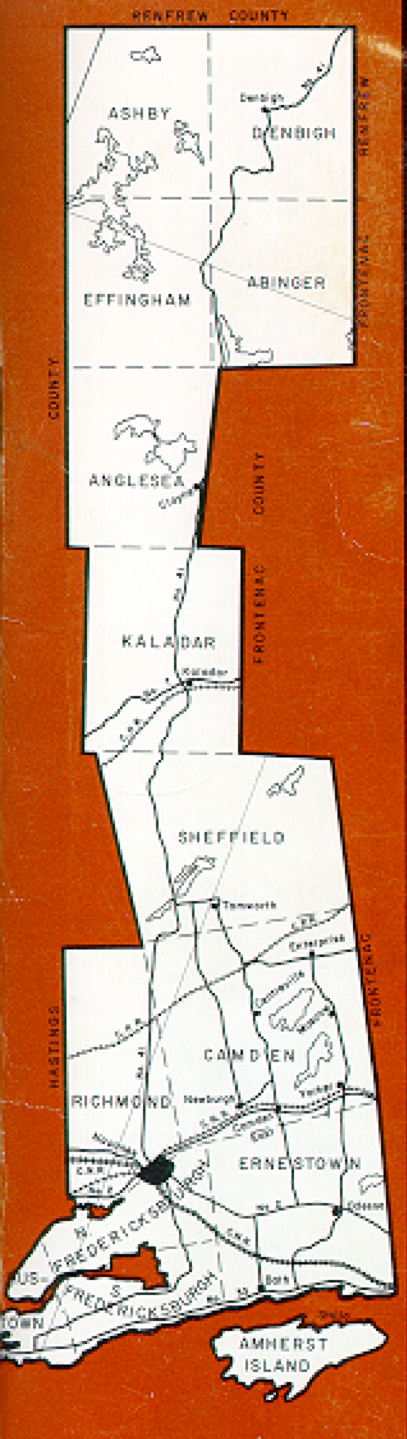
SOIL SURVEY OF LENNOX & ADDINGTON COUNTY

REPORT NO. 36
OF THE ONTARIO SOIL SURVEY



Prepared jointly by the Research Branch, Canada Department of Agriculture and the Ontario Agricultural College.

CANADA DEPARTMENT OF AGRICULTURE, OTTAWA
ONTARIO DEPARTMENT OF AGRICULTURE, TORONTO

THE SOIL SURVEY OF LENNOX AND ADDINGTON COUNTY

by

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RESEARCH BRANCH, CANADA
DEPARTMENT OF AGRICULTURE AND THE ONTARIO
AGRICULTURAL COLLEGE

SOIL SURVEY MAPS AND REPORTS

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The soil map was prepared for lithographing by the Cartographic section of the Soils Research Institute, Canada Department of Agriculture, Ottawa.

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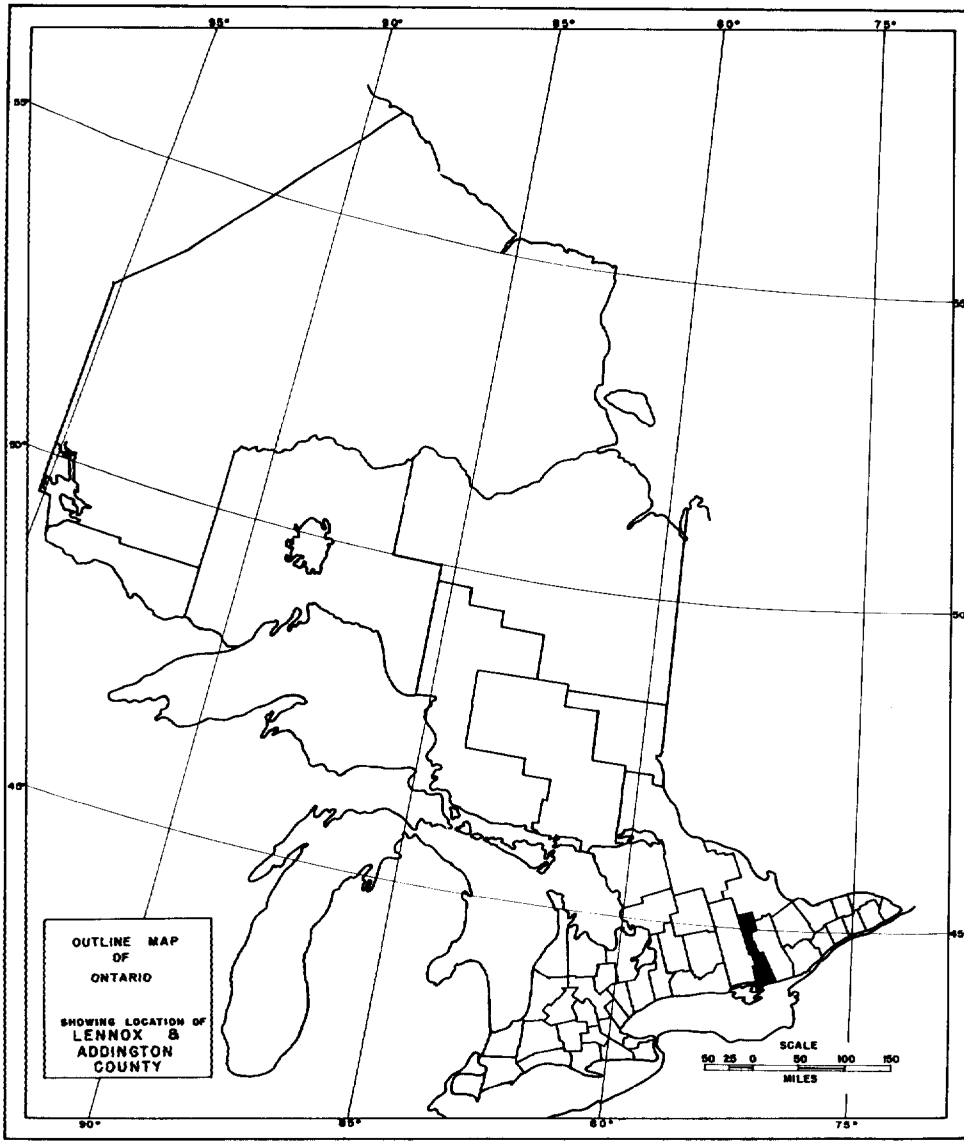


Figure 1. Outline Map of Ontario Showing Location of Lennox and Addington County

THE SOIL SURVEY
OF THE
COUNTY OF LENNOX AND ADDINGTON

INTRODUCTION

The soil survey of Lennox and Addington County was begun in 1952 with the object of making an inventory of the soil resources of the county. This included the mapping of the various soils and gathering information about their characteristics from which to estimate their adaptability and use in the growing of agricultural crops.

The following report gives the characteristics of each soil as well as information concerning the best management practices for crop production. Those who desire soils information about a certain area should locate the area on the map, note the colour or colours and the indicated map symbol and use the key to determine the soil type or types involved. Description of these types may then be found in the report.

GENERAL DESCRIPTION OF THE AREA

Location and Size

The location of the county within the Province is shown in Figure 1. It borders on Lake Ontario, and is bounded on the west by Hastings County and on the east by Frontenac County.

The area of the county is approximately 748,654 acres.* The county is about 77 miles long and varies in width from 8 miles to 26 miles.

County Seat and Principal Towns

The county seat is Napanee, (population 4,500**). Several small villages in the county serve as marketing and distribution centres for some of the agricultural produce from adjacent farms. Among these are Bath, Odessa, Newburgh, Tamworth, Erinsville and Enterprise.

Population

The total population of the county is 23,717**. This represents an increase of 4,170 persons in the ten year period between 1951 and 1961. The most spectacular increase is in the township of Ernestown which had a population increase of about 30 per cent in the five-year period. Most of the increase was due to industrial growth. Some northern townships and Amherst Island and Adolphustown, have had a decrease in population.

*Census of Canada 1951
**Census of Canada 1961.

