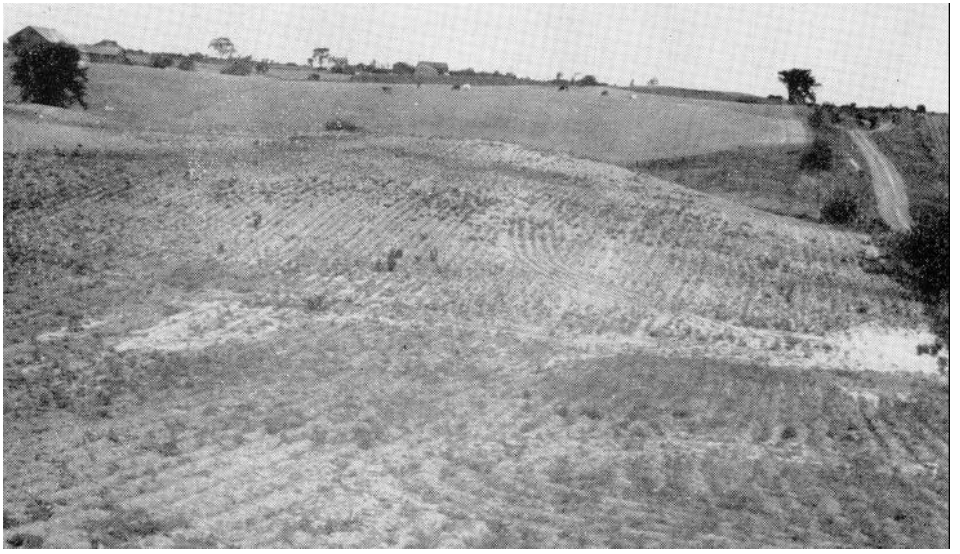
King clay loam is developed on calcareous fine textured till. Note the well developed A_2 and B horizons, typical of the Grey-Brown Podzolic soils.

Both internal and external drainage is good. Erosion is moderate to severe. These soils have developed under a vegetation consisting mainly of soft maple and elm and are fairly well supplied with plant nutrients.

Agriculture

The King clay loam is well suited to dairy farming and some good farms have been established on this type. Most of the farm crops grown in York County have been produced with reasonably good success on this soil. The type is well adapted to the growing of cereal grains, hay and pasture.

Susceptibility to erosion is the chief hazard limiting the production of some crops. However, where dairy farming is practised, the use of forage crops and barnyard manure provides the basis for an effective and sound



The greyish knolls appearing in this picture of King clay loam show that topsoil has been lost by sheet erosion.

erosion control program. The internal drainage and supply of plant nutrients is sufficiently good to permit the growth of alfalfa and other legumes. To produce satisfactory yields, there is a need for complete fertilizer containing nitrogen, phosphorus and potassium.

King silt loam (600 acres)

Except for the texture of the surface soil the profile of the King silt loam is similar to that of the King clay loam. Land use and soil management problems are similar to those of the King clay loam.

King clay loam-steep phase (11,100 acres)

The profile of the King clay loam—steep phase is similar to that of the King clay loam. The topography of the King clay loam—steep phase is irregular steeply sloping and the soil is very susceptible to erosion. Cultivation should be limited to the smoother slopes, the steep slopes being kept under a permanent cover of trees or grass. Where soil loss has been severe, part or all of the soil profile may be missing.

(b) Imperfect Drainage

Monaghan clay loam (9,200 acres)

Monaghan clay loam is found chiefly in King Township. It has developed on calcareous heavy textured till and has been previously mapped in other parts of Ontario. The type is a member of the Grey-Brown Podzolic Great Soil Group and exhibits the following characteristics:

A_0—Thin layer of partially decomposed leaves, twigs, etc.

A_1 — 0–5 inches clay loam; very dark grey (7.5 YR 3/0); medium granular structure; friable consistency; stonefree; pH — 6.8.

A_2 — 5–13 inches clay loam; brown (7.5 YR 5/4); slightly mottled; medium nuciform structure; friable consistency; stonefree; pH — 6.5.

B_2 — 13–25 inches clay; dark greyish brown (10 YR 4/2); mottled; coarse blocky structure; hard consistency when dry, plastic when wet; stonefree; pH — 7.0.

C — Clay till; brown (10 YR 5/3); prismatic structure; hard consistency when dry, plastic when wet; calcareous; few stones; pH — 7.8.

The topography is smooth gently sloping and both internal and external drainages are slow. The type has not suffered greatly from sheet erosion and chemical tests show it to be fairly well supplied with plant nutrients.

Although most of the land has been cleared, existing woodlots show the tree cover to be dominantly soft maple and elm. Ash, ironwood, basswood and beech are also common.

Agriculture

Monaghan clay loam is used chiefly for general farming and dairying. Fairly good yields of cereal grains, hay and pasture can be obtained although crop production is limited, to some extent, by inadequate drainage. During dry seasons Monaghan soils produce good yields because of their fairly high moisture reserve.

The type is fairly well supplied with plant nutrients and the organic matter supply can be maintained by applications of barnyard manure. Maintenance of good tilth is necessary to the successful management of the Monaghan soil.

Monaghan silt loam (3,600 acres)

Developed on similar materials, Monaghan silt loam differs from Monaghan clay loam in the texture of the surface soil. Because of the lower clay content in the silt loam the soil is somewhat easier to cultivate.

SOILS DEVELOPED ON POORLY SORTED SANDS

The materials on which the soils of this group developed, were deposited by glacio-fluvial action. These materials occur in broad areas in Vaughan, King, Whitchurch and Markham Townships and consist mainly of sand with pockets of gravel and till also present. The materials are calcareous.

(*a*) *Good Drainage*

Pontypool sandy loam (21,200 acres)

The Pontypool series is the only catenary member recognized and mapped and is well drained. The profile is well developed and characteristic of the Grey-Brown Podzolic soils. The characteristics of the Pontypool sandy loam are illustrated by the following profile description:

A_0—Thin layer of partially decomposed leaves, twigs, etc.

A_1—0-4 inches sandy loam; dark greyish brown (10 YR 4/2); fine crumb structure; very friable consistency; few stones; pH—6.6.

A_{21}—4-19 inches sand; yellowish brown (10 YR 5/4); very weak platy structure; very friable consistency; stonefree; pH—6.4.

A_{22}—19-24 inches sand; light yellowish brown (10 YR 6/4); single grain structure; loose consistency; stonefree; pH—6.4.

B_2—24-34 inches loam; dark brown (10 YR 4/3); medium nuciform structure; friable consistency; few stones; pH—6.8.

C—Sand; greyish brown (10 YR 5/2); single grain structure; loose consistency; calcareous; few to frequent stones; pH—7.8.

The Pontypool sandy loam is a light textured, well drained to excessively drained soil on irregular steeply sloping topography. Although most of the area mapped has been cleared, it would appear that the Pontypool sandy loam developed under a tree cover of hard maple, beech and spruce. When cultivated, the surface soil is a greyish brown sandy loam low in organic matter. The soil is low in the elements phosphorus, potassium and nitrogen.

The steep irregular slopes of Pontypool sand should be reforested.

Agriculture

The Pontypool sandy loam is an early soil, because of the porous nature of the materials, and can be cultivated with ease. It is used for general farming,

dairying, and some cash crops are grown. A large part of the area mapped as Pontypool sandy loam is used for pasture.

Crop production is limited by low fertility and susceptibility to wind erosion. Cash crops such as potatoes, peas, tomatoes, and corn do well when the soil is heavily fertilized. However, row crops should not be grown intensively because of the danger of excessive loss of topsoil by erosion. The soil should be kept under cover for as long a proportion of time as possible. Because of low fertility levels the type is only fairly well suited for the production of cereal grains, hay and pasture.

The organic matter content is low and adequate amounts of manure should be added to build up and maintain this important component.

Pontypool sand (14,000 acres)

Pontypool sand is very susceptible to wind erosion and has a lower level of natural fertility than the Pontypool sandy loam. Where this soil has not been kept under a cover of grass or trees, serious soil loss has occurred. In some localities the entire profile has been destroyed. Part of the area has been reforested by the Department of Lands and Forests. Such a program of reforestation will prevent soil loss and increase the value of the land.

2. WELL SORTED SANDY OUTWASH

A fairly large proportion of the soils of York County has developed on well sorted sandy materials deposited by still or slowly moving water. These outwash materials assume the form of sand bars, outwash plains or beaches. The materials vary in lime content from low to high and they are stonefree. The Brighton catena has developed on high lime sands and consists of the well drained Brighton series, the imperfectly drained Tecumseth series and the poorly drained Granby series. The well drained Fox series, the imperfectly drained Brady series and the poorly drained Granby series are members of the Fox catena which has developed on the medium lime sandy outwash materials. The Percy series has developed on high lime sand that is much finer than the materials of the Brighton and Fox series. The well drained Percy series is the only catenary member recognized and mapped in York County. The Uplands catena has developed on low lime sands and only the imperfectly drained member, the Rubicon series, has been recognized and mapped in the County.

(a) Good Drainage

Brighton sandy loam (24,800 acres)

Brighton sandy loam is formed on coarse sandy outwash material and has smooth gently sloping topography and numerous areas occur in Whitchurch and East Gwillimbury Townships. It is a Grey-Brown Podzolic soil although a shallow podzol may occur in the A horizon of the Grey-Brown Podzolic profile.

The characteristics of the Brighton sandy loam are described as follows:

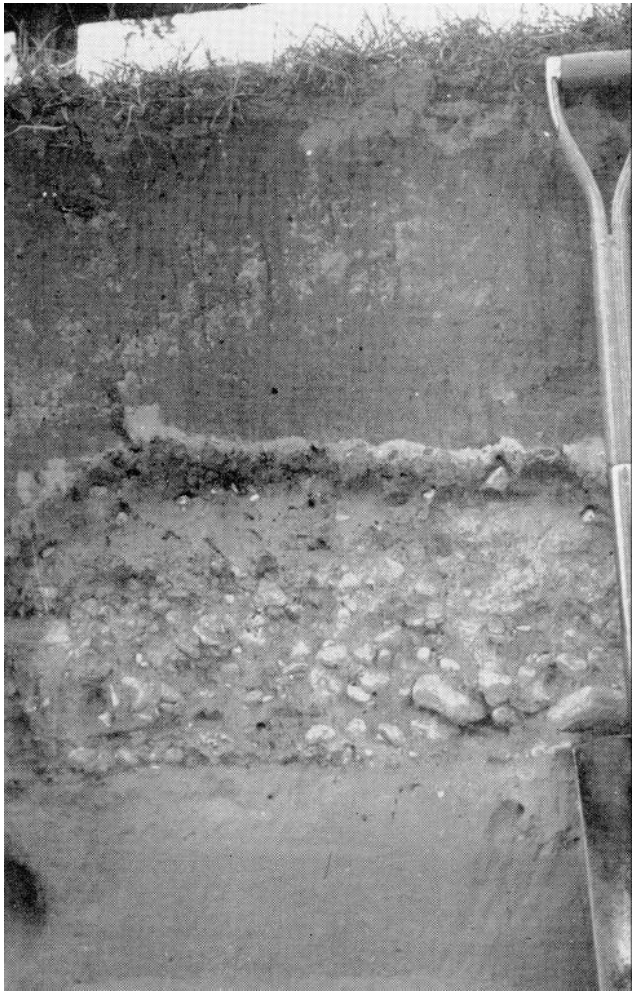
A_0 — Thin layer of partially decomposed leaves, twigs, etc.

A_1—0-4 inches sandy loam; dark greyish brown (10 YR 4/2); fine crumb structure; very friable consistency; stonefree; pH—7.0.

A_2—4-16 inches sand; brownish yellow (10 YR 6/8); single grain structure; loose consistency; stonefree; pH—6.6.

B_2—16-20 inches sand; yellowish brown (10 YR 5/6); single grain structure; loose consistency; stonefree; pH—7.0.

C —Sand; very pale brown (10 YR 7/4) ; single grain structure; loose consistency; calcareous; pH—8.0.



Brighton sandy loam over gravel has well developed A_2 and B horizons. This soil is used for the growing of horticultural crops.

In spite of the smooth gently sloping topography, Brighton sandy loam is well drained because the porosity of the materials facilitates the rapid percolation of moisture. The organic matter content of the soil is low, resulting in a low moisture holding capacity.

Most of the forest cover has been removed but remaining woodlots show the tree cover to have consisted mainly of beech, sugar maple, pine and oak.

Agriculture

Low organic matter, droughtiness and low natural fertility limit the capability of this type for the production of most crops. The soil is fairly well suited to cash crops such as potatoes, corn and peas, and provided adequate supplies of manure and fertilizers are applied, yields are adequate.

The vegetative cover in permanent pastures is usually not thick enough to prevent soil loss by wind erosion. Permanent pasture, cereal grains, and hay will produce greater yields when adequate fertility levels are established and maintained.

Brighton sandy loam over gravel (4,000 acres)

The Brighton sandy loam over gravel consists of sandy A and B horizons, similar to those of the Brighton sandy loam underlain by well sorted gravel. Gravel stones are present in varying amounts throughout the profile. Low natural fertility limits crop production on this soil.

Fox sandy loam (11,800 acres)

Fox sandy loam is found in the southern part of the County, the largest area occurring in the southeast corner of the County near Lake Ontario. It has developed on well sorted sandy outwash materials of medium lime content, and is characteristic of the Grey-Brown Podzolic Great Soil Group. Unlike the Brighton series, the Fox series has a distinct textural B horizon as is shown in the following profile description of Fox sandy loam:

A_0 — Thin layer of partially decomposed leaves, twigs, etc.

A_1 — 0–5 inches sandy loam; very dark greyish brown (10 YR 3/2); medium crumb structure; very friable consistency; stonefree; pH — 6.3.

A_{21}— 5–22 inches sand; yellowish brown (10 YR 5/4); single grain structure; loose consistency; stonefree; pH — 6.0.

A_{22}— 22–25 inches sand; pale brown (10 YR 6/3); single grain structure; loose consistency; stonefree; pH — 6.0.

B_2 — 25–38 inches loam; dark brown (10 YR 4/3); medium nuciform structure; friable consistency; stonefree; pH — 6.8.

C — Sand with occasional gravel strata; grey (10 YR 5/1); single grain structure; loose consistency; calcareous; pH — 7.6.

Much of the Fox sandy loam found near the lakeshore in York County has a characteristic double profile consisting of a Podzol profile superimposed on a Grey-Brown Podzolic profile. The following is a description of this double profile as it occurs under virgin conditions:

A_0 — Thin layer of partially decomposed leaves, twigs, etc.

A_1 — 0–3 inches sandy loam; black (10 YR 2/1); fine crumb structure; very friable consistency; stonefree; pH — 5.0.

A_2 — 3–4 inches sand; grey (10 YR 5/1); single grain structure; loose consistency; stonefree; pH — 4.2.

B_2 — 4–9 inches sand; strong brown (7.5 YR 5/6); single grain structure; loose consistency; stonefree; pH — 5.8.

B_3 — 9–23 inches sand; brownish yellow (10 YR 6/6); single grain structure; loose consistency; stonefree; pH — 6.0.

C — 23–35 inches sand; light yellowish brown (10 YR 6/4); single grain structure; loose consistency; non-calcareous; pH — 6.5.

B^{GB}— 35–39 inches sandy loam; brown (10 YR 5/3); weak nuciform structure; friable consistency; stonefree; pH — 7.2.

C — Sand; grey (10 YR 5/1); single grain structure; loose consistency; calcareous; pH — 7.6.

Fox sandy loam is well drained occurring on smooth gently sloping topography. The type is low in organic matter content and is low in potassium and phosphate. Soil loss by wind erosion is severe when the soil is left uncovered for long periods of time.

Agriculture

The Fox series is used extensively for the production of specialized crops, being well suited to the production of tree fruits, vegetables, and small fruits. The porous soil materials allow for rapid percolation of moisture, permitting early spring cultivation. Its good drainage, workability, light texture and uniformity make it especially suited to early crops.

Crop production is limited by low fertility, susceptibility to erosion and droughtiness. Nitgrogen, phosphate and potash levels should be increased and maintained by additions of mineral fertilizer. Cover crops and manure should be used to build up and maintain the organic matter content and to help prevent soil loss due to wind erosion. Because high value crops can be grown on Fox soils, heavy applications of fertilizer are profitable and desirable.

Much of the area occupied by the Fox series in York County is now being used for building sites.

Percy fine sandy loam (10,200 acres)

Developed on high lime fine sand, Percy fine sandy loam occurs in fairly large tracts in Whitchurch Township. It is a Grey-Brown Podzolic soil. The profile of Percy fine sandy loam is described below:

A_0 — Thin layer of partially decomposed leaves, twigs, etc.

A_1 — 0–5 inches fine sandy loam; very dark grey-brown (10 YR 3/2); fine crumb structure; very friable consistency; stonefree; pH — 7.2.

A_{21}— 5–18 inches sandy loam; greyish brown (10 YR 5/2); weak platy structure; very friable consistency; stonefree; pH — 7.0.

A_{22}— 18–21 inches sand; pale brown (10 YR 6/3); weak platy structure; very friable consistency; stonefree; pH — 7.0.

B_2 — 21–33 inches sandy loam; dark brown (10 YR 4/3); weak medium nuciform structure; friable consistency; stonefree; pH — 7.4.

B_3 — 33–37 inches sand; light yellowish brown (10 YR 6/4); single grain structure; loose consistency; stonefree; pH — 7.4.

C — Sand; light brownish grey (10 YR 6/2); single grain structure; loose consistency; stonefree; calcareous; pH — 7.8.

The topography is smooth gently sloping to moderately sloping, and the type is moderately susceptible to sheet erosion. Sugar maple, beech and a few basswood are the main trees associated with the type.

Agriculture

Percy fine sandy loam is used chiefly for general farming in York County, although in some areas the farm income is derived from dairying or cash cropping. The soil is adapted to the growth of wheat, oats, barley, alfalfa, hay and pasture, and is well suited to the growing of fruit and canning crops where climatic conditions are favourable. The soil is generally well adapted to these crops because it drains easily and yet retains enough moisture for plant needs. The land can easily be worked early in the spring and soon after heavy rains.

The maintenance of organic matter is important for successful production and the soil benefits from heavy applications of manure. Ploughing down green crops, such as legumes, grasses, buckwheat and rye is an excellent way to maintain the organic matter content of the soil when the supply of manure is limited. The use of commercial fertilizer to supplement barnyard or green manure should prove satisfactory since this soil is medium to low in phosphate and potash.

Tioga sandy loam (300 acres)

Tioga sandy loam occupies a very small part of the total County acreage

and occurs in Gwillimbury East Township. It usually consists of a Podzol profile developed in the upper part of a Grey-Brown Podzolic profile. The following is a profile description of Tioga sandy loam:

A_0 — Thin layer of partially decomposed leaves, twigs, etc.

A_1 — 0–3 inches sandy loam; black (10 YR 2/1); fine crumb structure; very friable consistency; stonefree; pH — 5.0.

A_{2p}—3–4 inches sand; grey (10 YR 5/1); single grain structure; loose consistency; stonefree; pH — 4.2.

B_{2p} —4–9 inches sand; strong brown (7.5 YR 5/6); single grain structure; loose consistency; stonefree; pH — 5.8.

B_{3p}—9–23 inches sand; brownish yellow (10 YR 6/6); single grain structure; loose consistency; stonefree; pH — 6.0.

A_2 — 23–35 inches sand; light yellowish brown (10 YR 6/4); single grain structure; loose consistency; non-calcareous; pH — 6.5.

B_2 — 35–39 inches sandy loam; brown (10 YR 5/3); weak nuciform structure; friable consistency; stonefree; pH — 7.2.

C — Sand; grey (10 YR 5/1); single grain structure; loose consistency; calcareous; pH — 7.6.

The Tioga occurs as a smooth gently sloping outwash plain with low external drainage and rapid internal drainage. Tree cover consists mainly of sugar maple and beech although a secondary growth of poplar, balsam and cedar may occur in areas where the maple and beech have been removed. The natural fertility of the soil is low and the surface reaction is medium to strongly acid.

Agriculture

Most of the Tioga sandy loam in York County is used for permanent pasture. Crop production is limited by low fertility and susceptibility to wind erosion and yields of spring grains, hay and pasture are usually low. Additions of commercial fertilizer, barnyard and green manures will help to increase the yields of these crops.

When heavy applications of fertilizer are made, good potato crops can be grown. When the soil is cultivated, cover crops and windbreaks should be used to reduce the loss of soil by wind erosion. The soil is droughty and crop failures may occur in dry years.

(b) *Imperfect Drainage*

Tecumseth sandy loam (15,200 acres)

Tecumseth sandy loam which occurs in the northern part of the County, is characteristic of the Grey-Brown Podzolic soils. The series is the imperfectly

drained member of the Brighton catena. Water percolates at a fair rate through the profile but run-off is low. A profile description of Tecumseth sandy loam developed under tree cover follows:

A_0 — Thin layer of partially decomposed leaves, twigs, etc.

A_1 — 0–4 inches sandy loam; very dark grey (10 YR 3/1); fine crumb structure; loose consistency; stonefree; pH — 7.2.

A_2 — 4–9 inches sand; light yellowish brown (10 YR 6/4); slightly mottled; single grain structure; loose consistency; stonefree; pH — 7.0.

B_2 — 9–17 inches sand; yellowish brown (10 YR 5/6); single grain structure; loose consistency; stonefree; pH — 7.4.

C — Sand; very pale brown (10 YR 7/4); single grain structure; loose consistency; calcareous; stonefree; pH — 8.0.

The topography is smooth very gently sloping. Erosion is slight except where inadequate cover allows soil loss by wind to occur. The natural vegetation consists mainly of soft maple and elm. Aspen, cedar and silver birch commonly occur as second growth in some areas. The type is low in natural fertility. The potash, phosphate, and nitrogen levels are all low.

Agriculture

Tecumseth sandy loam is used chiefly for general farming and produces fair crops of cereal grains, hay and pasture. Tree fruits and canning crops could be grown to advantage where climatic conditions are favourable.

The sandy materials are generally low in fertility and regular applications of manure and commercial fertilizers are required. Fertilizer mixes high in phosphate should increase yields of cereal grains and mixes high in potash are required for canning crops. If high value crops requiring good drainage are grown, the moisture relations can be improved by tile draining. The soil should be kept under a cover of trees or grass for as long a proportion of time as possible to prevent soil loss due to wind erosion.

Tecumseth sandy loam over gravel (500 acres)

The Tecumseth sandy loam over gravel consists of sandy A and B horizons, similar to those described for the Tecumseth sandy loam underlain by well sorted gravel. The stones occur in varying amounts throughout the profile but usually do not seriously interfere with cultivation.

Brady sandy loam (1,500 acres)

Brady sandy loam is found in association with the Fox series in the southern part of the County. It is the imperfectly drained member of the Fox catena and is a Grey-Brown Podzolic soil. The profile of the Brady sandy loam developed under tree cover is described as follows:

A_0 — Thin layer of partially decomposed leaves, twigs, etc.

A_1 — 0–5 inches sandy loam; very dark greyish brown (10 YR 3/2); medium crumb structure; very friable consistency; stonefree; pH — 6.5.

A_2 — 5–14 inches sand; yellowish brown (10 YR 5/4); mottled; single grain structure; loose consistency; stonefree; pH — 6.1.

B_2 — 14–26 inches sandy loam; dark brown (10 YR 4/3); mottled; medium nuciform structure; friable consistency; stonefree; pH — 6.8.

C — Sand with occasional gravel strata; grey (10 YR 5/1); single grain structure; loose consistency; calcareous; pH — 7.6.

The topography is smooth gently sloping. Internal drainage is moderate and external drainage is low. Most of the type has been cleared but soft maple and elm are the dominant tree species found in the existing woodlots. The type is low in potassium and phosphorus and is medium to low in organic matter content.

Agriculture

Brady sandy loam is mainly used for general farming. Yields of cereal grains, hay and pasture are fair. Tree fruits, vegetables, and small fruits can be grown where climatic conditions are favourable.

Yields on the soil are low unless adequate amounts of fertilizer are used. Best results are obtained on the type when drainage is improved. Organic matter such as green manure, stable manure and muck incorporated into the soil will greatly benefit the plants.

The improvement of the Brady soils involves soil management that tends to make the surface soil more uniform in organic matter, moisture-holding capacity and general fertility.

Rubicon sandy loam (400 acres)

The Rubicon series as mapped in York County is not as variable in topography and drainage as that mapped in Eastern Ontario and the underlying materials are somewhat higher in lime than those in Eastern Ontario. It is a Ground-Water Podzol that exhibits the following profile characteristics:

A_0 — Thin layer of partially decomposed leaves, twigs, etc.

A_1 — 0–2 inches sandy loam; black (10 YR 2/1); fine crumb structure; very friable consistency; stonefree; pH — 5.8.

A_2 — 2–5 inches sand; grey (10 YR 6/1); mottled; single grain structure; loose consistency; stonefree; pH — 5.4.

B_1—5-14 inches sand; yellowish red (5 YR 4/8); single grain structure; loose consistency; sometimes indurated or with ortstein concretions; stonefree; pH— 5.8.

B_2—14-26 inches sand; yellowish red (5 YR 4/6); single grain structure; loose consistency; often with ortstein concretions dark reddish brown (5 YR 3/4) in colour; stonefree; pH—5.8.

B_3—26-34 inches sand; yellow (10 YR 7/6); mottled; single grain structure; loose consistency; stonefree; pH—5.8.

C —Sand; light grey (10 YR 7/2); single grain structure; loose consistency; stonefree; non-calcareous; pH—7.0.

Rubicon sandy loam is a Ground-Water Podzol. Note the ashy-grey A_2 horizon.

Because of very gently sloping topography external drainage is slow. The internal drainage is usually moderate but drainage conditions usually vary within very short distances because of numerous small knolls and depressions. The natural vegetation in the existing woodlots consists mainly of soft maple and elm with cedar, aspen poplar, and silver birch occurring in lesser amounts.

Agriculture

Most of the soil is in pasture but a small proportion of the type has been cultivated and crops are fair to poor where sound management practices have not been followed. The soil is mainly used for general farming purposes. Potatoes can be grown on this soil with a fair amount of success.

Chemical tests indicate that Rubicon sandy loam is low in practically all plant nutrients. On most areas, lime and heavy applications of commercial fertilizers are needed for the production of legumes. Areas left to permanent pasture usually contain a vegetative cover largely dominated by Red Top and Canada Blue grass. There appears to be a place for an effective pasture improvement program on this soil type. Due to the geographic location of the Rubicon soils in York County, they are not used for growing the high value crops commonly found on the Brady and, to a lesser extent, the Tecumseth soils.

The use of the soil is limited by the lack of adequate drainage. Obtaining suitable outlets may prove an obstacle to drainage improvement.

(c) *Poor Drainage*

Granby sandy loam (15,200 acres)

The poorly drained member of the well sorted sandy outwash soils is mapped as the Granby series. Granby sandy loam is the only type of the series occurring in York County and is found chiefly in the northern townships. It is poorly drained and the profile is characteristic of the Dark Grey Gleisolic soils. The following is a profile description of Granby sandy loam:

A_0 — Thin layer of partially decomposed leaves, twigs, etc.

A_1 — 0–7 inches sandy loam; very dark brown (10 YR 2/2); fine crumb structure; very friable consistency; stonefree; pH — 7.4.

G — 7–21 inches sand; light brownish grey (10 YR 6/2); very mottled; mottles brown (10 YR 5/3) in colour; single grain structure; loose consistency; stonefree; pH — 7.4.

C — Sand; light grey (10 YR 7/2) mottled; single grain structure; loose consistency; calcareous; stone free; pH — 8.0.

The topography is smooth very gently sloping to level and the drainage is very slow. The high water table has favoured the development of a surface high in organic matter content, and in some areas, the accumulation of free carbonates in the solum. The natural vegetation consists mainly of elm, ash and cedar with a second growth of willow and aspen poplar occurring in some areas.

Agriculture

Most of the Granby sandy loam is used for permanent pasture or trees. The soil is late in the spring and is often used for short season crops such as buckwheat. A wider range of crops could be grown if drainage were improved but the installation of tile may prove difficult because of the lack of suitable outlets. If drainage is improved the organic matter content of the soil should be maintained by additions of barnyard manure.

Perhaps the most profitable land use for the Granby sandy loam is to seed it with suitable grasses to provide forage when upland pastures are suffering from drought.

3. WELL SORTED GRAVELLY OUTWASH

The well sorted gravelly outwash was deposited in slowly moving water and occurs as outwash plains. The materials are calcareous, although those in the southern part of the County have a lower lime content than those found in the north.

The well drained series developed on these materials in York County are the Burford, and Sargent. The Burford series is developed on medium lime materials and is the well drained member of the Burford catena. The Gilford series is the poorly drained member of the Burford catena and is the only other member mapped in the County. The Sargent series is the well drained member developed on high lime gravelly outwash, and the Gwillimbury series is the imperfectly drained member of the Sargent catena.

(a) Good Drainage

Burford loam (400 acres)

The Burford series is developed on well sorted gravelly materials derived largely from limestone and containing smaller proportions of shaley materials. The Burford is the well drained member of the catena of the same name and exhibits the characteristics of the Grey-Brown Podzolic Great Soil Group. The following is a description of a profile developed under tree cover:

A_0 — Thin layer of partially decomposed leaves, twigs, etc.

A_1 — 0–4 inches loam; very dark greyish brown (10 YR 3/2); fine granular structure; very friable consistency; cobbles; pH — 6.5.

A_{21}— 4–18 inches sandy loam; yellowish brown (10 YR 5/8); weak platy structure; very friable consistency; few stones; pH — 5.8.

A_{22}— 18–21 inches sandy loam; light yellowish brown (10 YR 6/4); weak platy structure; very friable consistency; few stones; pH — 5.8.

B_2 — 21–36 inches clay loam; dark brown (7.5 YR 4/4); coarse nuciform structure; firm consistency; stony; pH — 6.8.

C — Well sorted gravel; grey (10 YR 6/1); single grain structure; loose consistency; calcareous; pH — 7.6.

The topography of the Burford loam is smooth gently sloping, and erosion is slight. The natural vegetation found in the woodlots consists mainly of sugar maple and beech. External drainage is moderage and internal drainage is rapid.

Agriculture

The Burford loam in York County is used chiefly for dairying and general farming. It is fairly well suited for the growing of cereal grains, hay and pasture. Yields may be limited by low inherent fertility. The soil is well suited to certain high value cash crops such as tree fruits and small fruits provided the climatic environment is favourable.

The low nitrogen, phosphorus, and potassium content can be built up and maintained by additions of commercial fertilizer. Barnyard manure should be used to maintain adequate organic matter levels. Erosion is slight and can be controlled by the use of long rotations.

Sargent sandy loam (1,200 acres)

Occurring in North Gwillimbury and Georgina Townships, Sargent sandy loam is developed in calcareous gravelly materials. Although most profiles are characteristic of the Brown Forest Great Soil Group some have weakly developed characteristics of the Grey-Brown Podzolic soils. The following is a description of a Sargent sandy loam profile occurring under natural forest cover:

A_0 — Thin layer of partially decomposed leaves, twigs, etc.