Agricultural Development

The first settlement in Lennox and Addington County commenced in 1874 with the arrival of a large number of United Empire Loyalists who settled in the front townships of Ernestown, Fredericksburg and Adolphustown.*

Amherst Island was originally part of the Seigniory of La Salle. Later it was owned by Sir John Johnson who, according to legend, obtained it from an Indian chief in exchange for his full dress gold braided frock. Thus private ownership delayed the settlement of Amherst Island until 1803 when some United Empire Loyalists left Ernestown township and took up land on the eastern part of the Island. Shortly afterwards, Irish immigrants commenced the settlement of the western end of the Island.

A large scale immigration from the British Isles and the Continent resulted in rapid settlement of Richmond and Camden Townships soon after the turn of the 19th century. Two sons of Elias Huffman, whose farm was in Richmond Township, left home in 1825 with a few days rations to locate farms for themselves and took up land in an uninhabited region which is now in the Moscow area. The first settlers to locate in Denbigh Township arrived in 1858.

The first cheese factories in the county commenced operating near Odessa about 1866. Other cheese factories were in operaion in Denbigh in 1902 and Vennachar in 1903.

*History of the County of Lennox and Addington—Herrington.

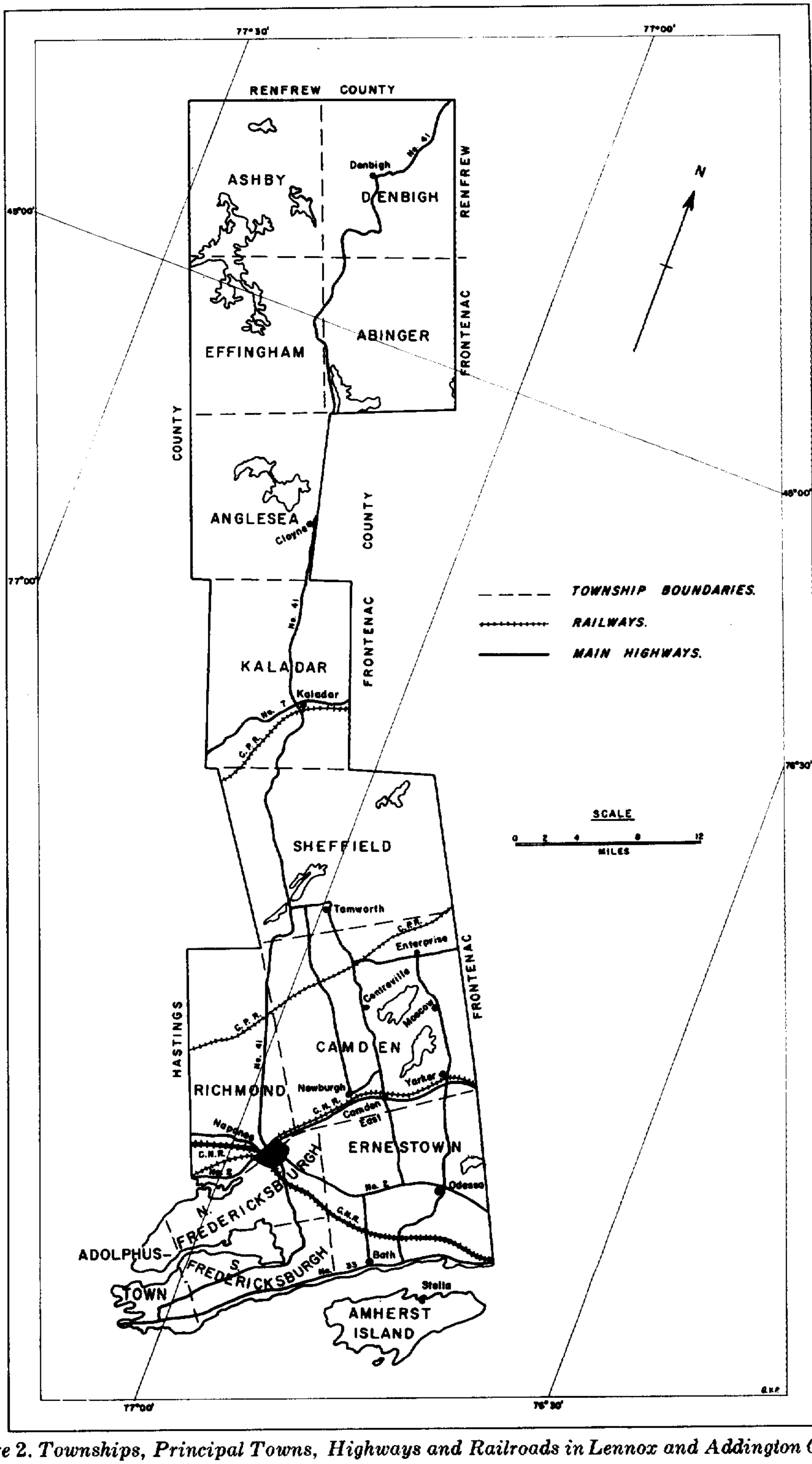


Figure 2. Townships, Principal Towns, Highways and Railroads in Lennox and Addington County

Transportation and Markets

The southern part of the county, from Lake Ontario north to Tamworth, is well supplied wih roads. Provincial highways (numbered) 2, 33, 401, and 7 run east and west across the county, as shown in Figure 2. Highway 41 traverses the full length of the county from Napanee to the northern boundary. There are also a number of hard-top (county) roads in the townships of Camden East, Ernestown and the two Fredericksburg Townships as well as gravelled (concession) roads.

Main lines of the Canadian National and Canadian Pacific Railways cross the county and branch lines provide additional local service although there is no rail service in the county north of Kaladar.

Present Agriculture

The agriculture of Lennox and Addington, as in the neighbouring counties to the east and west, is dominantly dairy farming. In 1958, 1,032,234 pounds of creamery butter and 2,904,869 pounds of cheddar cheese were produced in the county as compared to 311,445 pounds of butter and 4,867,259 pounds of cheese in 1951. This shift from cheese to butter production caused by the loss of the overseas cheese markets has resulted in reduced income for farmers. Table 1 shows the acreage of the major crops grown in the county in 1951. Most of the crops grown are used on the farm for feed. Fall wheat is the only important cash crop grown in the county.

Region 1 (Table 1) comprising the six northern townships in the county is not an agricultural area but rather a forestry and recreational region. The farms within this region produce food for home consumption and some for local markets.

Region 2 consists mainly of rolling to hilly loam textured soils with lesser amounts of poorly drained clay soils. In comparison with Region 3, farming is more diversified. There are more beef cattle, sheep and swine than in area number 3.

Region 3 is composed of nearly level lacustrine soils. Although the total acreage of pasture and cultivated crops is greater than in Region 2, the total livestock population is less.

TABLE 1

PRESENT AGRICULTURE

(Census 1956)

Region	*Area of Improved Land (ac.)*	*Wheat (ac.)*	*Oats (ac.)*	*Mixed Grain (ac.)*	*Hay (ac.)*	*Pasture (ac.)*	*Cattle*		*Sheep (No.)*	*Pigs (No.)*
							Total (No.)	*Cows & heifers milking (No.)*		
1. Denbigh, Abinger, Ashby, Kaladar, Anglesea, Effingham	5,267	12	498	8	1,476	1,676	1,065	382	252	337
2. Camden, Sheffield, Richmond	75,743	2,101	8,661	3,171	32,331	21,298	21,586	8,410	3,053	7,498
3. Ernestown, Fredericksburgh N. Fredericksburgh S. Amherst Island, Adolphustown	86,423	4,375	8,930	840	29,840	18,276	16,212	8,276	2,884	5,560
Total (Census 1956)	167,433	6,488	18,089	4,019	63,647	41,250	38,865	17,068	6,189	13,395
Total (Census 1961)	——	3,141	28,008	1,930	60,340	——	41,287	16,261	4,256	13,673