A_1 — 0–3 inches sandy loam; very dark brown (10 YR 2/2); fine crumb structure; very friable consistency; gravelly and stony; calcareous; pH — 7.2.

B_2 — 3–12 inches sandy loam; dark brown (10 YR 4/3); weak fine nuciform structure; friable consistency; stony; calcareous; pH — 7.4.

C — Sand and gravel; yellowish brown (10 YR 5/4); single grain structure; loose consistency; stony; calcareous; pH — 8.0.

Profiles more characteristic of the Grey-Brown Podzolic soils have a thin A_2 horizon present and the B horizon is somewhat finer in texture. The topoggraphy is smooth gently sloping and erosion is slight. Because of coarse, open materials drainage is good. The tree cover consists mainly of beech and sugar maple.

Agriculture

Sargent sandy loam is most commonly used for general farming. Fairly good yields are obtained from oats, alfalfa, timothy, and pasture. Where these soils occur close to Lake Simcoe they are used for growing horticultural crops.

Although rapid percolation of moisture permits the soil to warm up early in the spring, a droughty condition often exists during the warm summer months.

Moisture can be conserved to some extent by maintaining the supply of organic matter in the soil by additions of barnyard manure.

The natural fertility of the type is low and good results are usually obtained when fertilizer mixes high in phosphorus, potassium and nitrogen are used. Stones may be an obstacle to cultivation.

(b) *Imperfect Drainage*

Gwillimbury sandy loam (400 acres)

The Gwillimbury series is the imperfectly drained member of the Sargent catena. Only a very small area of the type occurs in York County. The following is a description of a Gwillimbury loam profile:

A_0 — Thin layer of partially decomposed leaves, twigs, etc.

A_1 — 0–6 inches sandy loam; very dark brown (10 YR 2/2); fine granular structure; friable consistency; calcareous; few stones; pH — 7.0.

B_2 — 6–19 inches loam; dark brown (10 YR 4/3); slightly mottled; medium nuciform structure; friable consistency; stony; pH — 7.4.

C — Gravelly outwash; pale brown (10 YR 6/3); single grain structure; loose consistency; calcareous; pH — 8.0.

The topography is smooth very gently sloping and the external drainage is slow. The internal drainage is moderate.

The natural vegetation consists mainly of elm, soft maple and a few cedar.

Agriculture

Gwillimbury sandy loam is used chiefly for pasture and woodlot growth. Imperfect drainage and low fertility limit crop production. However, when drainage is improved and fertility levels are maintained, fair yields of cereal grains, hay and pasture can be obtained.

The organic matter content is medium and phosphorus and potassium levels are low.

Gilford loam (500 acres)

Gilford loam is a poorly drained soil with level to depressional topography and is representative of the Dark Grey Gleisolic Great Soil Group.

The natural vegetation consists of both deciduous and coniferous trees with elm, ash, aspen and white cedar being most common.

The following is a description of Gilford loam:

A_0 — Thin layer of partially decomposed leaves, twigs, etc.

A_1 — 0–7 inches loam; very dark brown (10 YR 2/2); fine granular structure; friable consistency; gravelly; pH — 7.0.

G — 7–26 inches loam; light yellowish brown (10 YR 6/4); very mottled; massive structure; friable consistency; few stones; pH — 7.2.

C — Gravel and cobbles; very pale brown (10 YR 7/3); calcareous; pH — 7.8.

Occasional strata of sand or silt may be present in the C horizon. The organic matter content of the surface soil is medium and the surface reaction is about neutral.

Agriculture

The areas of Gilford loam in the County are small and usually support pasture or trees. Crop production is limited by poor drainage although spring grains and hay can be grown during dry seasons. In late seasons buckwheat is often the only crop that can be planted. Drainage improvement is of prime importance if a wide range of crops is to be grown. However the installation of tiles may be troublesome because of the difficulty of finding an outlet.

The soil is well supplied with organic matter and the potassium and phosphorous levels are medium to low.

C. SOILS DEVELOPED ON SANDS UNDERLAIN BY LOAMY LIMESTONE TILL

Small areas of soil developed on sands underlain by loamy limestone till occur along the York-Ontario County boundary. The till is similar to that of the Bondhead catena while the coarser textured overburden resembles closely the materials of the Pontypool series.

The Dundonald series, which is the well drained member of the Dundonald catena, is the only catenary member recognized and mapped in York County. The Dundonald soils are placed in the Grey-Brown Podzolic Great Soil Group.

(*a*) *Good Drainage*

Dundonald sandy loam (1,000 acres)

Occupying only a small part of the total land area of York County, Dundonald sandy loam has smooth moderately sloping topography. The profile exhibits the following characteristics:

A_0 — Thin layer of partially decomposed leaves, twigs, etc.

A_1 — 0–4 inches sandy loam; dark greyish brown (10 YR 4/2); fine crumb structure; very friable consistency; stonefree; pH — 6.8.

A_{21}— 4–12 inches sand; dark yellowish brown (10 YR 4/4); single grain structure; loose consistency; stonefree; pH — 6.6.

A_{22}— 12–18 inches sand; yellowish brown (10 YR 5/6); single grain structure; loose consistency; stonefree; pH — 6.4.

B_2 — 18–22 inches loam; dark yellowish brown (10 YR 4/4); weak medium nuciform structure; friable consistency; few stones; pH — 7.0.

D — Loamy till; grey (10 YR 6/1) prismatic structure; hard consistency; stony; calcareous; pH — 8.0.

The depth of overburden is variable, being deepest when the type occurs close to the sandy materials of the Pontypool series. The B horizon is occasionally formed in the sandy overburden but usually is found at the juncture of the overburden and underlying till. When present, the C horizon is a pale brown calcareous sand. External drainage is medium and internal drainage is rapid. Tree cover consists mainly of sugar maple and beech, with pine and oak occurring in smaller amounts. The type is moderately susceptible to erosion.

Agriculture

The type appears to be well suited for general farming purposes. Cereal grains, alfalfa, hay and pasture are grown and, if climatic conditions are satisfactory, specialized crops such as tree fruits and canning crops can be grown with success.

The natural fertility of the type is low and crops usually respond to additions of mineral fertilizers. Organic matter maintenance is important and frequent additions of barnyard manure should be made. Crop rotations containing a high proportion of hay and pasture can be used effectively in reducing soil loss by erosion. The use of cover crops will also reduce the erosion hazard. The practice of leaving the soil bare during the winter months contributes greatly to the erosion hazard.

D. SOILS DEVELOPED ON SANDS UNDERLAIN BY CLAY TILL

The outwash materials are similar to those of the Brighton catena while the clay till resembles that of the Chinguacousy catena. The depth of sand is variable ranging from a veneer of a few inches in depth up to three feet. Three series were mapped, the Bookton occurring on well drained sites, the Berrien on the imperfectly drained sites, and the Wauseon on the poorly drained locations. Where the sand deposit is a foot or more in depth and the drainage is good, a profile has developed which exhibits Grey-Brown Podzolic characteristics.

(*a*) *Good Drainage*

Bookton sandy loam (3,100 acres)

Bookton sandy loam is a well drained soil with smooth gently sloping to smooth moderately sloping topography. A wide range of profiles occurs depending on the depth of sand overburden. A commonly occuring profile exhibits the following characteristics:

A_0 — Thin layer of partially decomposed leaves, twigs, etc.

A_1 — 0–3 inches sandy loam; dark greyish brown (10 YR 4/2); fine crumb structure; very friable consistency; stonefree; pH — 6.6.

A_2 — 3–8 inches sand; yellowish brown (10 YR 5/6); single grain structure; loose consistency; stonefree; pH — 6.6.

B_2 — 8–16 inches sand; dark brown (10 YR 4/3); single grain structure; loose consistency; stonefree; pH — 6.8.

B_3 — 16–22 inches sand; brown (10 YR 5/3); single grain structure; loose consistency; stonefree; pH — 7.0.

C — 22–23 inches sand; greyish brown (10 YR 5/2); single grain structure; loose consistency; calcareous; pH — 7.6.

D — Clay till; brown (10 YR 5/3); prismatic structure; hard consistency; calcareous; pH — 7.6.

Although there is a wide variation in the depth of sandy overburden, the heavy clay till usually occurs at depths of about 30 inches. When the B horizon is formed at the juncture of the sandy overburden and the underlying till, an A-B-D profile is found.

The natural vegetation found in the woodlots consists mainly of hard maple, beech, and spruce.

Agriculture

Bookton sandy loam in York County is used for dairying and general farming. The sandy veneer is low in phosphorus and potassium, but the underlying clay till is better supplied with these elements. The type is fairly well suited to the production of cereal grains, hay and pasture. Vegetables, tree fruits and small fruits should do well where the climatic environment is satisfactory.

Fertility and organic matter maintenance are the main requirements for successful farming on this soil. Satisfactory nutrient and structural condition can be maintained by soil management practices commonly associated with successful dairy farming operations.

(b) *Imperfect Drainage*

Berrien sandy loam (7,900 acres)

The Berrien series is the imperfectly drained member of the Bookton catena and exhibits the characteristics of the Grey-Brown Podzolic Great Soil Group. The topography is smooth gently sloping. The profile description is as follows:

A_0 — Thin layer of partially decomposed leaves, twigs, etc.

A_1 — 0–5 inches sandy loam; dark greyish brown (10 YR 4/2); fine crumb structure; very friable consistency; stonefree; pH — 6.8.

A_2 — 5–9 inches sand; pale brown (10 YR 6/3); mottled; single grain structure; loose consistency; stonefree; pH — 6.6.

B_2 — 9–19 inches sand; dark brown (10 YR 4/3); mottled; single grain structure; loose consistency; stonefree; pH — 7.2.

B_3 — 19–29 inches sand; yellowish brown (10 YR 5/6); single grain structure; loose consistency; stonefree; pH — 7.2.

C — 29–32 inches sand and gravel; greyish brown (10 YR 5/2); single grain structure; loose consistency; calcareous; pH — 7.6.

D — Clay till; brown (10 YR 5/3); prismatic structure; hard consistency when dry, plastic when wet; calcareous; pH — 7.6.

The heavy clay till usually appears at depths of three feet and less. Although an arbitrary depth of 3 feet and less of sandy overburden has been established for the Berrien series, occasionally the sand deposits are more variable. In places the clay may come to the surface between sandy swells. Often it is difficult to recognize the C horizon.

The natural drainage is imperfect, the run-off being low and the permeability slow. The natural vegetation consists mainly of soft maple, elm, and ash. Coniferous species such as hemlock, cedar, and spruce may also occur.

Agriculture

The Berrien sandy loam mapped in York County occurs in the dairying district in the central part of the County and is used for the production of oats, hay and pasture. Cash crops can be successfully grown where climate permits. The chief limitations to successful crop production are low fertility and inadequate drainage. High fertility levels are required particularly where cash crops are grown, and should be maintained by additions of mineral fertilizer and barnyard manure.

(c) *Poor Drainage*

Wauseon sandy loam (800 acres)

Wauseon sandy loam is the poorly drained member of the Bookton catena and exhibits characteristics of the Dark Grey Gleisolic Great Soil Group. Only a small acreage occurs in York County.

The topography is level to depressional. The run-off is very low and the permeability is slow.

The following is a generalized profile description:

A_0 — Thin layer of partially decomposed leaf litter.

A_1 — 0–9 inches very dark brown (10 YR 2/2) sandy loam; brown mottlings appear in the lower part of the horizon; fine granular structure; very friable consistency; pH — 7.3.

G — 9–15 inches yellow-brown (10 YR 5/6) grading to greyish brown (10 YR 5/2) sand; single grain structure; very friable consistency; pH — 7.4.

C—15-18 inches light yellow-brown (10 YR 6/4) sand; single grain structure; calcareous; very friable; pH—7.6.

D—Grey (10 YR 5/1) clay till; yellow-brown mottlings; fragmental structure; plastic consistency when wet, hard when dry; pH—8.2.

Occasionally the glei layer rests on the clay till. The clay till usually appears at a depth of 3 feet or less. The natural vegetation consists mainly of elm and aspen. Trees such as soft maple, willow, white cedar and ash are also present.

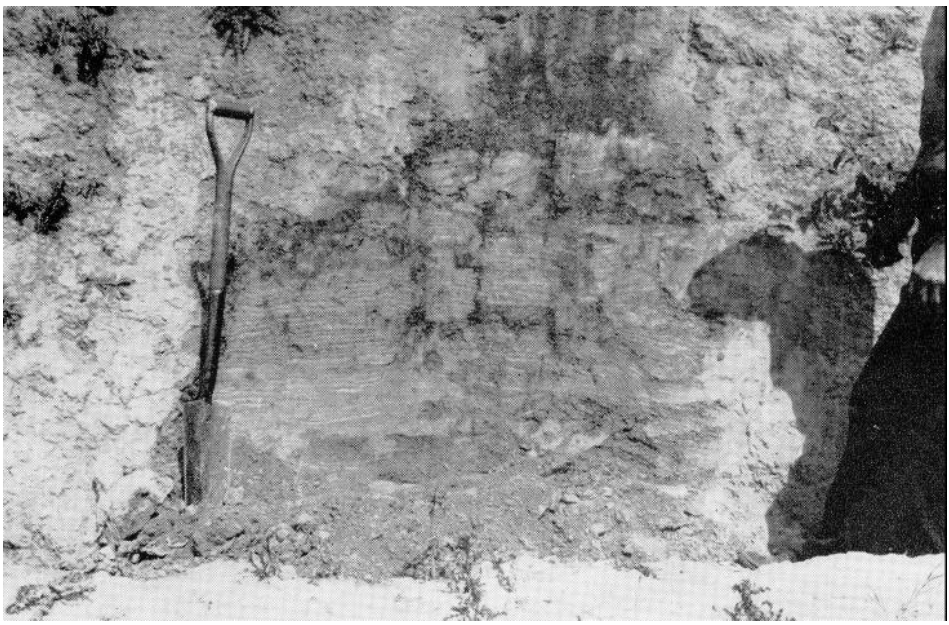
The cultivated surface layer is a black sandy loam approximately nine inches deep. The organic matter content is medium to high and the levels of available plant nutrients are low. The surface reaction is usually neutral.

Agriculture

This series is used largely for permanent pasture and woodland. It is not well suited to the production of most farm crops and poor drainage lessens its usefulness as pasture land because of the low quality grasses it supports. It is a late soil in the spring and often buckwheat is the only grain crop planted. Areas that have been retired to permanent pasture are being invaded by willows and scrub tree growth. Drainage improvement is difficult because of the trouble in obtaining outlets and the presence of the heavy textured clay till at moderately shallow depths.

E. SOILS DEVELOPED ON STONEFREE CLAYS AND SILTS

The Schomberg catena has developed on very pale brown clays and silts with high lime content. The lacustrine deposits occur in fairly large expanses



Often the parent material of the Schomberg soils is varved.

in Whitchurch and East Gwillimbury Townships. It is possible the materials in the Newmarket vicinity owe their origin to the water of the Schomberg "ponding" and those in the Lake Simcoe area owe their origin to the waters of glacial Lake Algonquin.* The materials are often varved consisting of alternate layers of silt and clay. Free cabonates occur in the parent material.

The Schomberg catena consists of the well drained Schomberg series, the imperfectly drained Smithfield series and the poorly drained Simcoe series. The Schomberg is correlated with the Grey-Brown Podzolic Great Soil Group. The Smithfield exhibits horizons somewhat more weakly defined than those of the Schomberg but is correlated with the Grey-Brown Podzolic Great Soil Group. The Simcoe series has developed under high moisture conditions and is a typical member of the Dark Grey Gleisolic Great Soil Group.

(*a*) *Good Drainage*

Schomberg silt loam (5,100 acres)

The Schomberg soils have been formed from lacustrine deposits which consist of alternate layers of calcareous silt and clay. The profile is well developed and is described below:

A_0 — Thin layer of partially decomposed leaves, twigs, etc.

A_1 — 0–4 inches silt loam; very dark grey (10 YR 3/1); medium granular structure; friable consistency; stonefree; pH — 6.8.

A_{21}— 4–11 inches silt loam; light yellowish brown (10 YR 6/3); weak platy structure; friable consistency; stonefree; pH — 6.8.

A_{22}— 11–15 inches silt loam; light brownish grey (10 YR 6/2); weak platy structure; friable consistency; stonefree; pH — 6.6.

B_2 — 15–23 inches clay; dark yellowish brown (10 YR 4/4); coarse blocky structure; very plastic consistency when wet, very hard when dry; stonefree; pH — 7.4.

C — Silt and clay layers; silt light grey (10 YR 7/2); clay grey-brown in colour (10 YR 5/2); medium platy structure; plastic consistency when wet, hard when dry; stonefree; calcareous; pH — 8.0.

The Schomberg soils are cleared except for small woodlots where sugar maple and beech are the dominant species found. The topography is smooth moderately sloping and the soil is susceptible to sheet erosion. Internal drainage is slow and external drainage is high.

Agriculture

The Schomberg silt loam is one of the most fertile soils in the area and is largely used for dairying, stock raising and mixed farming. The soil is well

* Chapman, L. J., and Putnam, D. F. — The Physiography of Southern Ontario. University of Toronto Press, Toronto, 1951.

Schomberg silt loam is characteristic of the Grey-Brown Podzolic soils. The profile is stonefree.

suited to clover and alfalfa production. Yields of oats average 40-50 bushels per acre and fall wheat 30 to 40 bushels per acre but yields much in excess of these have been obtained. The type is also suited to the production of corn, barley and forage crops.

The soil, although quite productive, usually requires additions of phosphorus and barnyard manure. The use of barnyard manure or the ploughing down of green crops will help to maintain the organic matter content and improve the physical condition. Although there is a widespread need for phosphorus fertilizers, potassium and nitrogren are also required.

Erosion is one of the most serious problems on the Schomberg silt loam. Moderate slopes and fine texture cause a large percentage of the rainfall to run over the surface carrying with it the valuable topsoil. Soil loss can be reduced greatly, by keeping the land under cover for as long a proportion of

time as possible and by using specialized practices such as contour tilling, and strip cropping, where applicable. Gully erosion can be prevented to a large extent through the use of grass waterways.

Schomberg clay loam (16,800 acres)

Similar to the Schomberg silt loam except for texture of the surface horizons, Schomberg clay loam has a slightly higher level of natural fertility. Soil management problems are similar to those on the silt loam except that the soil is somewhat more difficult to work. Cultivation should be avoided when the soil is excessively wet.

Schomberg clay loam—steep phase (4,300 acres)

Small areas occurring at the edge of the interlobate moraine have irregular steeply sloping topography and have been mapped as a steep phase. These areas are very susceptible to erosion and are probably best used for pasture or reforestation purposes.

(b) *Imperfect Drainage*

Smithfield clay loam (3,900 acres)

Smithfield clay loam is one of the minor types occurring in the County occupying 0.7 per cent of the total area. The series is the imperfectly drained member of the Schomberg catena. One type has been mapped in the Smithfield series, the clay loam, which is described below:

A_0 — Thin layer of partially decomposed leaves, twigs, etc.

A_1 — 0–5 inches clay loam; very dark grey (10 YR 3/1); medium granular structure; friable consistency; stonefree; pH — 6.8.

A_2 — 5–8 inches clay loam; light yellowish brown (10 YR 6/3); mottled; weak platy structure; friable consistency; stonefree; pH — 6.4.

B_2 — 8–20 inches clay; very dark greyish brown (10 YR 3/2); coarse blocky structure; very plastic consistency when wet, very hard when dry; stonefree; pH — 7.3.

C — Clay and silt layers; silt light grey in colour (10 YR 7/2); clay greyish brown (10 YR 5/2); medium platy structure; plastic consistency when wet, hard when dry; calcareous; stonefree; pH — 8.0.

Surface stones are present in some areas where the type occurs close to a till or other soil developed from stony materials. Smithfield clay loam is imperfectly drained, having moderate to low external drainage and slow internal drainage. The topography is smooth gently sloping and erosion is slight. The natural vegetation consists mainly of soft maple and elm.

Agriculture

Although inadequate drainage limits the use of Smithfield clay loam to some extent, it is used for stock raising, dairying and mixed farming. Fair crops of oats, red clover, corn and pasture are grown. Alfalfa should produce good yields if the drainage is improved.

Fertility should be maintained by the use of barnyard manure and commercial fertilizers. Additions of manure are also required for the maintenance of satisfactory soil structure.

(c) *Poor Drainage*

Simcoe clay loam (4,600 acres)

The Simcoe series is the poorly drained member of the Schomberg catena. Simcoe clay loam occurs in association with the Schomberg soils and the area of the type mapped in the County is small. A Dark Grey Gleisolic type of profile has developed in which it is difficult to observe horizon differentiation. The tree cover which may be observed in the remaining woodlots is chiefly composed of elm, ash and cedar. The following is a description of Simcoe clay loam occurring under natural forest cover:

A_0 — Thin layer of partially decomposed leaves, twigs, etc.

A_1 — 0–6 inches clay loam; very dark brown (10 YR 2/2); medium granular structure; friable consistency when dry, plastic when wet; stonefree; pH — 7.2.

G_1 — 6–12 inches clay; greyish brown (10 YR 5/2); very mottled; medium blocky structure; very hard consistency when dry, very plastic when wet; stonefree; pH — 7.4.

G_2 — 12–20 inches clay; light brownish grey (10 YR 6/2); very mottled; coarse blocky structure; very hard consistency when dry, very plastic when wet; stonefree; pH — 7.4.

C — Clay and silt layers; silt light grey in colour (10 YR 7/2), clay greyish brown (10 YR 5/2); medium platy structure; hard consistency when dry, plastic when wet; calcareous; stonefree; pH — 8.0.

Free carbonates often occur throughout the solum. The parent material may or may not be varved or layered.

The topography is very gently sloping. External drainage is low and internal drainage is very slow. The humus content of the Simcoe clay loam is medium to high and the surface is usually very dark grey to black in colour.

Agriculture

Crop growth on Simcoe clay loam is limited by poor drainage, and the type is used chiefly for pasture. Some crops such as oats and hay do fairly

well in dry years. However, before a wide range of crops can be grown drainage must be improved.

Additions of barnyard manure are required to maintain soil structure when drainage is improved. The fertility requirements are similar to the other members of the catena.

Simcoe silt loam (4,000 acres)

Practically all of the Simcoe silt loam has been cleared and it is used for mixed farming. Similar to the Simcoe clay loam, crop production is limited by poor drainage. Fair crops of oats, hay and pasture are grown.

SOILS DEVELOPED ON STONEFREE CLAYS UNDERLAIN BY CLAY TILL

The parent material of this group of soils was deposited by still water as a thin veneer over the underlying clay till. It is possible the lacustrine materials owe their origin to the waters of glacial Lake Peel. Free carbonates commonly occur in both the lacustrine and till materials.

The Cashel catena has developed on the high lime lacustrine clays underlain by heavy textured clay till. Three members of the catena were recognized and mapped in the County consisting of the well drained Cashel series, the imperfectly drained Peel series, and the poorly drained Malton series.

(*a*) *Good Drainage*

Cashel clay (11,600 acres)

The Cashel clay occurs in the townships of Vaughan and Markham. Smooth moderately sloping topography and good drainage are characteristic of this type. The following is a profile description of Cashel clay developed under natural forest conditions:

A_0 — Thin layer of partially decomposed leaves, twigs, etc.

A_1 — 0–5 inches clay; dark greyish brown (10 YR 4/2); medium granular structure; friable consistency when dry, plastic when wet; stonefree; pH — 6.6.

A_2 — 5–13 inches clay; yellowish brown (10 YR 5/4); fine nuciform structure; firm consistency when dry, plastic when wet; stonefree; pH — 6.6.

B_2 — 13–23 inches clay; dark brown (10 YR 4/3); medium nuciform structure; very plastic consistency when wet, very hard when dry; stonefree; pH — 7.2.

C — 23–26 inches clay; greyish brown (10 YR 5/2); medium nuciform structure; very plastic consistency when wet, very hard when dry; stonefree; calcareous; pH — 7.8.

D — Clay till; light greyish brown (10 YR 6/2); fragmental structure; very hard consistency when dry, very plastic when wet; gritty; few stones; calcareous; pH — 7.8.

The solum is stonefree but usually contains small bits of shale. The internal drainage is slow but there is sufficient fall towards the stream courses to permit adequate external drainage. The type has suffered from sheet erosion to some extent and gully erosion may require control measures, particularly along stream courses. The tree cover appears to have been dominated by oak, hard maple and pine.

Agriculture

Cashel clay is used for dairying and general farming. It is well suited to the production of cereal grains, legumes, hay and pasture. Susceptibility to erosion is the chief limitation to crop production. Soil loss can be lessened by the use of forage crops in a long rotation.

The organic matter content is medium to high but should be maintained by additions of manure. Organic matter is necessary, particularly in clay soils, to keep a satisfactory soil structure. Chemical tests show the Cashel clay to be fairly well supplied with plant nutrients. Fertility requirements will vary according to the previous management and crop to be grown and should be determined through the use of a soil test.

(b) *Imperfect Drainage*

Peel clay (51,000 acres)

The Peel series is the imperfectly drained member of the Cashel catena and occupies a large section of Vaughan and Markham Townships. Formed from stonefree lacustrine materials, Peel clay is a neutral to slightly acid soil with clay till appearing at depths of three feet and less. The Peel exhibits the characteristics of the Grey-Brown Podzolic Great Soil Group.

A_0 — Thin layer of partially decomposed leaves, twigs, etc.

A_1 — 0–6 inches clay; dark greyish brown (10 YR 4/2); medium granular structure; friable consistency when dry, plastic when wet; stonefree; pH — 6.8.

A_2 — 6–8 inches clay; light yellowish brown (10 YR 6/4); medium nuciform structure; firm consistency when dry, plastic when wet; stonefree; pH — 6.5.

B_2 — 8–18 inches clay; dark brown (10 YR 4/3); coarse nuciform structure; very plastic consistency when wet, very hard when dry; stonefree; pH — 7.0.

C — 18–20 inches clay; greyish brown (10 YR 5/2); medium nuciform structure; very plastic consistency when wet, very hard when dry; stonefree; pH — 7.0.

D — Clay till; light greyish brown (10 YR 6/2); fragmental structure; very hard consistency when dry, very plastic when wet; gritty; few stones; calcareous; pH — 7.8.

The internal drainage is low and the run-off is slow except where the slope is sufficient to provide a somewhat more rapid external drainage. The topography is smooth gently sloping and erosion is slight.

The A_2 horizon of the Peel clay is not as well developed as that of the Cashel clay. Note the structure of the B horizon.

The surface soil is fairly high in organic matter and plant nutrients. The type would respond to tile drainage, especially where basin-like depressions occur between the swells in the topography. However, these depressions make the installation of tile drains difficult. The natural vegetation in existing woodlots is dominantly soft maple and elm.

Agriculture

The soil is well suited to the production of cereal grains, hay and pasture. Alfalfa produces fairly good yields except where drainage is inadequate. The Peel clay is adapted to dairy farming which is the most common agricultural

endeavour found on it. The type is also suited to crops such as corn, flax and other cash crops of this kind.

The organic matter is well incorporated with the mineral portion of the soil. Productivity can be fairly well maintained through the use of good farm practices. The production of good yields depends, to some extent, on favourable climatic conditions. Optimum climatic conditions are important on this soil, especially where drainage is inadequate, because of gently sloping topography and impermeability of the subsoil. There is usually only a short period in the spring when moisture conditions are optimum for the preparation of a good seed bed and for seeding operations. If the soil is worked when too wet, it will puddle and bake on drying, the bad effects of which usually last throughout the entire season. On the other hand, if the soil is cultivated when too dry, it will remain too lumpy for a satisfactory seed bed. The type of farming followed on the Peel clay makes it possible to maintain satisfactory physical condition in the soil. A high proportion of forage crops are grown to provide feed for the dairy herds. A large amount of barnyard manure is produced and when this is supplemented with commercial fertilizer, high yields are obtained on this soil type.

(c) *Poor Drainage*

Malton clay (3,100 acres)

Malton clay is the poorly drained member of the Cashel catena. Developed on materials similar to those of the Cashel series, it occurs on smooth very gently sloping topography under high moisture conditions. The horizons of the profile are poorly defined as indicated by the following description:

A_0 — Thin layer of partially decomposed leaves, twigs, etc.

A_1 — 0–7 inches clay; very dark greyish brown (10 YR 3/2); medium granular structure; friable consistency when dry, plastic when wet; stonefree; pH — 7.0.

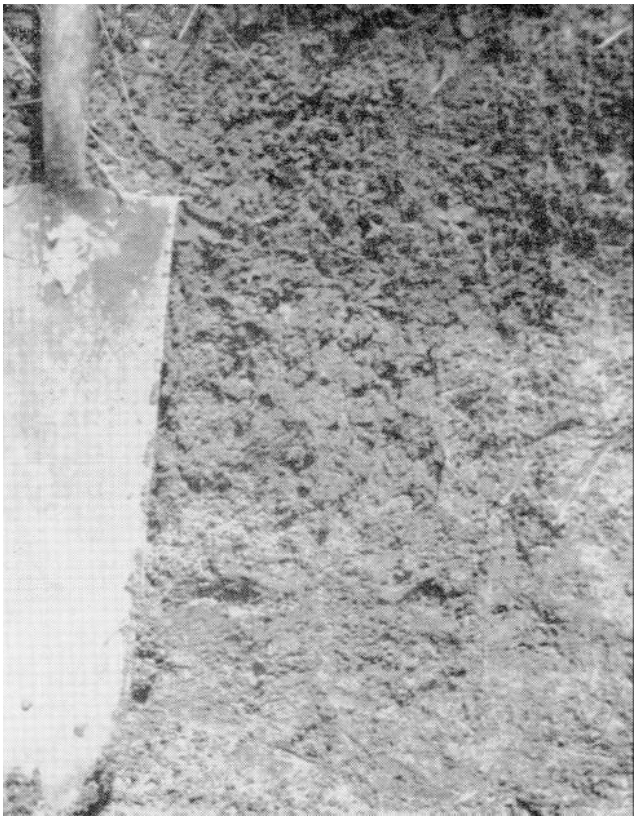
G_1 — 7–11 inches clay; dark greyish brown (10 YR 4/2); mottled; medium blocky structure; very plastic consistency when wet, very hard when dry; stonefree; pH — 7.0.

G_2 — 11–22 inches clay; dark greyish brown (10 YR 4/2); intensely mottled; coarse blocky structure; very plastic consistency when wet, very hard when dry; stonefree; pH — 7.2.

C — 22–27 inches clay; greyish brown (10 YR 5/2); mottled; medium nuciform structure; very plastic consistency when wet, very hard when dry; stonefree; calcareous; pH — 7.8.

D — Clay till; light brownish grey (10 YR 6/2); mottled; fragmental structure; very hard consistency when dry, very plastic when wet; calcareous; few stones; pH — 7.8.

The tree cover on the Malton consisted largely of elm, ash, cedar and a few soft maples. Chemical tests show the type to be fairly well supplied with



Malton clay is a Dark Grey Gleisolic soil. A grey glei horizon underlies the deep dark A_1 horizon.

most plant nutrients, the chief limitation for crop production being the poor drainage conditions.

Agriculture

General farming and dairying are the most common agricultural endeavours found on the Malton clay. Poor drainage practically prohibits the growing of alfalfa. Provided weather conditions permit reasonably early planting, fairly good yields of cereal grains are obtained. The type is well suited to the production of hay and pasture.