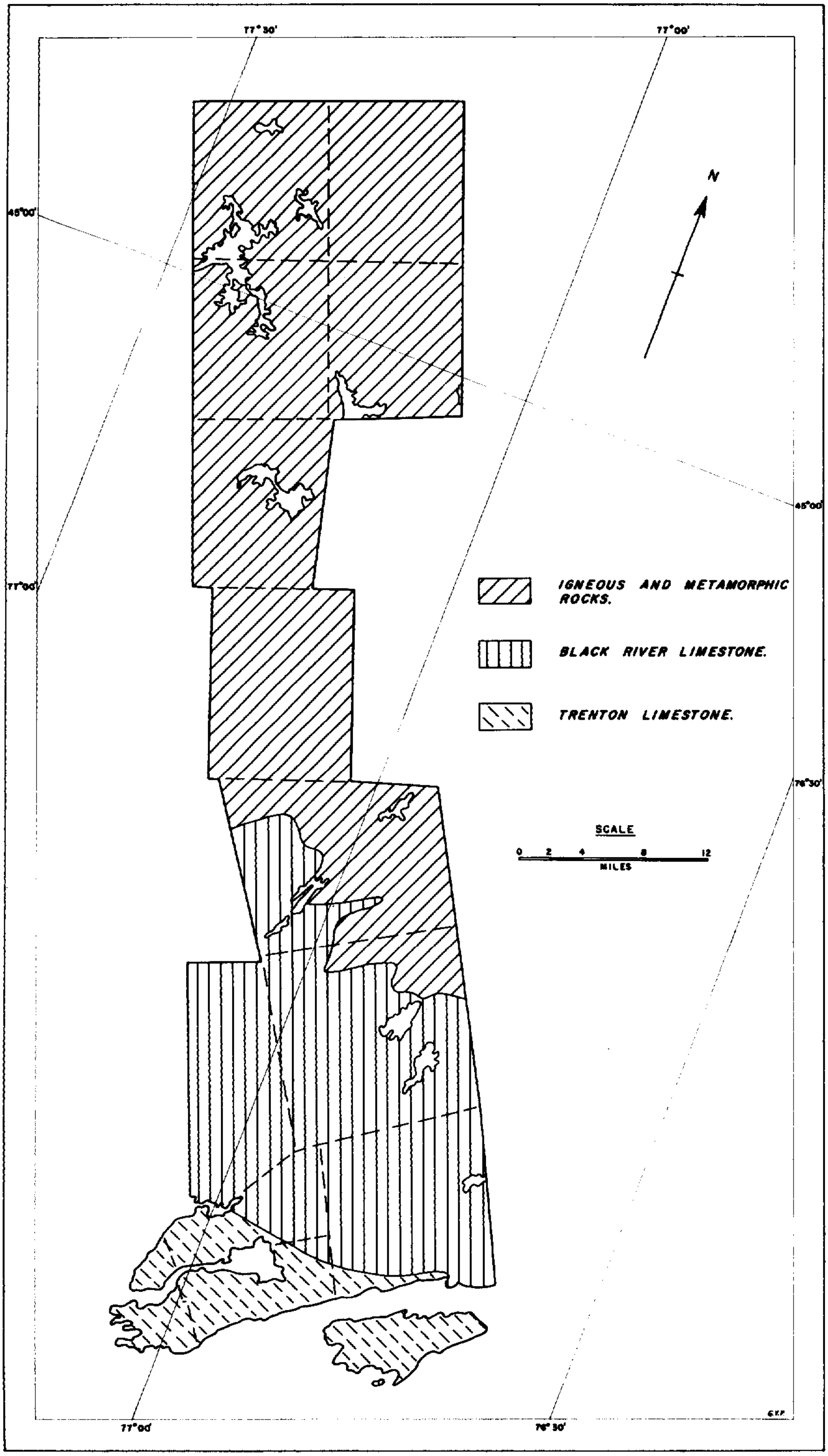


Figure 3. Outline Map Showing The Bedrock Geology of Lennox and Addington County

GEOLOGY

The bedrock geology of Lennox and Addington County is shown in Figure 3. In the northern part of the county which lies within the Precambrian Shield the bedrock is composed of igneous and sedimentary rocks of Precambrian age. Large masses of granite and granite gneiss as well as metamorphosed rocks of sedimentary origin are found in the area. Crystalline limestone occurs in several areas.

Ordovician limestones occur in the southern part of the county. These are subdivided into two formations, the Black River and the Trenton. The Black River formation is fine-grained and generally thickly bedded. Glacial action left thin soils over much of this area. Trenton limestone overlies the Black River formation in the Adolphustown peninsula. It is coarser than the Black River limestone and is thinly bedded with shale partings.

SURFACE DEPOSITS

The unconsolidated surface materials along the southern border of the county were deposited in fresh-water glacial lakes or in the marine waters of the Champlain Sea. These deposits which are mainly fine-textured occur on a relatively flat plain and extend from Amherst Island northwesterly to the Salmon River.

Unsorted deposits (called "till") that were laid down by moving ice cover the major part of the county and also occur as isolated ridges or drumlins throughout the clay plain to the south. The till materials were mainly derived from the grinding action of glaciers on the Ordovician limestones underlying these areas. However the till materials of the Precambrian Shield lying in the northern area of the county, were derived from igneous and metamorphic rock and are coarse textured and non-calcareous. In two isolated areas where crystalline limestone bedrock is exposed, calcareous soils have been developed either by ice action or residual weathering. The till deposits in this northern part of the county are thin over bedrock; rock outcrops are numerous.

Coarse-textured deposits such as sand and gravel are found in small areas throughout the county. Most of these deposits were formed by melt-water flowing from the front of the glacier (sand plains) or were laid down in ice channels within the glacier producing long "snake-like" ridges several miles in length (gravel deposits).

An extensive level limestone plain with thin soil covering occurs in Camden township and the northern part of Ernestown township. The depth of soil varies from zero to less than one foot.

DRAINAGE

The drainage systems of the county are shown in Figure 4. The slope of the land is southwesterly. The Skootamatta, Salmon and Napanee Rivers are the largest rivers in the county. The clay plain in the south of the county is drained inadequately by a number of creeks such as the Millhaven, Wilton and Spring Creeks.

CLIMATE

Although there are no weather stations within the county, the weather records for Belleville, Bloomfield and Kingston should apply in the townships of Adolphustown, North and South Fredericksburg, Ernestown and Amherst Island. The data for Tweed should apply in the Tamworth area, while the temperature and precipitation data for Bancroft should be similar to that of the northern townships.