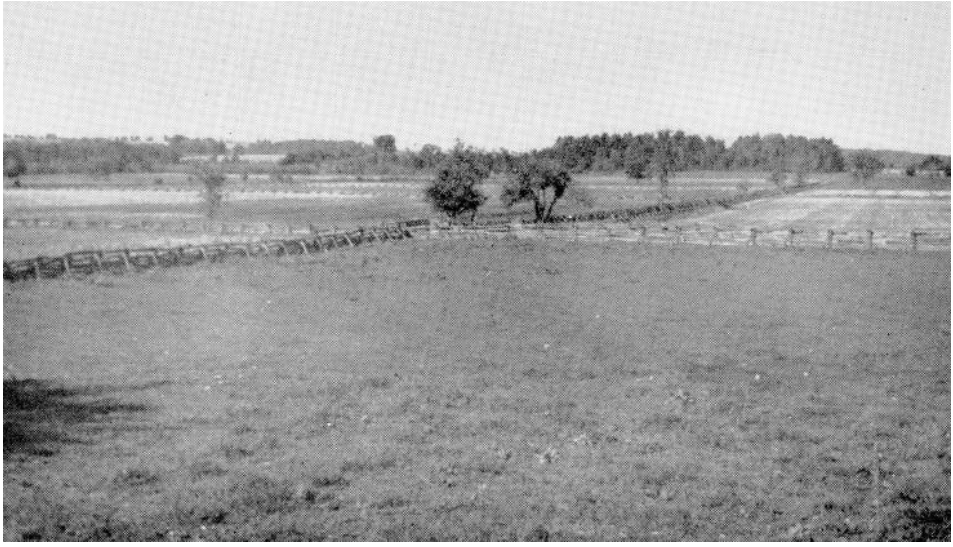
ORGANIC SOILS

The organic soils are most commonly found in the northern part of York County. They are developed on the accumulation of organic materials and are referred to in the literature as bog soils.

(a) Very Poor Drainage

Muck (27,800 acres)

Muck soils are made up of well decomposed organic materials and are very dark in colour. The profile of a muck soil usually does not exhibit the character-



Malton clay is smooth very gently sloping and often is used for pasture.

istic layering of the mineral soils. The following description of a muck soil indicates the arrangement of the layers:

1/	Surface: black (10 YR 2/1); well decomposed organic materials derived from sedges, leaves and other readily decomposed material; variable depth; neutral reaction.
2/	less well decomposed wood material.
3/	sticky, dark in colour; well decomposed.
4/	clay, sand, marl or bedrock.

Muck usually occurs on depressional topography. The drainage is very poor and often muck land is under water for part of the season. The vegetation consists mainly of elm, ash, white cedar and sedges, the latter being the dominant herbaceous plant. The reaction ranges from neutral to slightly alkaline.

Agriculture

In York County some areas are highly developed and are being used for market gardening. Such an area is found bordering the Holland River, and the use of drainage and irrigation has made this district a valuable producer of such crops as lettuce, carrots, onions, celery, potatoes, etc. Muck soils are very high in nitrogen and are low to very low in potassium, phosphorus, and some minor elements. Fertilizer mixes high in phosphorus and potassium should be added to the soil. Soil tests should be made to determine if additions of some minor element are required. Soil test data will also furnish information as to the kind and amount of each element required.

Muck areas are suitable for specialized crops when they occur in an area where they can be easily and economically drained and irrigated. Drainage is required in the spring so that the water table can be lowered in time to allow

Onions are commonly grown on the muck soil at Bradford.

early planting. Irrigation is necessary to provide water during the warm summer months when the water table is low. Since the improvement of muck soil is often uneconomical and impractical, much of the muck is not cultivated but is used for tree growth, recreation purposes or as a water reservoir.

H. RECENTLY DEPOSITED ALLUVIUM ALONG VALLEY FLOORS

(a) Variable Drainage

Bottom Land (36,000 acres)

The low lying soils along stream courses which are subject to flooding are mapped as Bottom Land. Bottom Land is an immature soil and shows little horizon differentiation. The profile usually consists of a deep dark coloured surface underlain by greyish material. The drainage varies but is usually poor. Vegetation consists of willow, elm and cedar. Bulrushes, sedges and marsh grasses occur where the land is flooded for most of the season.

Bottom Land is used largely for pasture but in some locations, where large areas exist, it can be cultivated and used for general farm crops. Before general farm crops can be grown successfully, the time and extent of flooding must be considered.

I. MISCELLANEOUS SOILS

(a) Excessive Drainage

Bridgman sand (600 acres)

Bridgman sand may be found in areas of the Pontypool or Brighton series where the dark surface soil has been entirely removed by wind and water erosion. It is not unusual to find the sand drifting. Bridgman sand includes the eroded areas and the places where the eroded materials are accumulating.

There is no profile development. It consists of loose, incoherent coarse sand with gravel stones and some boulders. It is very droughty and contains little or no organic matter.

Bridgman sand is a non-agricultural soil. In its present condition, the sand is drifting and accumulates on cropland, pastureland and woodland. All such "blow-outs" should be reforested and fenced from livestock.

When Pontypool sand is left without cover "blowouts" occur. These are mapped as Bridgman sand.

PART IV

AGRICULTURE AND LAND USE

Early Settlement and Agricultural Development

The settlement of York County is closely related to the growth of the city of Toronto. The first fort was erected near the harbour entrance by the French in 1750 and was known as Fort Rouillé. Here the French traded with the Indians. After the fort was captured by the British, the establishment of York, the forerunner of Toronto, occurred when Governor Simcoe selected it as the capital of Upper Canada. The presence of such a town added impetus to the settlement of the surrounding district and all the townships in York County were largely settled by 1815.

As in other parts of Ontario, lumbering was the first industry of the County. As the settlers cleared a small area of land they developed a self-sufficient type of agriculture to provide food for themselves and their livestock. Of necessity, the combination of lumbering and agriculture was common in early days, with the farmer concentrating his efforts on agricultural production during the summer months and turning to lumbering in the fall and winter.

In 1881, according to the Report of the Agricultural Commission published at that time, farm endeavours consisted of stock raising, grain growing and dairying. Fruit growing and market gardening were also largely followed, particularly in Etobicoke and York Townships.

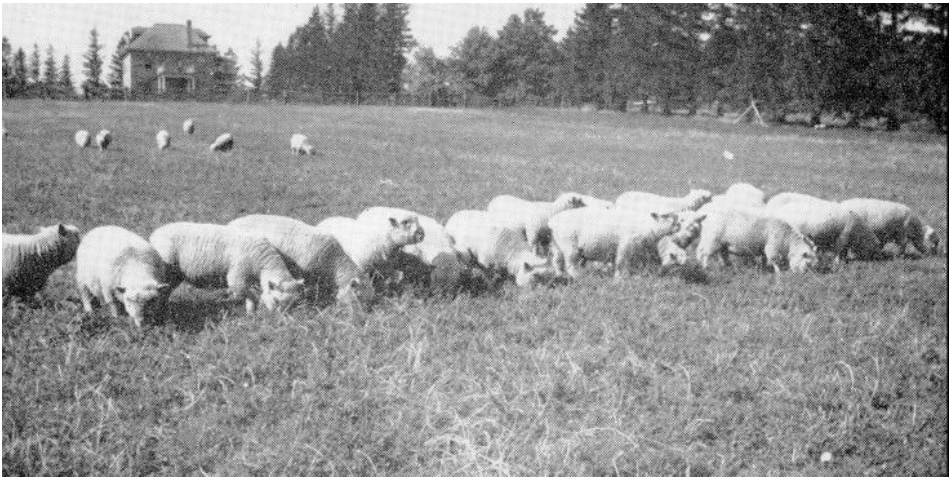
Omitting the City of Toronto, which has no municipal connection with the County, there were many industries situated throughout the County, dependent upon or providing a market for agricultural products. Such industries included flour mills, cheese factories, tanneries, saw mills, grist mills, agricultural implement factories and woollen mills.

Only a very small proportion of the farms were drained in early days. Tile drains were used to a limited extent on a few farms in King, Markham and York Townships. The need for fertilizers to maintain soil fertility was soon recognized and plaster, salt and superphosphate were used as fertilizer supplements.

Present Agriculture

Under the climatic conditions prevailing in York County the wide variety of soils permits the production of a relatively large number of different crops. Mixed farming and dairying are generally practised and wheat, oats, barley, timothy clover, alfalfa, fodder corn and pasture are the main crops grown. Most of these crops are used to feed the dairy cattle, while some of the milk by-products and some of the grain are fed to hogs and poultry. Vegetables and small fruits are grown in the southern part of the County and are sold on nearby markets. Development of the Bradford marsh has provided an excellent site for vegetable production.

A four year crop rotation is used on many farms in the county. The first year of the rotation includes fall wheat, oats, mixed grain or corn. The second year oats or barley are seeded down with a suitable grass legume mixture. Hay is harvested during the two following years.



Sheep raising is an important endeavour on some farms in the County.

The amount of manure used varies greatly depending on the number of livestock kept. On farms where large amounts of manure are used annually the soils are richer in humus, have a higher fertility level and better physical properties.

Commercial fertilizers are used by many farmers. However the practice of annual fertilization on a part of the rotation is far from being a general one. Superphosphate, 3-18-9, 2-16-6 and 2-12-10 mixtures are commonly used for grain while 4-12-10 is used for potatoes, corn, roots and gardens.

The present status of land use in the County is indicated in Table 5.

TABLE 5

PRESENT LAND USE (1951 CENSUS)

	Acres	% OF TOTAL
Total land area	564.480	100%
Area of occupied farm land	403,304	71.4%
Area of improved land	307,122	53.4g
Area of unimproved land	96,182	17.0%

Approximately 71 per cent of the total land area is occupied farm land. The remainder of the area is occupied by cities, towns, villages, road allowances and stream courses.

The condition of the occupied farm land is shown in Table 6.

TABLE 6

CONDITION OF OCCUPIED FARM LAND

	ACRES
Improved land	307,122
Under crops	225,269
Pasture	50,877
Summer fallow	15,333
Other	15,643
Unimproved land	96,182
Woodland	35,971
Other	60,211

Field crop data is presented in the Annual Report of the Statistics Branch, Ontario Department of Agriculture. Table 7 shows the field crops commonly grown in York County and their acreage for 1953. The total acreage of field crops (216,415) differs from that of the 1951 Census (225,269) because the records apply to two different years. A glance at Table 7 shows the predominance of hay and clover, oats, fall wheat, mixed grains, alfalfa and fodder corn grown in the County. Large acreages of these crops contribute to the establishment of successful dairy farms.

TABLE 7

ACREAGE OF FIELD CROPS IN YORK COUNTY

(Annual Report of Statistics Branch, 1953, Ontario Department of Agriculture)

	Acres	
Hay and clover	82,100	
		82,100
Oats	42,800	
Fall Wheat	38,400	
Mixed Grains	30,500	
Barley	5,600	
Spring Wheat	1,200	
Buckwheat	1,500	
Rye	1,200	
		121,200
Corn (Fodder)	6,300	
Potatoes	2,900	
Field Roots	1,255	
Corn (Husking)	1,900	
Peas	90	
Soybeans	600	
Flax	70	
		13,115
Total Field Crops		216,415
Seeded Pasture		52,400

Vegetables, tree fruits and small fruits are important crops in some areas. In 1950 the County produced 1,517,485 dollars worth of vegetables, the second highest production value in the Province for that year. The acreages of vegetables, tree fruits and small fruits commonly grown in the area are shown in Table 8.

TABLE 8

ACREAGE OF VEGETABLES, TREE FRUITS AND SMALL FRUITS IN YORK COUNTY (1951 CENSUS)

	Acres	
Vegetables	6,156	
		6,156
Tree Fruits		
Apples	1,540	
Pears	128	
Plums	59	
Cherries	35	
Peaches	9	
Others	22	
		1,793
Small Fruits		
Raspberries	169	
Strawberries	85	
Grapes	23	
Others	27	
		304
Total		9,253

The Use and Management of York County Soils

The use of the soils in an area is determined by physical, economic and social factors. Often economic and soil factors make it difficult to develop a land use program in keeping with the quality and potentials of the land. One of the aims in the operation of a farm is to develop a system of land use in keeping with the physical limitations of the soil. After the farmer has decided upon suitable uses for his land the matter of management of the different soils logically follows. The term "soil management," as used here, refers to such practices as (1) choice and rotation of crops (2) application of soil amendments (3) tillage practices and (4) control of water on the farm.

For purposes of discussion the soils of York County have been grouped on a textural basis. The sands and sandy loams have been placed in the "coarse textured" group, the loams and fine sandy loams in the "medium textured" group and the silt loams, clay loams and clays with the "fine textured" soils. Muck is discussed under the heading of organic soils. The distribution of the textural classes within the County is shown in Figure 10.

Coarse Textured Soils

(a) *Well Drained*

Soil Type	Acreage	% of Total
Woburn sandy loam	12,600	2.2
Bondhead sandy loam	6,300	1.3
Otonabee sandy loam	4,800	0.8
Pontypool sandy loam	21,200	3.9
Pontypool sand	14,000	2.4
Brighton sandy loam	24,800	4.5
Fox sandy loam	11,800	2.1
Brighton sandy loam over gravel	4,000	0.7
Tioga sandy loam	300	0.1
Sargent sandy loam	1,200	0.2
Dundonald sandy loam	1,000	0.2
Bookton sandy loam	3,100	0.5
Bridgman sand	600	0.1
Total	105,700	19.0

As pointed out in Part III the components of this group vary chiefly in underlying material and topography. They have a low moisture retaining quality and tend to be droughty in a normal season. Because of their porous nature the soluble salts are readily leached. However the rapid percolation of moisture results in a well drained condition and permits early spring cultivation. Crop production on these soils is influenced by moisture relationships and low fertility levels.

The Woburn, Bondhead and Otonabee sandy loams occur on smooth moderately sloping topography. Crop production is limited by relatively low fertility and susceptibility to erosion. The soils produce fairly good crops of cereal grains, hay and pasture. Soil loss by erosion can be reduced by keeping the soils under cover for as great a proportion of time as possible.

The Pontypool sandy loam, Pontypool sand, and Bridgman sand have developed from moderately deep sand deposits and as a result are droughty and low in fertility. The Pontypool soils are generally not favourable for successful crop production unless the general fertility of the soils has been built up and the organic matter increased in order to improve the moisture-holding capacity. Hay, grain, silage corn and pastures are generally poor.