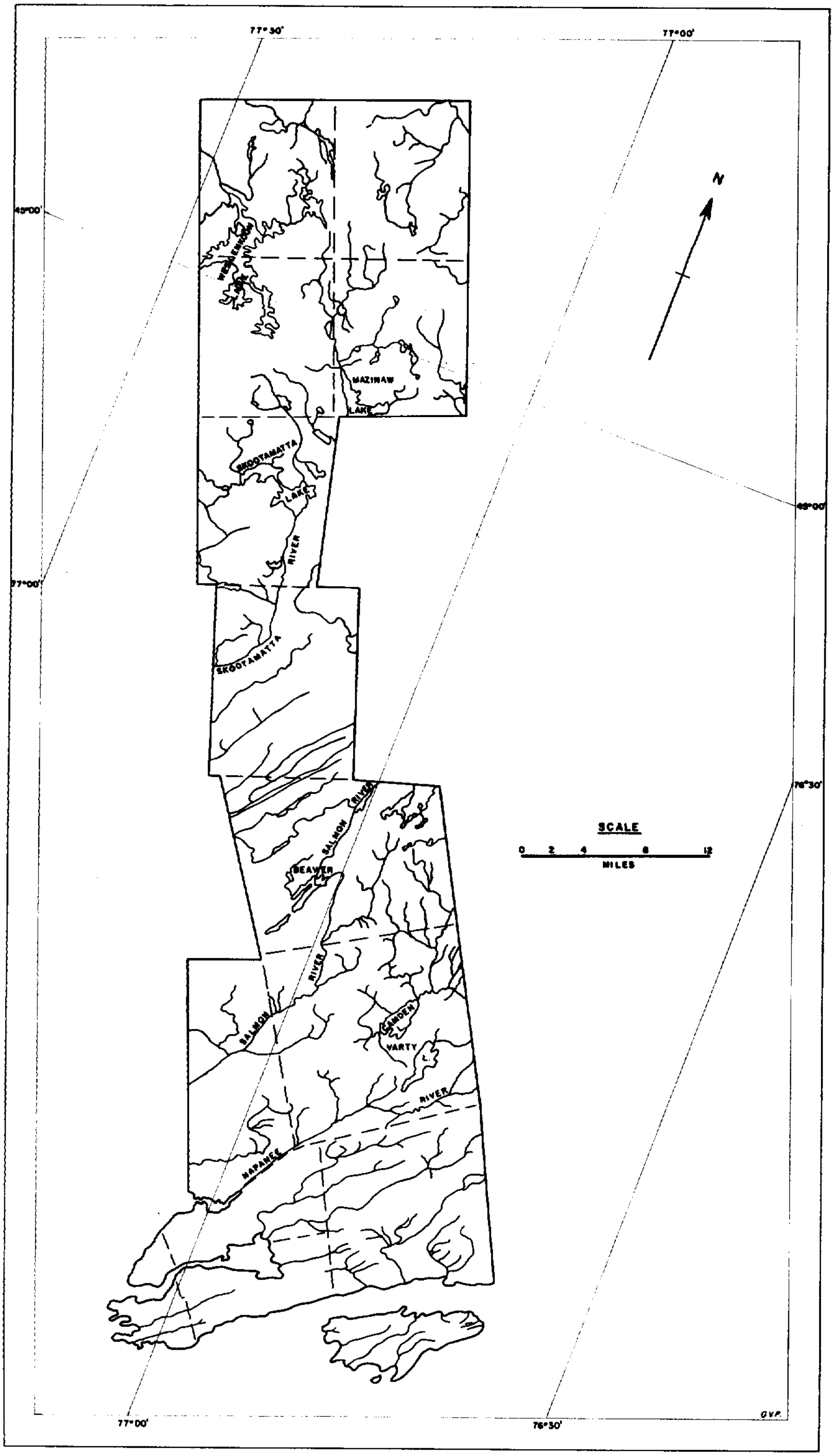


Figure 4. Outline Map Showing the Natural Drainage Courses in the County

TABLE 2

Mean Monthly and Annual Temperature for Areas Adjacent to Lennox and Addington

Station	*Jan.*	*Feb.*	*March*	*April*	*May*	*June*	*July*	*Aug.*	*Sept.*	*Oct.*	*Nov.*	*Dec.*	*Year*
Bloomfield 38 years	19.9	17.6	27.6	40.6	52.8	62.4	68.8	67.0	60.5	48.8	36.8	24.9	43.9
Belleville 47 years	18.6	18.8	28.2	42.0	54.2	64.9	70.1	67.8	60.2	47.1	35.1	21.8	44.1
Kingston 62 years	19.0	18.0	28.0	41.0	53.0	63.0	68.0	67.0	61.0	49.0	37.0	24.0	44.0
Tweed 29 years	15.0	17.0	29.0	42.0	55.0	65.0	69.0	67.0	59.0	47.0	35.0	21.0	44.0
Bancroft 37 years	13.0	12.0	24.0	38.0	51.0	60.0	65.0	62.0	54.0	43.0	31.0	18.0	39.0

TABLE 3

Mean Monthly and Annual Precipitation for Areas Adjacent to Lennox and Addington County

Station	*Jan.*	*Feb.*	*March*	*April*	*May*	*June*	*July*	*Aug.*	*Sept.*	*Oct.*	*Nov.*	*Dec.*	*Year*
Bloomfield	2.83	2.27	2.34	2.56	2.48	2.25	2.26	2.21	2.62	2.59	2.76	2.71	27.9
Belleville	3.26	2.46	2.63	2.17	2.37	2.66	2.52	2.65	2.78	2.28	2.85	2.54	31.2
Kingston	2.82	2.18	2.50	2.33	2.82	2.89	2.89	2.73	2.86	2.99	2.96	2.85	32.8
Tweed	3.12	2.20	3.25	2.30	3.23	2.71	3.26	2.19	3.31	2.73	3.32	2.92	34.5
Bancroft	3.70	2.90	2.40	1.60	2.80	3.10	2.80	2.10	2.70	2.40	3.30	2.60	32.4

TABLE 4

FROST DATA FOR AREAS ADJACENT TO LENNOX AND ADDINGTON COUNTY

Station	*Average Frost-Free Period*	*Last Frost - (Spring)* *Average*	*Earliest*	*Latest*	*First Frost - (Fall)* *Average*	*Earliest*	*Latest*
Bloomfield	148	May 10	April 9	June 8	Oct. 5	Sept. 14	Oct. 30
Belleville	147	May 10	April 17	June 1	Oct. 4	Sept. 19	Oct. 24
Kingston	161	May 3	April 11	May 27	Oct. 11	Sept. 11	Nov. 3
Tweed	138	May 12	April 23	May 24	Sept. 27	Sept. 11	Oct. 13
Bancroft	98	June 2	May 4	June 29	Sept. 8	July 25	Oct. 8

The length of the growing season varies from 196 days in the south to 182 days in the northern end of the county.

THE CLASSIFICATION AND DESCRIPTION OF THE SOILS OF LENNOX AND ADDINGTON COUNTY

The surface deposits previously described are the parent materials from which the soils have developed. Differences in the kinds of soils are due to differences in the parent materials as well as to differences in natural drainage and vegetation.

Under the cool humid climate and forest vegetation, soils tend to be acid. The acidity is the result of the removal of bases, particularly calcium, from the surface layers of the soil by percolating water. Weathering and percolation of water within the soil materials results in the development of layers or horizons that differ from one another in thickness, colour, and structure and frequently in texture.

The vertical sequence of horizons in a soil is called the *soil profile.* In agricultural practice, it is customary to refer to the different horizons as surface soil, subsoil and parent material. However because many soils have more than three horizons it is convenient to use the specific pedological terms A horizon, B horizon and C horizon. Various letters and numerals can be appended to the major horizonal divisions as shown in the glossary appended to this report.

The A horizon is the horizon of maximum weathering and from which the bases are removed. In many soils the A horizon can be subdivided into A_h and A_e. The A_h horizon contains the largest amount of organic matter and the A_e is the horizon with the lightest colour. Some of the constituents (clay, iron, organic matter) leached from the A_h and the A_e accumulate in the B horizon. Hence the B horizon is often finer in texture than other horizons in the profile. The C horizon, generally referred to as parent material, may be unaltered or only slightly altered by the soil-forming processes.

Poorly drained soils or those in which ground-water is present for a large part of the year have a gley horizon. The gley horizon is bluish grey and has yellow and red blotches throughout the horizon, hence a mottled appearance.

It is on the basis of the horizons in the soil profile that soils are classified.

One of the principal classification units is the Great Soil Group. This unit commonly consists of a number of soils that differ greatly in texture but are similar in the kind and arrangement of their horizons. The following pictures and descriptions show the characteristics of the major Great Soil Groups in Lennox and Addington County.

A Grey-Brown Podzolic Profile

Most of the soils in the southern part of the county are classified in the Grey-Brown Podzolic Great Soil Group. These soils have a dark greyish brown A_h horizon, 3 inches thick and relatively high in organic matter, underlain by a yellowish brown A, horizon that becomes lighter in colour with depth. The B horizon is brown and finer in texture than any other horizon. It contains accumulations of clay minerals and sesquioxides.

A Brown Forest Profile

The Brown Forest soils occur in highly calcereous till materials. These soils have a very dark brown A_h horizon, high in organic matter which is underlain by a brown B horizon containing some accumulation of sesquioxides and often some clay. Base saturation throughout the solum is 100 per cent.

A Podzol Profile

The Podzol soils have an AL horizon, which is underlain by a grey or white A_e horizon, each horizon being 1 to 2 inches thick. The B horizon is reddish brown grading to yellowish brown and contains accumulations of sesquioxides or organic matter or both.

A Grey Wooded Profile

The Grey Wooded Soils have a thin A_h horizon not more than two inches thick underlain by an almost white A, horizon. The B horizon is subdivided into an AB horizon having white coatings over the blocky aggregates and a B_t horizon. The aggregates in this horizon are coated with dark greyish brown clay skins containing sesquioxides.

Soil reaction ranges from a pH of 5.2 in the A horizon to pH 8.2 in the parent material.

A Dark Grey Gleysolic Profile

The Dark Grey Gleysolic soils are poorly drained. They have a dark coloured surface soil, high in organic matter, and a greyish subsoil with yellow and orange mottling.

In very poorly drained positions where the organic horizon is thicker than 12 inches the soils are classified. as Muck or Peat and are designated as Organic Soils.

SERIES, TYPES, PHASES AND COMPLEXES

The principal unit of soil classification is the soil series which may be subdivided into two or more soil types or phases. Each soil series is defined in terms of the characteristics of the soil profile; the soils included in a given series have similar profile development. The series is given a geographic name usually taken from an area where its occurrence is most common, e.g. Otonabee series, a name taken from Otonabee Township, Peterborough County. A soil series may include two or more soil types that differ only in the texture of the surface horizon. The name of the soil type is a combination of the series name and the surface texture, for example, Otonabee loam. Phases are usually subdivisions of soil types used to indicate external characteristics of the soil such as slope, depth to bedrock, amount of stones on the surface, that are not normal for the soil type, for example, Otonabee loam—shallow phase.

Some of the map units in this survey are soil complexes, i.e. a combination of two or more soil series or of two or more soil types. Such map units are used where two or more soil series occur in such an intricate pattern in the field that their boundaries cannot be delineated on the map. The names of the two dominant soil series are used in designating a soil complex.

SOIL KEY

A. Soils developed on calcareous glacial till.

	Acreage
I. Sandy loam parent material.	
(a) Good drainage.	
1. Bondhead sandy loam (Bsl)*	6,700
2. Bondhead sandy loam—shallow phase (Bl-sh)	400
3. Bondhead loam (Bl)	1,100
4. Bondhead loam—shallow phase (Bsl-sh)	700
(b) Imperfect drainage	
1. Guerin loam (Gul)	7,800
2. Guerin loam—shallow phase (Gul-sh)	900
(c) Poor drainage	
1. Lyons loam (Lyl)	300
2. Lyons loam—shallow phase (Lyl-sh)	900
II. Loamy parent material	
(a) Good drainage	
1. Otonabee loam (Ol)	12,500
2. Otonabee loam—shallow phase (Ol-sh)	4,400
3. Otonabee loam—stony phase (Ol-st)	4,800
4. Otonabee loam—steep phase (Ol-s)	700
(b) Imperfect drainage	
1. Emily loam (El)	3,900
2. Emily loam—shallow phase (El-sh)	3,000
III. Very stony loamy parent material	
(a) Good drainage	
1. Dummer loam (Dl)	29,000
2. Dummer loam—shallow phase (Dl-sh)	6,800

B. Soils developed on non-calcareous glacial till.

I. Sandy loam parent material	
(a) Good drainage	
1. Monteagle sandy loam (Msl)	900

C. Soils developed on calcareous stonefree clay materials.

I. Lacustrine clay parent material	
(a) Imperfect drainage	
1. Elmbrook clay (Ec)	1,400

* Symbol on soil map shown in brackets.

(b) Poor drainage	
1. Sidney clay (Sc)	15,600
2. Sidney clay—shallow phase (Sc-sh)	400
II. Silty clay parent material	
(a) Poor drainage	
1. Moscow clay (Mc)	6,800
2. Moscow clay—shallow phase (Mc-sh)	100
3. Moscow clay—rocky phase (Mc-R)	1,300
III. Fine sandy loam, loam and silt loam parent material	
(a) Good drainage	
1. Newburgh fine sandy loam (Nufsl)	800
(b) Imperfect drainage	
1. Picadilly loam (Pl)	1,000
(c) Poor drainage	
1. Hinchinbrooke silt loam (Hsil)	100
IV. Lacustro-Marine parent material	
(a) Good drainage	
1. Gananoque clay (Gc)	400
(b) Imperfect drainage	
1. Lansdowne clay (Lac)	13,500
2. Lansdowne clay—shallow phase (Lac-sh)	800
(c) Poor drainage	
1. Napanee clay (Nc)	39,700
2. Napanee clay—shallow phase (Nc-sh)	800

D. Soils developed in thin lacustrine deposits over till.

I. Clay and clay loam overlying calcareous loam till	
(a) Good drainage	
1. Waupoos clay loam (Wcl)	700
(b) Imperfect drainage	
1. Solmesville clay (Soc)	1,400
(c) Poor drainage	
1. Lindsay clay (Lc)	1,400
2. Lindsay clay—shallow phase (Lc-sh)	400

E. Soils developed on outwash and deltaic sand material.

I. Calcareous sand parent material	
(a) Good drainage	
1. Tioga sandy loam (Tis)	1,100
(b) Poor drainage	
1. Granby sandy loam (Grsl)	300
II. Non-calcareous sand parent material	
(a) Good drainage	
1. Wendigo loamy sand (Wes)	5,200
2. Wendigo loamy sand—rocky phase (Wes-R)	6,300
III. Non-calcareous fine sand parent material	
(a) Good drainage	
1. Bancroft sandy loam (Basl)	300
IV. Calcareous sand overlying calcareous clay	
(a) Good drainage	
1. Bookton sandy loam (Bos)	100
(b) Imperfect drainage	
1. Berrien sandy loam (Bes)	800
(c) Poor drainage	
1. Wauseon sandy loam (Was)	500

F. Soils developed on outwash gravel material.

I. Calcareous (sedimentary limestone) gravel parent material	
(a) Good drainage	
1. Cramahe gravelly loam (Cs)	100

II. Calcareous (crystalline limestone) gravel parent material		
(a) Good drainage		
1. White Lake gravelly sandy loam (WLs)	4,900	
III. Non-calcareous gravel parent material		
(a) Good drainage		
1. St. Peters gravelly sandy loam (Spg)	1,700	

G. Shallow soils on limestone bedrock.

(a) Good drainage	
1. Farmington loam (Fl)	114,800

H. Soils developed on organic deposits

1. Muck (M)	14,800
2. Peat (P)	5,500

I. Miscellaneous mapping units.

1. Marsh (Ma)	5,000
2. Rockland (RL)	138,600
3. Rock outcrop (RO)	200

J. Soil complexes.

1. Emily loam (shallow phase)—Moscow clay (El-sh—Mc)	400
2. Guerin loam—Lyons loam (Gul-Lyl)	3,200
3. Monteagle sandy loam—Rock outcrop—Muck or Peat (Msl-R)	246,800
4. Moscow clay (shallow phase)—Otonabee loam (Mc-sh—Ol)	1,700
5. Moscow clay—Otonabee loam (Mc-Ol)	300
6. Otonabee loam—Solmesville clay (Ol-Soc)	300
7. Otonabee loam—Moscow clay (Ol-Mc)	5,500
8. Otonabee loam (shallow phase)—Moscow clay (shallow phase) (Ol-sh.—Mc-sh)	1,900
9. Otonabee loam—Napanee clay (Ol-Nc)	1,000
10. Rock outcrop—Moscow clay (RL-Mc)	400
11. Tweed sandy loam—Rock outcrop—Monteagle sandy loam (Tws-R)	12,500
12. Bottom Land (BL)	3,200

BONDHEAD SERIES

The Bondhead soils are important agricultural soils in Central and Eastern Ontario because of their suitability for the production of a wide range of crops and for their ease of cultivation. In Lennox and Addington County, the Bondhead soils occur on isolated till ridges or drumlins that rise above the lacustrine clay plain in the southern part of the county.

The topography of the Bondhead soils is moderately sloping with occasional short steep slopes at the rounded ends of drumlins.

The soil parent material is a greyish brown calcareous sandy loam or loam till containing numerous fragments of limestone and larger boulders of granite. On some of the till ridges it is evident that the soil materials have been sorted by wave action.

Under cultivation the surface layer of the Bondhead soil generally has a fair content of organic matter, is friable and well aggregated, and about 6 inches thick. On some eroded slopes, however, the brown coloured B horizon

Profile of Bondhead Sandy Loam

appears at the surface. The B horizon is brown to dark brown clay loam, 5-7 inches thick. It is less permeable to water than the loam surface soil.

Legume hay, spring grains, fall wheat, silage and grain corn grow well on the Bondhead soil although barnyard manure and commercial fertilisers are necessary for optimum yields. Erosion losses may be serious on slopes that are left bare over winter; hence the steeper slopes should be protected by permanent grass vegetation.

Two soil types namely, Bondhead loam and Bondhead sandy loam were mapped in the county. The major portion of Bondhead loam soils is in the drumlinized area lying to the southwest of Napanee; the Bondhead sandy loam soils occur principally in the east and southeast portions of the county.