SURFACE TEXTURE

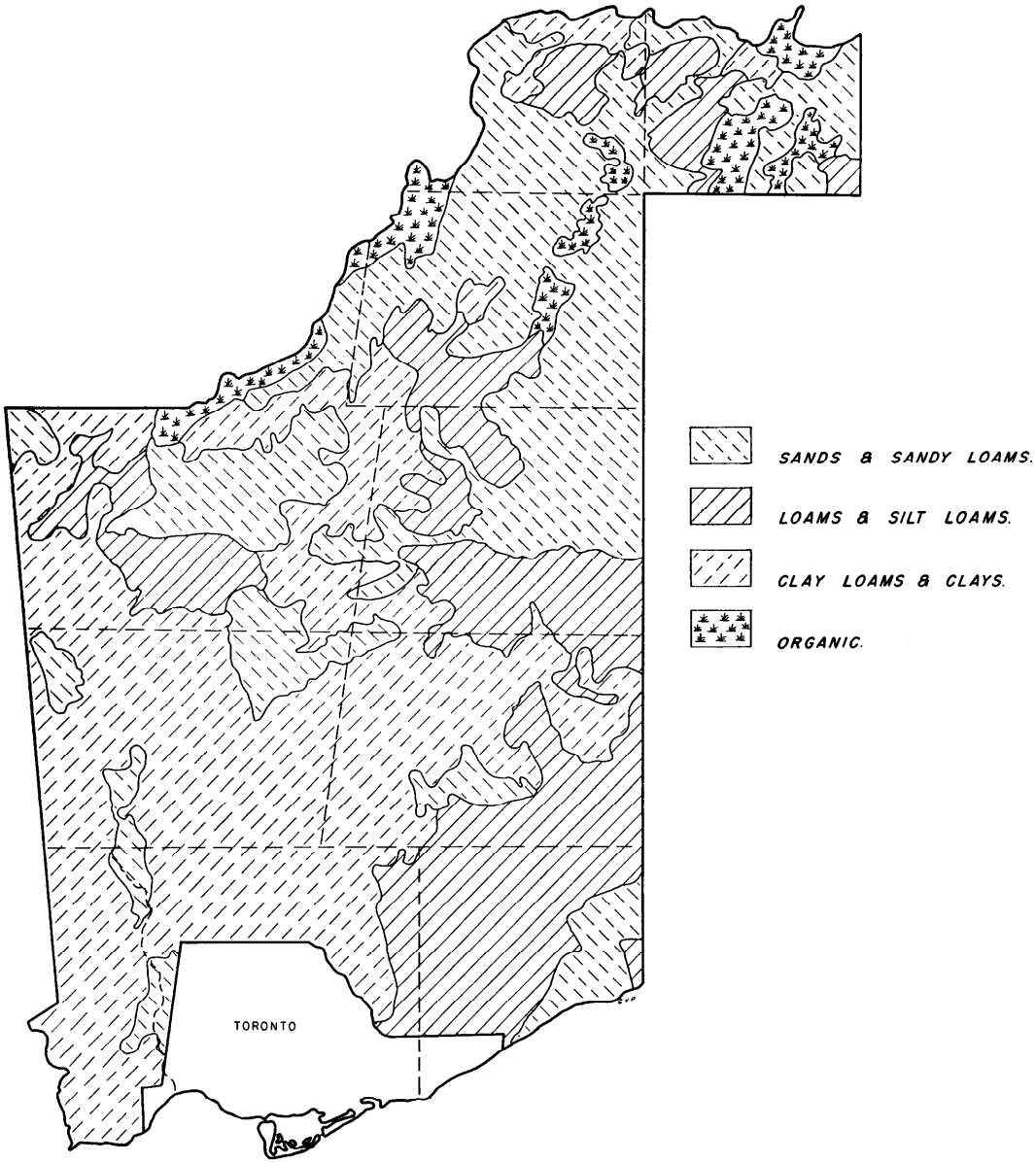


FIG. 10—Outline Map of York County showing distribution of coarse, medium and fine textured soils.

Special crops such as potatoes and small fruits may be produced quite successfully where the supply of organic matter and general fertility has been built up.

Wind erosion is a serious problem on the Pontypool series and crops should be protected by windbreaks, grass strips or other measures for the control of soil drifting. The Bridgman sand occurs where the vegetative cover has been removed and only drifting sand remains. Such areas should be protected from the wind, adequately fertilized and then planted to trees. At best, much of the Pontypool and Bridgman soils is marginal land and planting to forest may prove more profitable than farming. This would prevent erosion and conserve water, thus acting as a moisture reservoir for adjacent land.

The Brighton sandy loam, Fox sandy loam, Brighton sandy loam over gravel, Sargent sandy loam and Tioga sandy loam are smooth gently sloping soils that are well suited to the production of cash crops when fertility levels and organic matter content are increased and maintained. Tree fruits do well except where production is retarded by unsatisfactory climate. Areas that are susceptible to and have suffered from wind erosion should be kept under a vegetative cover for as great a proportion of time as possible. The Tioga soils are usually moderately acid and crops grown on these soils would benefit from the use of lime.

The Dundonald sandy loam is developed from sandy deposits overlying coarse textured till at depths of 3 feet and less, similar in composition to that of the Bondhead soils. The land use problems and soil management are similar to those discussed for the Bondhead sandy loam.

Clay occurs at depths of three feet and less in the Bookton sandy loam which increases its capability for growing crops. The underlying clay is better supplied with plant nutrients than the coarse textured overburden.

(b) *Imperfect Drainage*

Soil Type	Acreage	% of Total
Milliken sandy loam	400	0.1
Guerin sandy loam	1,600	0.3
Brady sandy loam	1,500	0.3
Tecumseth sandy loam	15,200	2.7
Tecumseth sandy loam over gravel	500	0.1
Rubicon sandy loam	400	0.1
Gwillimbury sandy loam	400	0.1
Berrien sandy loam	7,900	1.4
Total	27,500	5.1

Crop production is limited to some extent on the Milliken sandy loam and Guerin sandy loam by imperfect drainage. Satisfactory crops of hay, grain and pastures are obtained, particularly in the dry years. Where drainage is satisfactory, these soils are suitable for special crops such as potatoes, tomatoes, cabbages and some other garden crops. Early crops usually cannot be produced on these soils because they are somewhat slow to dry and warm up in the spring. Superphosphate is the main fertilizer requirement but potash and nitrogen will also give favourable response particularly where vegetables are grown.

The Brady sandy loam, Tecumseth sandy loam, Tecumseth sandy loam over gravel, Rubicon sandy loam and Gwillimbury sandy loam are low in natural fertility. General farming is commonly practised but large acreages of these soils are used for pasture. The carrying capacity of the pastures is not

very high as they are often weedy or tend to revert rapidly to grass of low feeding value. Where drainage is adequate and climate is suitable these soils are suited to tree fruits and market gardening. Best results are obtained when the soils are fertilized with superphosphate, potash and nitrogen. Additions of barnyard manure are necessary to maintain the organic matter content. Crops on the Rubicon sandy loam would probably respond to liming.

Berrien sandy loam is fairly well suited to the production of cereal grains, pasture, tree fruits and vegetables when drainage is improved and fertility is increased and maintained. The soil may be difficult to drain because of the fine textured clay occurring at depths of three feet and less.

(c) *Poor Drainage*

Soil Type	Acreage	% of Total
Granby sandy loam	15,200	2.7
Total	15,200	2.7

The Granby sandy loam requires drainage but is difficult to drain because of its depressional position. The kind of crops and the success with which they can be grown depend on drainage improvement. At present the soil supports pasture or trees. The pasture is generally weedy and contains low quality grasses and therefore is of low feeding value. A pasture improvement program would include drainage improvement, the use of phosphatic fertilizers, and the sowing of a good pasture mixture.

Medium Textured Soils

(a) *Well Drained*

Soil Type	Acreage	% of Total
Woburn loam	34,800	6.3
Bondhead loam	13,100	2.3
Otonabee loam	6,000	1.1
Percy fine sandy loam	10,200	1.8
Burford loam	400	0.1
Total	64,500	11.6

The soils of this group are adapted to a wide range of field crops such as alfalfa, clover, fall wheat, oats, barley, pasture, and corn. They are also suited to special crops as potatoes, small fruits, market garden crops and to orchards. Variation in yields from year to year are not so great as on the other soils and in wet years they are the most productive soils in the area.

These soils are easy to cultivate once the stones have been removed from the stony types. The fertility is moderate and the best fertilizer responses are obtained from superphosphate and nitrogen on most farm crops. Legumes respond to potash fertilization. Water erosion is a problem on the Woburn, Bondhead and Otonabee soils and may be quite harmful on the steeper slopes if control measures are not used.

(b) *Imperfect Drainage*

Soil Type	Acreage	% of Total
Milliken loam	34,900	6.3
Guerin loam	500	0.1
Emily loam	4,600	0.8
Total	40,000	7.2

The medium textured, imperfectly drained soils make up about seven per cent of the area of the County. Imperfect drainage lessens the number of crops and the yields obtained. However yields of oats, clover, hay, pasture and corn are generally good, particularly during dry seasons. The installation of tile drains will increase their usability and reliability.

The soils are moderately well supplied with organic matter, calcium and potassium but the phosphorus content is low. Superphosphate is the main fertilizer required on these soils and potash is usually a requirement for some market garden crops. Manure will benefit all crops.

The stones which are found on or in the soil are not a serious handicap to cultivation and the land has a smooth gently sloping topography which lessens the danger of erosion.

(c) *Poorly Drained*

Soil Type	Acreage	% of Total
Lyons loam	3,500	0.6

A comparatively small area of medium textured, poorly drained soil occurs in York County. Crop production is limited by poor drainage on this soil and, as a result, it is used extensively for pasture and trees. However, fair yields of oats, clover, hay and corn are obtained when drainage is improved.

The natural fertility is moderate to high but when drainage improvement is effected, care must be taken to maintain the organic matter content and fertility levels.

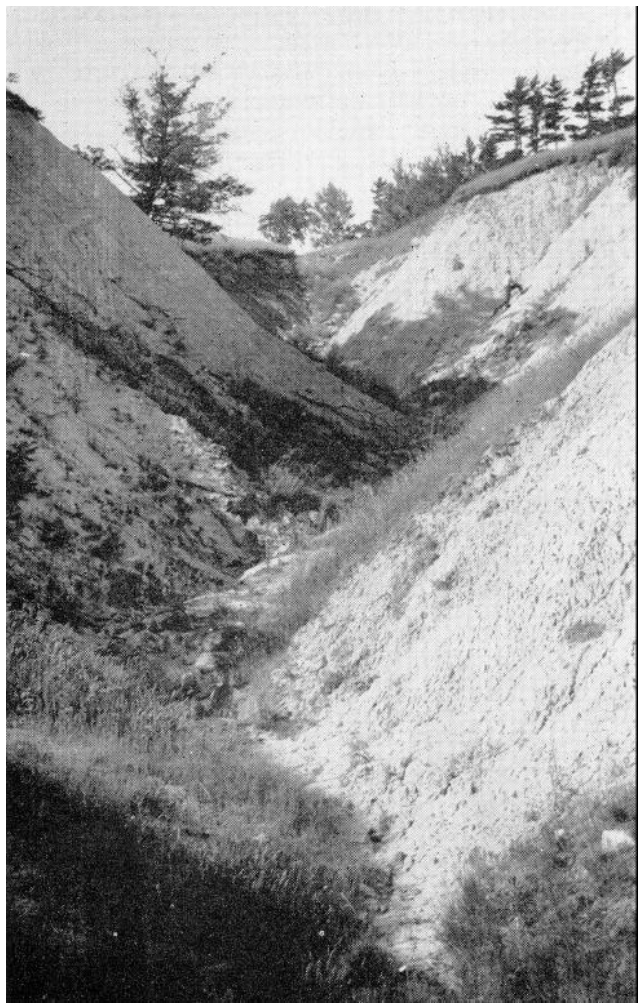
Fine Textured Soils

(a) *Well Drained*

Soil Type	Acreage	% of Total
Oneida clay loam	12,500	2.2
King clay loam	18,900	3.1
King silt loam	600	0.1
King clay loam — steep phase	11,100	2.0
Schomberg silt loam	5,100	1.0
Schomberg clay loam	16,800	3.0
Schomberg clay loam — steep phase	4,300	0.7
Cashel clay	11,600	2.1
Total	80,900	14.2

The fine textured well drained soils are well suited to dairying and mixed farming for which they are commonly used. The field crops generally grown are fall wheat, oats, silage corn, clover and timothy, alfalfa and pasture.

Occurring on smooth moderately sloping to irregular steeply sloping topography the soils of this group are quite susceptible to erosion. The degree to which these soils have been affected by erosion depends on past treatment and on length and degree of slope. Where short rotations have been practised and the soil left without cover during the fall and winter seasons, there has been a considerable loss of valuable topsoil. Topsoil contains most of the active plant nutrients and organic matter and it should be conserved at all costs. Sheet erosion can be reduced by keeping a dense vegetative cover on the soil for as large a proportion of time as possible. The maintenance of adequate organic matter and fertility levels is essential for an effective erosion control program. Where slopes are irregular and steep, as in the steep phase of the King and Schomberg soils, a permanent cover of grass or trees should be provided.



Gully erosion is severe in some parts of the County.

The soils of this group are fairly well supplied with potash and organic matter and are low in phosphate. Phosphatic fertilizers give favourable responses and additions of barnyard or green manure help to maintain fertility and organic matter, favour granulation and improve the permeability of the surface soil. Liming is beneficial on the Oneida soil but the other soils of the group are generally well supplied with lime.

(b) Imperfectly Drained

SOIL TYPE	Acreage	% of Total
Chinguacousy clay loam	37,200	6.7
Monaghan clay loam	9,200	1.6
Monaghan silt loam	3,600	0.6
Smithfield clay loam	3,900	0.7
Peel clay	51,000	9.2
Total	104,900	18.8

These soils are gently sloping and have developed from clay till, stonefree clay or thin stonefree clay deposits over clay Artificial drainage is required to some extent in all soils if a wide range of crops are to be grown. Crops generally grown are oats, wheat, silage corn, clover, timothy and pasture. Alfalfa may be grown on land properly drained but because of difficulties in establishing and maintaining the stands, it is seldom grown alone but rather in mixtures of clover and timothy. The soils are not suited to market gardening but some vegetable crops for canning such as tomatoes, and sweet corn may be grown.

Peel clay provides adequate pasture for milk production.

These soils have the advantage of being gently sloping and comparatively stonefree, facilitating the use of any type of farm machinery. On the other hand, much power is needed to cultivate the fine textured soils. These soils should be worked at optimum moisture conditions in order to maintain a satisfactory soil structure. Phosphatic fertilizers are most commonly used and give favourable response. Barnyard and green manures should be used since they help to maintain the organic matter and general fertility of the soil. The Chinguacousy soils may respond to liming.

(c) Poorly Drained

SOIL TYPE	ACREAGE	% OF TOTAL
Jeddo clay loam	5,000	0.9
Simcoe clay loam	4,600	0.8
Simcoe silt loam	4,000	0.7
Malton clay	3,100	0.5
Total	16,700	2.9

The poorly drained fine textured soils are level to very gently sloping and are commonly used for general farming and dairying. In the undrained condition, pasture is chiefly grown. However, when drained the soils are suited to oats, fall wheat, barley, clover, timothy and silage corn. Crop failures are due mainly to rainy spring weather which delays seeding time, germination and growth, or may cause drowning of crops, especially newly seeded plants.

These soils should be worked at optimum moisture conditions in order to maintain a satisfactory soil structure. This period of optimum working conditions is often very short and there is an advantage of adequate machinery and labour are available to perform the task quickly while conditions are favourable. The response to chemical fertilizers depends on climatic conditions. Phosphatic fertilizers are commonly used and give favourable responses. Granulation and permeability of the surface soil are improved and organic matter and general fertility are maintained when adequate amounts of barnyard and green manures are added to these soils.

Organic Soils

Soil Type	Acreage	% of Total
Muck	27,800	5.0

The organic soils form five per cent of the total acreage and are not used extensively for farm crops. These areas are often wooded or where they are cleared the land frequently is left idle. Such is the case in York County except in the Holland marsh area where excellent market garden crops are grown. The muck soils are suited to intensive farming and particularly market gardening. Their productivity depends largely on good management. The most productive organic soils are those that can be irrigated as well as drained. The muck soil is very rich in nitrogen but lacks the mineral elements such as phosphorus and potassium which must be supplied as commercial fertilizer. The response to fertilizers is excellent when the soil is kept at the proper moisture conditions by draining or irrigating.

Land Use and Soil Management Problems

Areas occur in York County where there are definite problems or hazards affecting the use of the soil. These problems can be attributed to the effect of one or a combination of two or more of the factors, low fertility, susceptibility to erosion and inadequate drainage. Most of the problems can be or have been easily overcome through the use of good soil management practices. The extent and distribution of the problem areas are shown in Figure 11.