Shallow phases of both soil types are mapped in areas where the till overlying the limestone bedrock is from 1 to 2 feet thick. Such shallow soils can be cultivated but their capacity to produce crops is restricted particularly because of their low moisture storage capacity.

GUERIN SERIES

The Guerin series is the imperfectly drained soil that is found in association with the Bondhead soils. The largest acreages of these soils are mapped in the Fellows area. Most of the Guerin soils in the county are underlain by bedrock at depths ranging from one to three feet and hence are classified as Guerin—shallow phase.

The topography is gently sloping, hence erosion is not a serious hazard. Surface drainage is slow and internal drainage often impeded by the underlying bedrock.

The organic matter content of the cultivated layer is generally higher than that of the Bondhead soils. Soil horizons below this surface layer are generally less well developed than corresponding horizons of the well drained soils.

The Guerin soils are used successfully for the growing of hay (including clovers), oats, corn and pasture but are less satisfactory for alfalfa and fall wheat than are the well drained Bondhead soils.

LYONS SERIES

Soils of this series occur on level to slightly depressional areas in association with the Bondhead and Otonabee soils. These soils are developed from stony calcareous till materials of loam texture; they are poorly drained and have a thick (6-8 inches) dark surface horizon that is rich in organic matter. Soil horizons underlying the surface have a drab grey colour and there is generally a zone of intense mottling. Free carbonates are usually found about 2 feet below the surface.

The Lyons soils are not suitable for spring grain crops but are satisfactory as pasture land. Most areas are used for (pasture and hay) but some still remain in forest. Oats or ensilage corn may be grown in favourable seasons but yields are generally low.

There are 900 acres of Lyons loam—shallow phase, i.e. less than 2 feet of soil over bedrock, in the southern part of the county, in close association with the Farmington series.

The topograohy is level to slightly depressional. The soil parent material is calcareous glacial till containing flat fragments of limestone. The surface soil is very dark grey in colour, underlain by mottled grey moderately stony soil resting on limestone bedrock. The entire solum is alkaline in reaction.

This shallow phase is generally used for pasture. It is a wet late soil in spring and crops may suffer from lack of moisture in July and August.

OTONABEE SERIES

The Otonabee soils occupy a large acreage in Central Ontario and extend to the eastern boundary of Lennox and Addington. Large acreages of Otonabee soil occurs around Camden Lake, in the Tamworth district, in South Fredericksburg, and in Adolphustown Townships. In the Enterprise-Moscow area, Otonabee soils are mapped as a complex with the Moscow series.

Otonabee soils are commonly found on oval-shaped hills having moderate slopes and also on short irregular slopes in areas of ground moraine. It is in these latter areas that till and clay soils are found in close association.

The soil parent material is a calcareous, grey, loam till. Occasionally the material is very stony and is mapped a stony phase. The solum is thin with a depth of 12 to 14 inches.

The base saturation of all horizons is high. The reaction of the surface soil is neutral and free carbonates are present in the B horizon which is usually within 8 to 10 inches from the surface.

Otonabee soils are suitable for the production of a wide variety of farm crops and are similar in productivity to the Bondhead soils. The distinction between these two series is in the thickness of solum and the degree of profile development.

The principal type of farming on these soils is dairying. Spring grains, corn and hay crops are alternated in the rotation.

The principal variations in the Otonabee soils which affect the agricultural use and to some extent productivity, are in the depth of soil that overlies the bedrock, in the steepness of the slope and in the amounts of stone that occur at the surface. These variations occur in specific areas and have been mapped separately as phases, namely Otonabee-shallow phase, Otonabee-stony phase, and Otonabee-steep phase.

The shallow phase soils have 1 or 2 feet of soil material overlying the bedrock and are most common in the Camden Lake regions where the till plain merges with the limestone rock plain. Although the soil covering is thin, these areas can be cultivated and will produce spring grains as well as cultivated hay. These soils are more droughty than the normal Otonabee soils and therefore are used mainly for hay and pasture.

A stony phase of Otonabee loam

The stony phase soils occur mainly around the village of Tamworth. These soils have a large quantity of field stones and boulders not only on the surface but also throughout the soil profile. Complete removal of stones is therefore difficult or impossible and the value of the soil for agricultural production is reduced accordingly.

The steep phase soils that also occur in the vicinity of Tamworth have steeply sloping hills and valley sides. Many of the steeper slopes are wooded or under permanent grass.

A good, field of corn on Otonabee loam

EMILY SERIES

The Emily soils occur in relatively small individual areas scattered over the southern townships, most of the areas occurring in Camden and Richmond Townships.

The Emily series is imperfectly drained and occurs in association with the Otonabee soils. The soil parent material is a loamy calcareous till. The topography is gently sloping; internal and external drainage of soil water is slow.

In the uncultivated state, the Emily sails have a deep surface horizon rich in organic matter underlain by a brown B horizon showing very little if any clay accumulation. Grey calcareous till underlies the B horizon at 14 to 16 inches below the surface. The profile has the characteristics of the Brown Forest soils.

Because of imperfect drainage, the Emily soils have limited suitability for the growing of agricultural crops. Clover and grass mixtures produce well, but alfalfa will not persist long. Excessive moisture in the spring makes this a later soil than the Otonabee; seeding of grain crops may be excessively delayed during wet spring seasons. Oats can be grown fairly successfully and good yields of ensilage corn can be obtained. Tillage is easy because the topography is gently sloping and erosion is not serious. Manuring for hay and corn and additions of phosphatic fertilizer for grain are necessary for good crop yields.

The shallow phase Emily soil has been mapped in association with the Farmington series north of Newburgh. The depth of soil over bedrock is greater than 1 foot but generally not over 2 feet. Soil characteristics are similar to those described for Emily loam.

Although the shallow phase soils are not recommended for intensive cultivation, they will provide good to fair pasture and fair hay crops. Pasture is good in spring and fall but poor in mid-summer because of lack of moisture.

DUMMER SERIES

The Dummer soils occur chiefly in Sheffield Township and the northern part of Richmond Township.

The soil parent materials are composed of very stony calcareous till which forms the eastern end of the great terminal moraine stretching across Peterborough and Victoria Counties.

The Dummer soils are irregular steeply sloping; the steepness of slope and coareness of the material combine to produce a soil with very rapid. internal drainage. The depressions contain deep accumulation of silt and fine sand that have been eroded from the surrounding slopes.

Dummer loam is mainly grazing land

The surface horizon under grass cover is 3 or 4 inches thick, very dark in colour and alkaline in reaction. The subsoil is greyish brown to dark brown and may have some clay accumulation in the B horizon. The grey, calcareous, stony parent material underlies the subsoil at depths ranging from 9 to 12 inches.

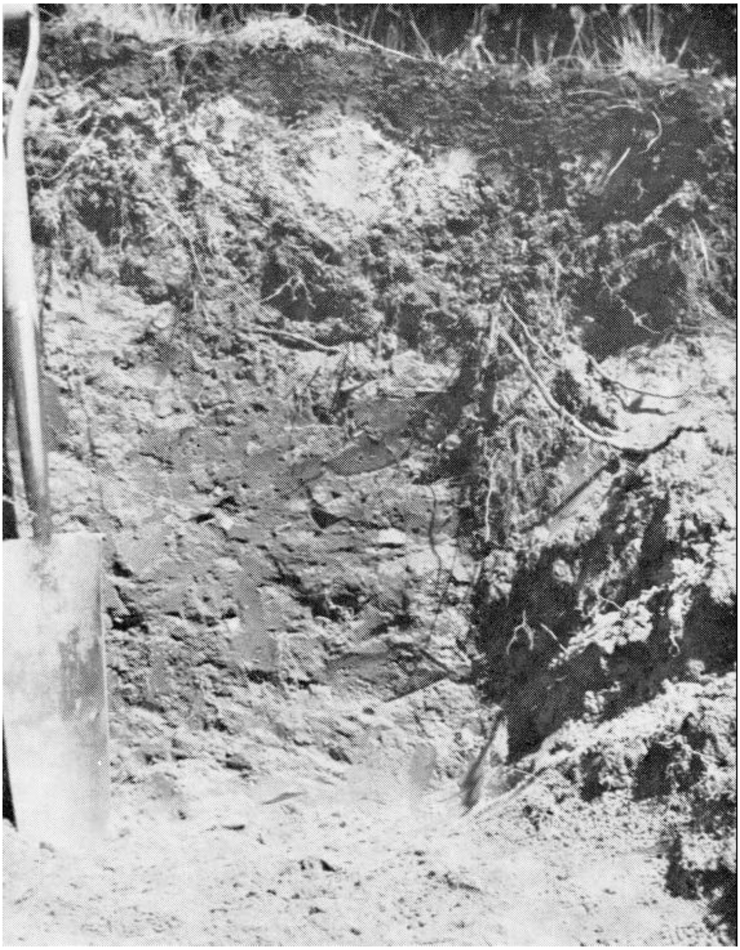
A large proportion of the Dummer soils is not suitable for cultivation because of stoniness and hilly topography. Most of these areas are suitable for pasture but some method of controlling weeds is a necessity. Most of the present range areas on these soils are choked with weeds; hence the carrying capacity of the pasture land is low.

The Dummer loam-shallow phase has a thin layer of soil over the limestone bedrock but is on steeper topography than the Farmington series which it otherwise resembles. It has very limited value as pasture land.

MONTEAGLE SERIES

The Monteagle soils are coarse-textured stony soils that have been derived from granites and other hard igneous rocks. These soils occur within the Precambrian Shield area that commences a few miles north of Tamworth in Sheffield Township and extends unbroken to the northern boundary of the county.

The soil material is till, but unlike the till soils in the southern part of the county, it contains no limestone. The deposits are thin and unevenly distributed so that the topography reflects the undulations in the bedrock; rock outcrops are common in association with the Monteagle soils.



Profile of Monteagle sandy loam

The areas shown on the soil map as Monteagle sandy loam constitute the areas with deeper soil materials and in which rock outcrop occupies less than 30 per cent. These soils have a dark coloured surface layer which originally developed under a mixed forest vegetation of deciduous and coniferous trees. During the last half century, logging operations and forest fires have depleted the forest, and grass vegetation is well established in all areas, except under the denser canopy of trees. The region is therefore a combination of grassy areas alternating with patches of forested areas in which there is no grass vegetation. This alternating pattern of vegetation must be recognized when assessing the potential of this region for grazing.

The lack of lime in the soil material has permitted the development of a Podzol soil profile. The surface leaf mat is underlain by a grey bleached layer, 1 or 2 inches in thickness. The subsoil, which is brown, loose and very porous, grades into the parent material at 14 to 22 inches. All horizons of the profile including the parent material have an acid reaction.

These soils are not used extensively for farming although some small areas are cultivated. Where permanent farmsteads are located much of the area is used for grazing.

The soils are strongly acid and have a low moisture-holding capacity. However, moisture deficiency is probably not as serious a factor as it would be in the southern part of the county where moisture evaporation is higher. The agricultural productivity of these soils is low.

ELMBROOK SERIES

The Elmbrook soils occur in the southern part of Richmond Township. The major areas of these soils are to be found in Hastings County.

These soils are imperfectly drained and occur in association with poorly drained soils (Sidney Series) formed on the same materials. The Elmbrook soils occupy the knoll positious in the landscape, or the areas adjacent to streams where natural drainage is relatively good; the Sidney soils occur in the flats.

These soils are developed on lacustrine clay materials deposited during the time of glacial Lake Iroquois. The borders of this lake extended as far north as Roblin Station. The sediments appear as fingers of clay extending into the limestone plains.

The Elmbrook soils have a dark coloured surface of medium organic matter content and good structure. The clay content of the surface horizons ranges from 27 to 38 per cent as contrasted with the parent material that has a clay content of 60 per cent. The soil is slightly acid to a depth of 18 inches and then becomes neutral and finally calcareous at 3 feet. Lime application is not necessary for the production of spring grains or corn but in order to establish good stands of legumes, clover or alfalfa, it is necessary to apply lime at the rate of 2 tons per acre.

The subsurface and subsoil horizons carry mottled colours indicative of imperfect drainage. There is no practical method of improving this condition and apart from delaying seeding operations in the spring it is doubtful that its effects are deleterious after the commencement of crop growth.

All of the Elmbrook soils are under cultivation and are used chiefly for the production of hay and grain.

SIDNEY SERIES

The Sidney soils are poorly drained clay soils extending from the Napanee River north to Roblindale Station in Richmond Township. They are developed in lacustrine clay sediments of glacial Lake Iroquois and are therefore of similar origin as the material that produced the South Bay and Elmbrook soils described elsewhere in this report.

During the time of glacial Lake Iroquois, this area could have been designated as the Thousand Islands. Numerous drumlinized hills protruded above the level of the lake waters resulting in the present pattern of hills that are composed of loam textured tills (Otonabee soils) completely surrounded by clay sediments. The eastern and northern extremities of these clay sediments merge with the large limestone rock plains that occur in Camden and the northern part of Richmond Townships.

The Sidney soils are deep; the surface layer contains 45 per cent clay and the parent material contains 80 per cent clay. They are among the finest textured soils that are to be found in the province.

The ease with which these soils can be cultivated depends on the structure of the surface soil. This in turn is governed to a large extent by the organic matter content. In general on the better managed soils, there is between 4 and 5 per cent organic matter in the surface soil. The massive subsoil and parent material almost completely block water movement through the soil; hence the soils are poorly drained and are water saturated for many months of the year. Very little artificial drainage has been attempted on these soils. It is doubtful that tile drains would work successfully and surface drainage is also difficult because the areas have little natural slope.

Cropping is limited almost exclusively to the production of hay, grass and legume mixtures, and to pasture. Whether or not spring crops can be safely grown depends upon the rainfall that occurs in the spring season. When precipitation is normal or exceeds the normal, spring grown grains generally fail. The production of hay is good and for that purpose the Sidney soils rate with the best in the district.

The Sidney clay-shallow phase soils consist of areas with thin (12 inches thick) deposits of clay overlying limestone bedrock. These areas occur where the clay flats emerge with the limestone rock plains and are used almost entirely as pasture land. Poor drainage is a major problem as it is in the deeper deposits of clay.

MOSCOW SERIES

The Moscow soils are poorly drained clay soils occurring in the Camden Lake,—Varty Lake region of Camden Township. The soil materials from which these soils developed originated in a local lacustrine basin separated by limestone plains and morainic ridges from the Lake Iroquois basin in which the Sidney clay and Napanee clay soils occur. Camden Lake and Varty Lake are remnants of a large lake that occupied an irregular shaped basin extending from the town of Croydon east into Frontenac County.

This is one of the best agricultural sections in the county and is a reflection of the soil combinations that occur in this area. The Moscow soils are interspersed among rolling upland areas on which till soils (Otonabee series) occur. Farm properties may therefore consist of variable combinations of these two types of soils. Although these are the principal agricultural soils in the area, large acreages of peat and muck soils are also present.

The Moscow soils have a neutral, dark, clay surface (the clay percentage varying from 35 to 45 per cent) which is friable and has good structure in contrast to the Napanee soils. The subsoil and parent material ranges from silty clay loam to silty clay.

The poor internal drainage of these soils is a result of their position in the landscape rather than to impervious subsoil material. They occupy the level flats and depressions between the rolling morainic ridges. Stream drainage through the adjacent peat and muck areas is very sluggish and the high water table in these areas probably extends into the adjacent Moscow clay. It is doubtful that any effective drainage improvement in the Moscow soils is possible without also improving that of the organic soil areas.

The Moscow clay soils are used principally for hay and spring grain crops. Since these are the principal crops grown in this dairy farming area, no data is available regarding the production of other crops on the Moscow clay.

The Moscow clay-shallow phase soils have limestone bedrock at depths of 1½ to 2 feet. These shallow soils are used for agricultural purposes in much the same way as the normal Moscow clay.

The Moscow clay-rocky phase, consists of a complex pattern of small level clay areas with frequent outcrops of granite and other hard bedrock. This pattern limits the usefulness of the soil for agricultural purposes other than pasture, although hay crops are occasionally harvested from the larger areas of clay. These soils occur in the vicinity of the town of Enterprise where the clay sediments merge with the Precambrian Shield.