Water Erosion and Fertility

Loss of valuable topsoil through erosion is closely related to topography and texture of the land. Fertility is lowered materially with the loss of soil. Areas of moderate to severe, slight, and little or no erosion are indicated in Figure 12. Moderate to severe water erosion occurs on soils of loam to clay texture with moderately to steeply sloping topography. Where the slopes are more gentle or where the land is level susceptibility to water erosion decreases. Wind erosion is most severe on coarse textured soils with steeply sloping topography.

In areas where erosion has taken its toll, a great loss of plant nutrients and organic matter has occurred. Additions of mineral fertilizer and barnyard manure are required to make up for these losses. In an erosion control program the importance of soil fertility cannot be overemphasized. The effectiveness of dense cover, in reducing soil loss is well established. Fertility must be the first consideration if the area is to be used for agricultural crops.

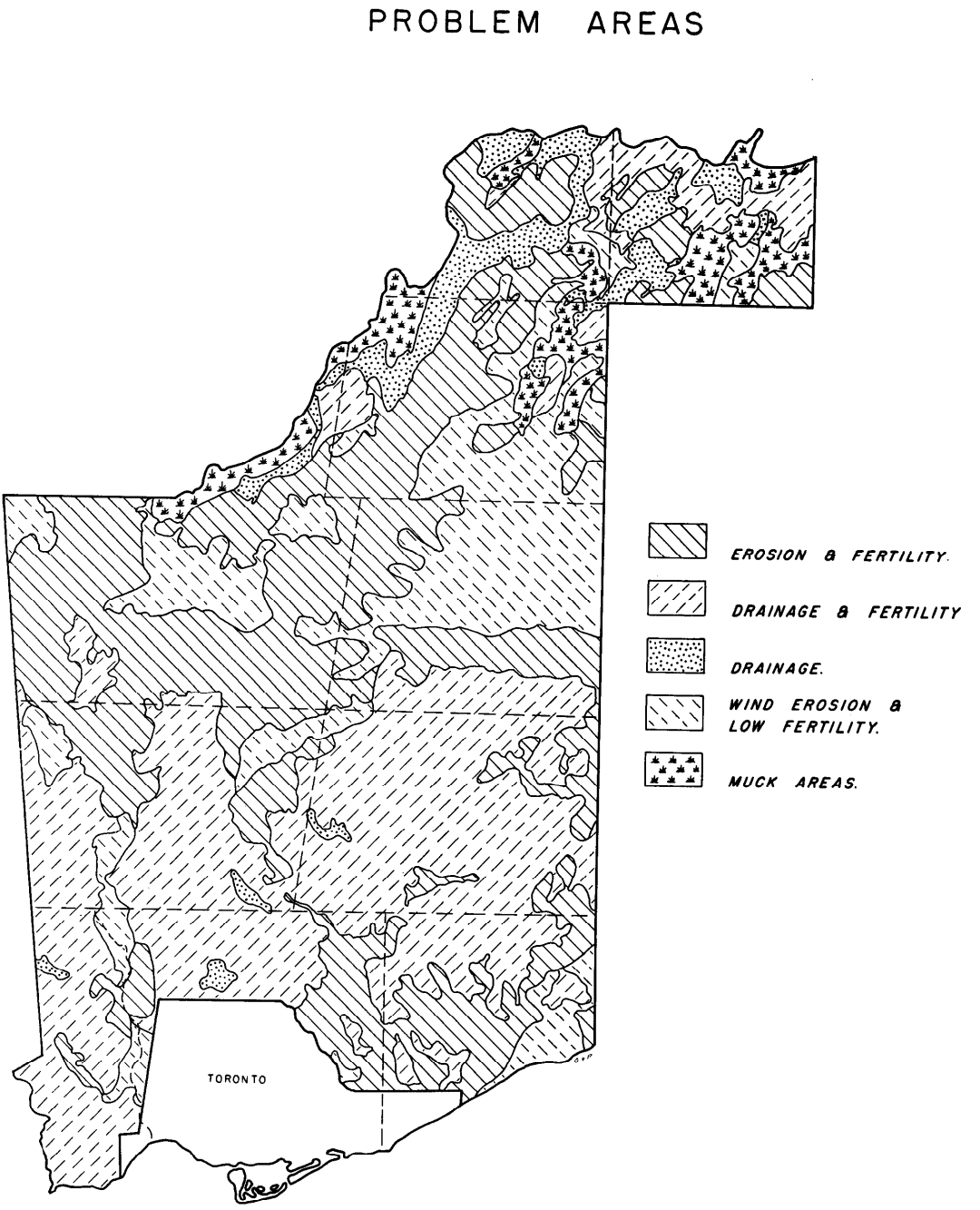


FIG. 11—Outline Map of York County showing the distribution of problem areas.

EROSION

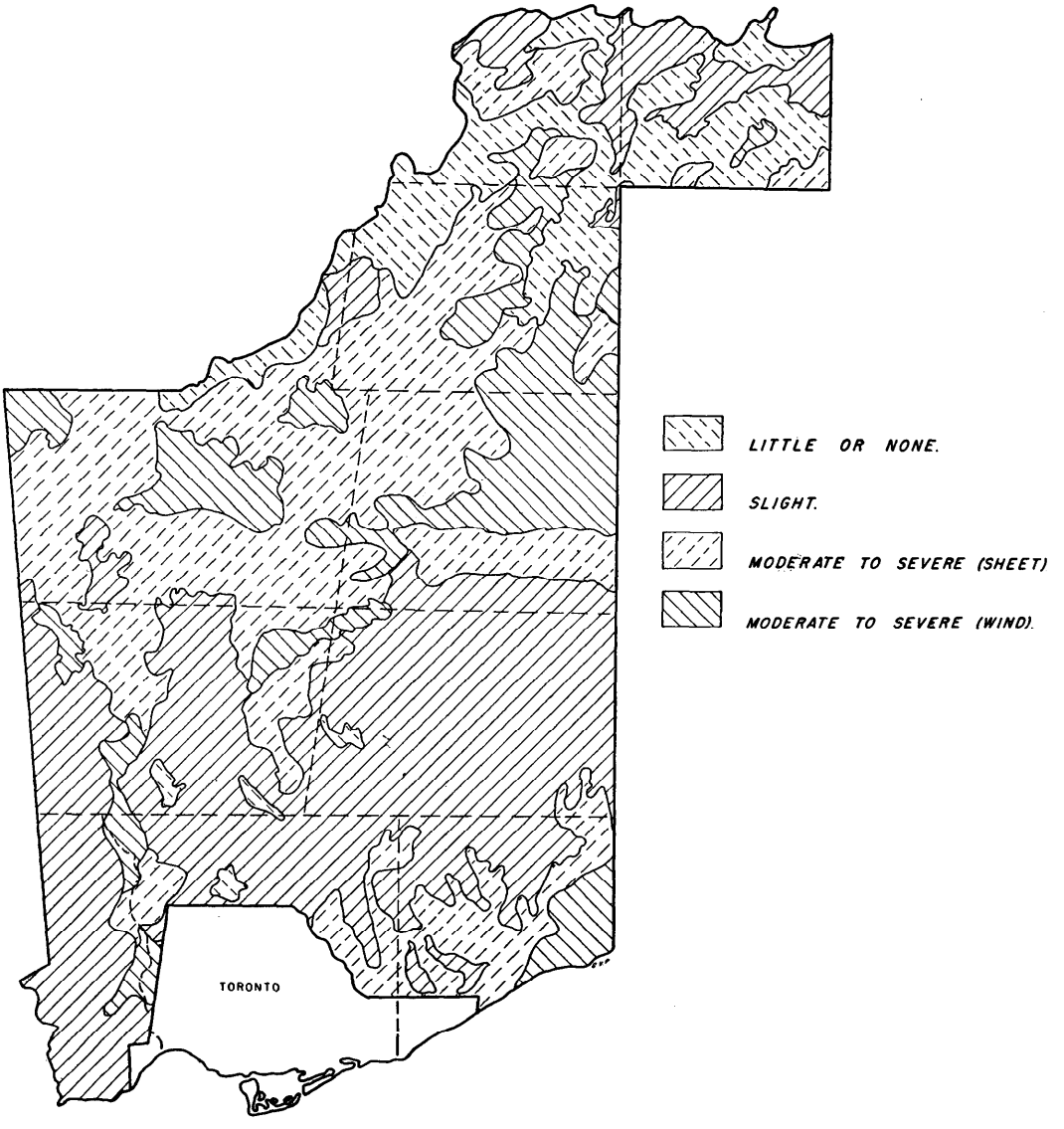
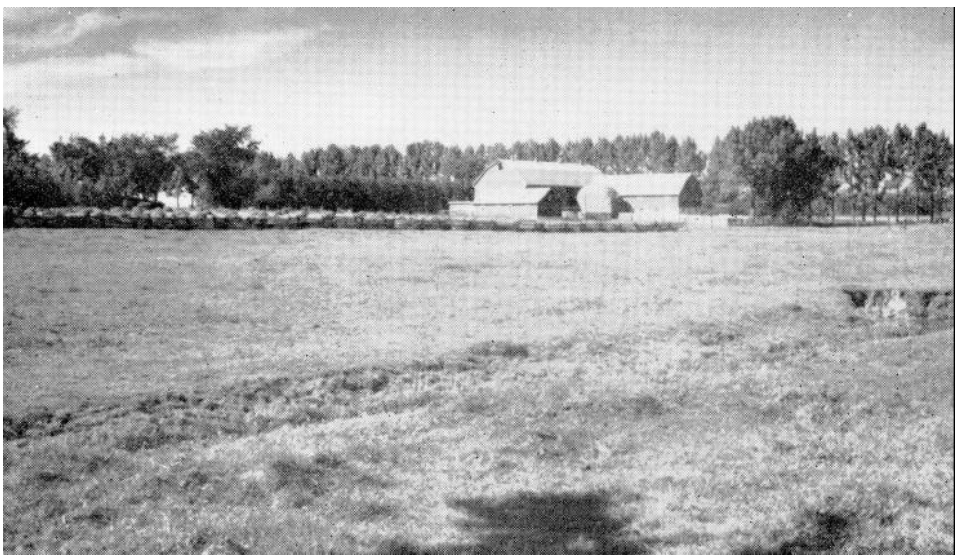


FIG. 12—Outline Map of York County showing distribution of erosion classes.

TABLE 9

EROSION CLASSES AND ACREAGES FOR YORK COUNTY

EROSION GROUP	ACREAGE	% OF TOTAL
Little or none	99,500	17.9
Slight	145,400	26.2
Moderate to severe (sheet)	188,900	34.0
Moderate to severe (wind)	79,900	14.4



Gullies may form on the gently sloping soils reducing their capability to produce crops.

Drainage and Fertility

Drainage improvement and fertility maintenance are problems on the imperfectly drained soils of the County. A wider range of crops can be grown where tile drains are installed. Fertility levels must be maintained by additions of mineral fertilizer and manure, particularly where drainage is improved.

Drainage

Areas of good, imperfect, poor and very poor drainage are delineated in Figure 13. Soil drainage is dependent on the rate of water percolation through the soil and the rate of surface run-off. Water percolation and surface run-off are dependent on topography and texture. Poor drainage results when either or both percolation or run-off are impeded.

Drainage is the dominant problem on the poorly drained soils of the County.

TABLE 10

DRAINAGE CLASSES AND ACREAGES FOR YORK COUNTY

DRAINAGE CLASS	ACREAGE	% OF TOTAL
Good	251,100	44.8
Imperfect	172,400	31.1
Poor	33,400	6.2
Very Poor	27,800	5.0

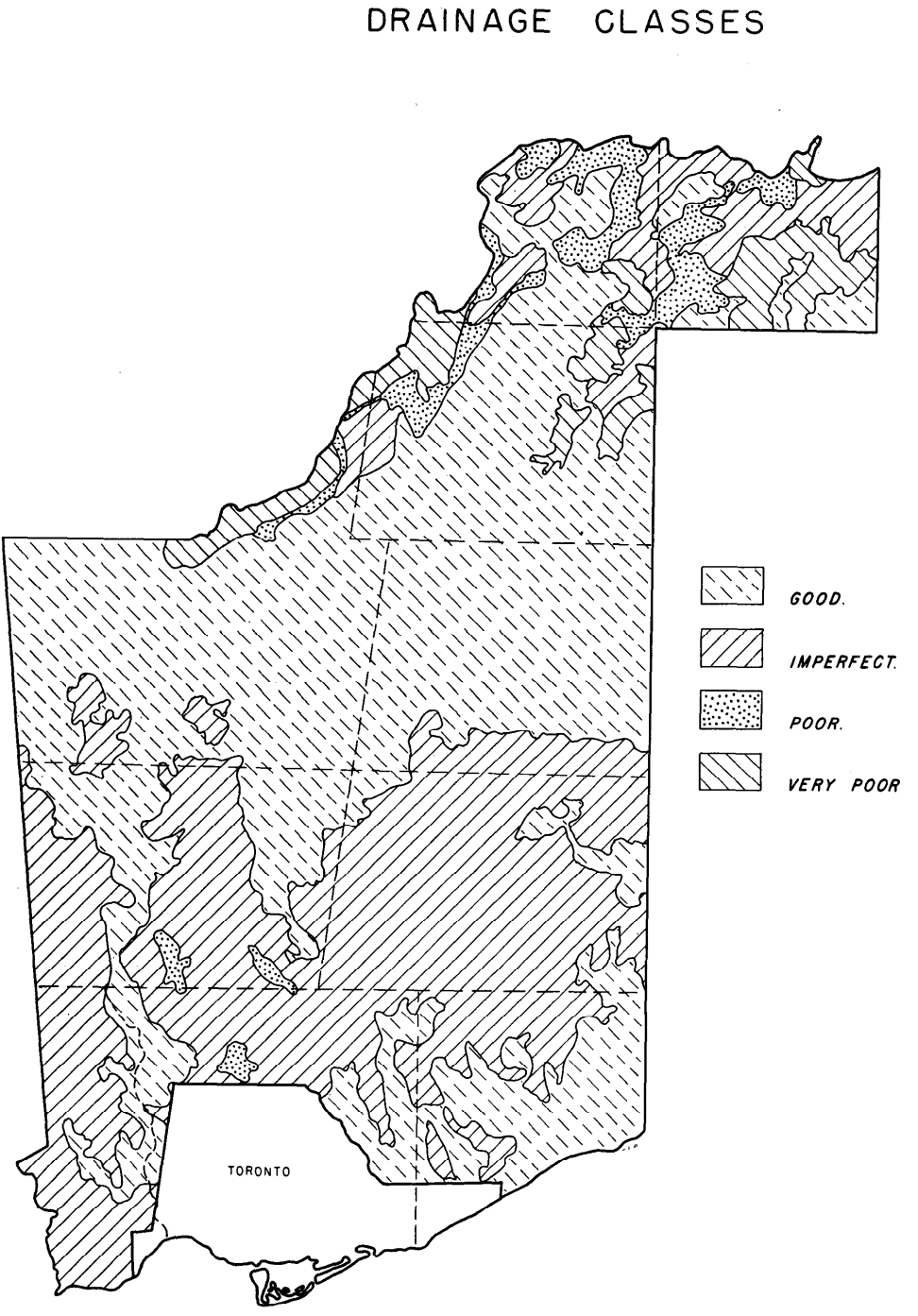


FIG. 13—Outline Map of York County showing distribution of drainage classes.

Wind Erosion and Low Fertility

Problems of wind erosion and low fertility occur on the well drained sands and sandy loams. Sandy soils are low to very low in plant nutrients and organic matter and unless these elements are increased and maintained the vegetative cover is often scanty. The lack of a dense vegetative cover permits the loss of topsoil by the wind. Areas where problems of wind erosion and low fertility exist are shown in Figure 11.

Muck Areas

Muck areas are often present in depressional areas where poor drainage has aided the accumulation of organic matter. Organic soils require drainage, irrigation and additions of mineral fertilizer before they can be used extensively for crop production.

A part of one of the best known marshlands in Ontario is located in York County. It is the Holland marsh, one of the largest producing areas of vegetable crops in the Province. The story of the reclamation of Holland Marsh and its development and success as a vegetable growing centre is absorbing.

Drainage operations started in 1925. A canal 17½ miles long and 7 feet deep was dredged around the entire marsh. All the natural drainage from the headwaters of the Schomberg River and from the side hills is caught by this canal and carried around and past the marsh. The earth from the canal was thrown up to form a dike wide enough for a roadbed. In order to drain the water from the land inside the dikes, open ditches were dug. Across the narrows and connecting the dikes, a dam 450 feet long was constructed to hold back the waters of Lake Simcoe. Pumps were installed on the dam to pump the water from the river into the main canal and these now control the water level in wet seasons; in dry seasons the Marsh is irrigated by pumping or siphoning water into the ditches from the drainage canal.

The muck in the marsh varies in its state of decomposition. In the centre of the marsh it is reddish brown, fibrous and not as well decomposed as the black organic material away from the centre. The muck is shallow along the margin and the underlying clay has been exposed. The clay is sticky when wet, and lumpy when dry and is difficult to work. The muck is low to very low in phosphorus, potassium, copper, boron and manganese but is well supplied with nitrogen. These elements, with the exception of nitrogen, must be supplied from the fertilizer bag.

The major crops grown on the Marsh are onions, lettuce, potatoes, carrots and celery. Over 15 per cent of the acreage is used for the growing of lettuce.

Besides the need for drainage, irrigation and fertilizer, the owner is harrassed by other problems. Since the land level is below the level of the water in the canal there is a danger of flooding. The marsh was completely flooded in 1954 when heavy rains during Hurricane Hazel raised the water level over the protecting dikes. Property damage was severe and the sponge-like muck was floated away in some areas.

The danger of fire when burning piles of roots should not be overlooked. Fires in muck land rapidly spread under ground and are extremely difficult to check.

Adaptability Ratings for York County Soils

The potentialities and limitations for crop production of the soil types have been discussed in Part III of this report. Recommendations for soil improvements have been suggested and reference has been made to those crops for which some types are especially suited. Now consideration is given to the soil type-crop relationship with particular reference to the comparative suitability of individual soil types for specific crops commonly grown in the area. A rating is given to show the adaptability of different soils to produce a wide range of crops.

Various methods have been used for making soil ratings. In this particular rating the characteristics of the soil are weighed in relation to their effect upon the production of a particular crop. Purely scientific ratings are rather difficult to obtain due to the many factors that influence crop production on the various soil types. If crop yields could be collected under specific management from sample areas well distributed over a soil type area and for a sufficient number of years to eliminate differences due to climate, crop ratings would probably be quite accurate. However, such a collection of data would be costly and time consuming.

Although yield capacity figures are not given for individual soil types, the following table shows a comparative rating of the different soils in York County according to their capability to grow wheat, oats, barley, alfalfa, red clover, alsike, timothy, corn, peas, beans, tree fruits, turnips and pasture. The ratings are made for crops commonly grown in the district, under prevailing systems of management. The productivity of any soil varies with management and management includes all the operations and materials required to produce a crop. The rating for York County soils is based on observations made during the progress of the soil survey, by data and opinions furnished by agronomic and soil workers familiar with the area and by consultation with local farmers and others. Should new varieties be introduced or farm management practices changed the ratings may of necessity require adjustment.

TABLE 11

ADAPTABILITY RATINGS FOR GOOD CROPLAND*

Soil Type	Wheat	Oats	Barley	Alfalfa	Red Clover	Alsike	Timothy	Fodder Corn	Peas and Beans	Tree Fruits	Turnips	Pasture
Bondhead loam	G	G	G	G	G	G	G	G–F	G–F	G–F	G–F	G
Woburn loam	G	G	G	G	G	G	G	G–F	G–F	G–F	G–F	G
Schomberg silt loam	G	G	G	G	G	G	G	G–F	G	F	G–F	G
Schomberg clay loam	G	G	G	G	G	G	G	G–F	G	F	G–F	G
King silt loam	G	G	G	G	G	G	G	G–F	G	F	G–F	G
King clay loam	G	G	G	G	G	G	G	G–F	G	F	G–F	G
Cashel clay	G	G	G	G	G	G	G	G–F	G	F	F	G
Oneida clay loam	G	G	G	G–F	G	G	G	G–F	G	F	G–F	G
Milliken loam	G	G	G–F	G–F	G	G	G	G–F	G	F	G–F	G
Otonabee loam	G	G	G	G	G	G	G	G–F	G	F	.....	G
Percy fine sandy loam	G	G	G	G–F	G–F	G–F	G–F	G–F	G–F	G–F	G–F	G–F

* The crop adaptability rating for each soil type is as follows:

G — Good; G–F — Good to Fair; F — Fair; F–P — Fair to Poor; P — Poor.

TABLE 12

ACREAGES OF GOOD CROPLAND

Soil Type	Acreage	% of Total	Limitations
Bondhead loam	13,100	2.3	Susceptibility to erosion
Woburn loam	34,800	6.3	Susceptibility to erosion
Schomberg silt loam	5,100	1.0	Susceptibility to erosion
Schomberg clay loam	16,800	3.0	Susceptibility to erosion
King silt loam	600	0.1	Susceptibility to erosion
King clay loam	18,900	3.1	Susceptibility to erosion
Cashel clay	11,600	2.1	Susceptibility to erosion
Oneida clay loam	12,500	2.2	Susceptibility to erosion
Milliken loam	34,900	6.4	Drainage
Otonabee loam	6,000	1.1	Susceptibility to erosion
Percy fine sandy loam	10,200	1.8	Susceptibility to erosion
Total	164,500	29.4	

TABLE 13

ADAPTABILITY RATINGS FOR GOOD TO FAIR CROPLAND

Soil Type	Wheat	Oats	Barley	Alfalfa	Red Clover	Alsike	Timothy	Fodder Corn	Peas and Beans	Tree Fruits	Turnips	Pasture
Smithfield clay loam	F	G–F	G–F	F	G–F	G	G	G–F	F	F–P	F	G
Monaghan clay loam	F	G–F	G–F	F	G–F	G	G	G–F	F	F–P	F	G
Monaghan silt loam	F	G–F	G–F	F	G–F	G	G	G–F	F	F–P	F	G
Peel clay	F	G–F	G–F	F	G–F	G	G	G–F	F	F–P	F	G
Bondhead sandy loam	G–F	G–F	G–F	F	G–F	G–F	G–F	F	F	F	F	G–F
Woburn sandy loam	G–F	G–F	G–F	F	G–F	G–F	G–F	F	F	F	F	G–F
Milliken sandy loam	G–F	G–F	G–F	F	G–F	G–F	G–F	F	F	F	F	G–F
Otonabee sandy loam	F	G–F	G–F	F	G–F	G–F	G–F	F	F	F	F	G–F
Dundonald sandy loam	G–F	G–F	G–F	F	G–F	G–F	G–F	F	F	F	F	G–F
Chinguacousy clay loam	F	G–F	G–F	F–P	G–F	G–F	G	G–F	F	F	F	G–F
Guerin loam	F	G–F	F	F	G–F	G–F	G–F	F	F	F	F	G–F
Emily loam	F	G–F	F	F	G–F	G–F	G–F	F	F	F	F	G–F
Burford loam	F	G–F	F	F	F	F	G–F	F	F	F	F	G–F

* The crop adaptability rating for each soil type is as follows:

G — Good; G–F — Good to Fair; F — Fair; F–P — Fair to Poor; P — Poor.

TABLE 14

ACREAGES OF GOOD TO FAIR CROPLAND

Soil Type	Acreage	% of Total	Limitations
Smithfield clay loam	3,900	0.7	Imperfect drainage
Monaghan clay loam	9,200	1.6	Imperfect drainage
Monaghan silt loam	3,600	0.6	Imperfect drainage
Peel clay	51,000	9.2	Imperfect drainage
Bondhead sandy loam	6,300	1.3	Susceptibility to erosion and low fertility
Woburn sandy loam	12,600	2.2	Susceptibility to erosion and low fertility
Milliken sandy loam	400	0.1	Susceptibility to erosion and low fertility
Otonabee sandy loam	4,800	0.8	Susceptibility to erosion and low fertility
Dundonald sandy loam	1,000	0.2	Susceptibility to erosion and low fertility
Chinguacousy clay loam	37,200	6.7	Imperfect drainage
Guerin loam	500	0.1	Imperfect drainage
Emily loam	4,600	0.8	Imperfect drainage
Burford loam	400	0.1	Low fertility
Total	135,500	24.4	

TABLE 15

ADAPTABILITY RATINGS FOR FAIR CROPLAND

Soil Type	Wheat	Oats	Barley	Alfalfa	Red Clover	Alsike	Timothy	Fodder Corn	Peas and Beans	Tree Fruits	Turnips	Pasture
Bookton sandy loam	F	F	F	F	F	G–F	F	F	F	F	F	F
Fox sandy loam	F	F	F–P	F	F	G–F	F	F–P	F	G–F	F	F
Sargent sandy loam	F	F	F–P	F	F	F	F	F–P	F–P	F	F	F
King clay loam — steep phase	F	F	F	F	F	G–F	G–F	P	P	P	P	G–F
Schomberg clay loam — steep phase	F	F	F	F	F	G–F	G–F	P	P	P	P	G–F
Brighton sandy loam	F	F	F–P	F–P	F	F	F	F	F	G–F	F	F
Brighton sandy loam over gravel	F	F	F–P	F–P	F	F	F	F	F	G–F	F	F
Guerin sandy loam	F–P	F	F	F–P	F	F	F	F	F–P	F–P	F	F
Simcoe clay loam	F–P	F	F	P	F	F	F	F–P	F–P	P	F–P	F
Simcoe silt loam	F–P	F	F	P	F	F	F	F–P	F–P	P	F–P	F
Jeddo clay loam	F–P	F	F	P	F	F	F	F–P	F–P	P	F–P	F
Malton clay	F–P	F	F	P	F	F	F	F–P	F–P	P	F–P	F

* The crop adaptability rating for each soil type is as follows:

G — Good; G–F — Good to Fair; F — Fair; F–P — Fair to Poor; P — Poor.

TABLE 16

ACREAGES OF FAIR CROPLAND

Soil Type	Acreage	% of Total	Limitations
Bookton sandy loam	3,100	0.5	Low fertility and susceptibility to erosion
Fox sandy loam	11,800	2.1	Low fertility
Sargent sandy loam	1,200	0.2	Low fertility
King clay loam — steep phase	11,100	2.0	Susceptibility to erosion
Schomberg clay loam — steep phase	4,300	0.7	Susceptibility to erosion
Brighton sandy loam	24,800	4.5	Low fertility
Brighton sandy loam over gravel	4,000	0.7	Low fertility
Guerin sandy loam	1,600	0.3	Imperfect drainage
Simcoe clay loam	4,600	0.8	Poor drainage
Simcoe silt loam	4,000	0.7	Poor drainage
Jeddo clay loam	5,000	0.9	Poor drainage
Malton clay	3,100	0.5	Poor drainage
Total	68,600	13.9	

TABLE 17

ADAPTABILITY RATINGS FOR FAIR TO POOR CROPLAND*

Soil Type	Wheat	Oats	Barley	Alfalfa	Red Clover	Alsike	Timothy	Fodder Corn	Peas and Beans	Tree Fruits	Turnips	Pasture
Pontypool sandy loam	F–P	F–P	F–P	F–P	F	F	F	F–P	F–P	F	F–P	F
Tecumseth sandy loam	F–P	F–P	F–P	F–P	F	F	F	F–P	F–P	F–P	F–P	F
Tecumseth sandy loam over gravel	F–P	F–P	F–P	F–P	F	F	F	F–P	F–P	F–P	F–P	F
Brady sandy loam	F–P	F–P	F–P	F–P	F	F	F	F–P	F–P	F–P	F–P	F
Gwillimbury sandy loam	F–P	F–P	F–P	F–P	F	F	F	F–P	F–P	F–P	F–P	F
Tioga sandy loam	F–P	F–P	F–P	P	F	F	F	F–P	F–P	F–P	F–P	F–P
Berrien sandy loam	F–P	F–P	F–P	P	P	F	F	F–P	P	P	P	F
Lyons loam	F–P	F–P	F–P	P	P	F–P	F–P	P	P	P	P	G–F
Rubicon sandy loam	F–P	F–P	F–P	P	P	F–P	F–P	F–P	P	P	P	F–P

* The crop adaptability ratings for each soil type is as follows:

G — Good; G–F — Good to Fair; F — Fair; F–P — Fair to Poor; P — Poor.

TABLE 18

ACREAGES OF FAIR TO POOR CROPLAND

Soil Type	Acreage	% of Total	Limitations
Pontypool sandy loam	21,200	3.9	Susceptibility to erosion and low fertility
Tecumseth sandy loam	15,200	2.7	Imperfect drainage and low fertility
Tecumseth sandy loam over gravel	500	0.1	Imperfect drainage and low fertility
Brady sandy loam	1,500	0.3	Imperfect drainage and low fertility
Gwillimbury sandy loam	400	0.1	Imperfect drainage and low fertility
Tioga sandy loam	300	0.1	Low fertility
Berrien sandy loam	7,900	1.4	Imperfect drainage and low fertility
Lyons loam	3,500	0.6	Poor drainage
Rubicon sandy loam	400	0.1	Imperfect drainage and low fertility
Total	50,900	9.3	

TABLE 19

ADAPTABILITY RATINGS FOR POOR CROPLAND*

Soil Type	Wheat	Oats	Barley	Alfalfa	Red Clover	Alsike	Timothy	Fodder Corn	Peas and Beans	Tree Fruits	Turnips	Pasture
Pontypool sand	F–P	F–P	F–P	P	P	P	P	P	P	F–P	P	F–P
Gilford loam	F–P	F–P	P	P	P	P	F–P	P	P	P	P	F–P
Wauseon sandy loam	P	F–P	P	P	P	P	F–P	P	P	P	P	F–P
Granby sandy loam	P	F–P	P	P	P	P	F–P	P	P	P	P	F–P

* The crop adaptability ratings for each type is as follows:

G — Good; G–F — Good to Fair; F — Fair; F–P — Fair to Poor; P — Poor.

TABLE 20

ACREAGES OF POOR CROPLAND

Soil Type	Acreage	% of Total	Limitations
Pontypool sand	14,000	2.4	Susceptibility to erosion and low fertility
Gilford loam	500	0.1	Poor drainage
Wauseon sandy loam	800	0.1	Poor drainage
Granby sandy loam	15,200	2.7	Poor drainage
Total	30,500	5.3	

TABLE 21

CROP ADAPTABILITY RATINGS FOR SUBMARGINAL CROPLAND*

Soil Type	Wheat	Oats	Barley	Alfalfa	Red Clover	Alsike	Timothy	Fodder Corn	Peas and Beans	Tree Fruits	Turnips	Pasture
Bottom Land	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	G–F
Muck	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	P
Bridgman sand	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

* The crop adaptability rating for each soil type is as follows:

G — Good; G–F — Good to Fair; F — Fair; F–P — Fair to Poor; P — Poor.

TABLE 22

ACREAGES OF SUBMARGINAL CROPLAND

Soil Type	Acreage	% of Total	Limitations
Bottom Land	36,000	6.4	Subject to periodic flooding
Muck	27,800	5.0	Very poor drainage
Bridgman sand	600	0.1	Seriously eroded by wind
Total	64,400	11.5	