NEWBURGH SERIES

The Newburgh soils are well drained soils that occur adjacent to the Napanee river and include most of the banks and upper terraces of the river extending for a few miles above and below the town of Newburgh. The parent materials of these soils consist of alluvial deposits of fine sand and silt laid down in some early period of deposition associated with this river channel. The deposits terminate rather abruptly (1½) miles below Newburgh and reappear again at Napanee. At this latter location the soils are imperfectly drained and classified as Picadilly loam.

The Newburgh soil area is dissected by drainage courses and the topography consists of valley slopes and smooth narrow divides between the valleys. Some of these valley features are associated with permanent streams but many consist of steep-sided gullies that project back into the upland. The agricultural use of these soils is confined to the moderate slopes and smooth upland locations.

The surface soil is a fine sandy loam, friable and slightly acid. The solum has developed to a depth of 24 inches and maintains a fine sandy loam texture down to the parent material. The parent material is calcareous and may be either fine sandy loam or silt loam. Soil drainage is free in all seasons of the year, which, combined with ease of cultivation, make these soils more versatile in production of agricultural crops than any other soils in the county. Slopes, however, are a serious limitation; hay and pasture crops are necessary to conserve this highly erodible material.

PICADILLY SERIES

The Picadilly soils have developed on silt loam and fine sandy loam deposits under imperfect drainage. They occur in two separate areas in the county; one adjacent to the town of Napanee where they occupy the upper benches of the bank of the Napanee river, the other, along the southern boundary of Varty Lake. It is likely that both areas had a similar origin in connection with the formation of the Napanee River.

The soil materials are much the same as those on which the Newburg soils developed but in comparison with the latter constitute a much shallower depth of deposit. Picadilly soils are less than 6 feet thick over limestone bedrock.

The surface soil is most commonly loam although local areas of silt loam are also present. The soils are friable, easy to work and are slightly acid. The subsoil is friable, porous, silt loam, with mottled colour indicative of imperfect drainage. The subsoil is saturated with water for many months of the year and probably dries out only in the summer months. The calcareous, silt loam, parent material occurs at a depth of 18 inches.

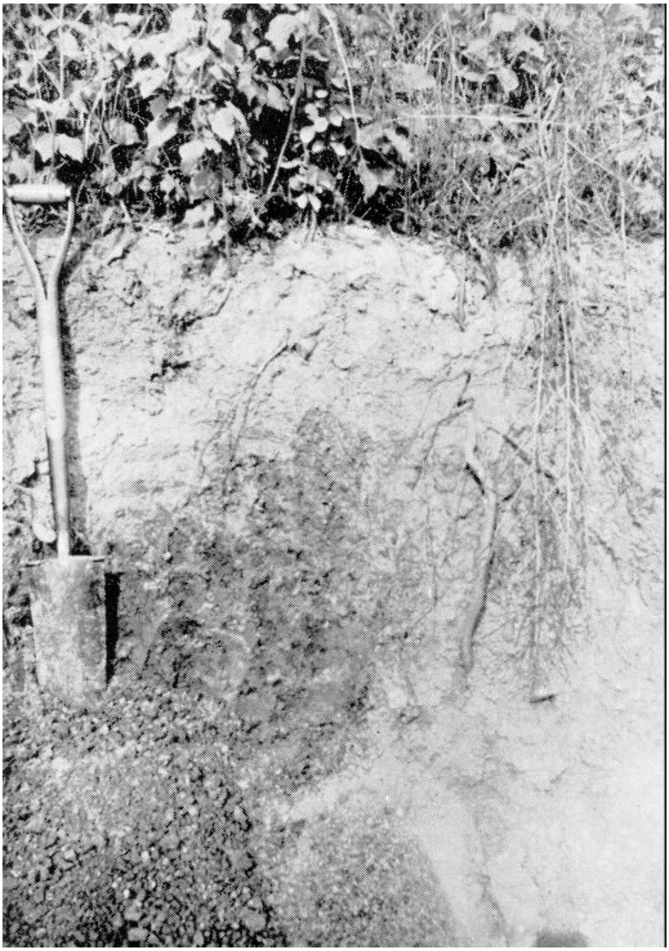
The principal crops grown are spring grains and hay. Because of the friable nature of these soils and their good workability, they are suitable for a variety of crops, including vegetable crops. Where internal drainage of the soil is a problem, tile drainage could be installed provided that the soil is sufficiently deep over the bedrock to permit a satisfactory installation.

HINCHINBROOKE SERIES

The Hinchinbrooke soils are poorly drained soils developed on calcareous silt loam. Alluvial and lake deposits associated with rivers and old shallow lake bays are found in the central part of the County.

These soils occupy depressional areas and are water-saturated for the greater part of the year. The surface soil is usually very dark indicating a high organic matter content. The surface and subsoil are silt loam, friable and easily drained if adequate drainage outlets can be provided.

In spite of their poor natural drainage these soils are cleared and are presently being used for the production of hay and pasture. Artificial improvement in the drainage will make these much better agricultural soils.



A Profile of Gananoque Clay

GANANOQUE SERIES

The Gananoque soils are developed in clay soil material having good to moderately good surface drainage. They occur only in the southern portion of the county. A part of this region was covered by salt waters of the Champlain Sea and it is assumed that these heavy clay sediments originated at this time. When first deposited these sediments must have been calcareous but the process of profile development has removed the lime from the surface layers to a depth of 36 to 48 inches.

Since these soils occur in a lake basin, the general topography is flat but is broken occasionally by gently rounded hills. It is presumed that these represent till knolls or rock domes covered by lake-laid sediments, but the till does not form a part of the soil profile. The soils that occur on these knoll positions where the drainage is moderately good, have been mapped as Gananoque clay.

The surface soil is slightly acid and is grey in colour, particularly when seen in a cultivated field. The subsurface soil is also grey, or when dry, is almost white. This is the most severely leached portion of the soil and has a low organic matter content. The remaining subsoil consists of brown clay with medium to coarse blocky structure and neutral reaction. The calcareous parent materials contain many hard lime concretions.

The Gananoque soils are among the best agricultural soils in the district. The application of commercial fertilizers or of barnyard manure is beneficial for all cultivated crops. Organic matter in some form must be regularly incorporated with the soil; otherwise it loses its friable structure.

LANSDOWNE SERIES

The Lansdowne series comprises the imperfectly drained clay soils occurring in the most southerly portions of the county, in the townships of North and South Fredericksburg, Adolphustown, Erneston and on Amherst Island. Associated with them are the Napanee clay soils which are derived from the same kind of soil materials but are poorly drained.

The Lansdowne soils are found on gentle slopes that probably represent the crests and slopes of buried drumlins or the rising elevations to a limestone plain. In some locations, islands of till soils occur completely surrounded by these clay sedimets. The position occupied by the Lansdowne soils is therefore the upper limits of the sediments deposited in the former glacial lake. Two conditions that contribute to the natural drainage on these clay soils are the natural slope of the surface which assists in water runoff, and the slope of the underlying sediment or base material.

Natural drainage of these soils is not completely satisfactory since clay texture restricts the movement of percolating water. These soils are therefore saturated with water for many months of the year and only dry out thoroughly during the summer.

The cultivated surface soil has a low content of organic matter. This low organic matter content is a natural condition brought about through soil development. The surface of cultivated fields is light grey and contrasts sharply with the soils in depressions that have a higher content of organic matter and are dark in colour. Plowed soils tend to be cloddy and difficult to cultivate, the general farm practice being to plow these soils in the fall and permit freezing and thawing during the winter to break down the large clods.

These soils are moderately acid to a depth of 24 inches, at 24 to 36 inches are neutral, and below 36 inches are calcareous. Applications of ground limestone are not necessary for cereal crops and corn, but may be for establishment of legumes such as alfalfa and red clover.

Gently Sloping Topography Characteristic of the Lansdowne Soils

The common crops grown on these soils are cultivated hay, spring grains, fall wheat, and corn. The productivity of the Lansdowne soil is good, and for these common crops it rates among the best of the clay soils in this region. Some difficulty is encountered in the production of alfalfa because of losses through winter killing; the practice is to substitute red clover which has a better chance of survival.

The Lansdowne-shallow phase soils are usually found in close association with the Farmington soils. They consist of clay deposits 12 to 18 inches thick underlain by limestone. Natural drainage is imperfect and the characteristics of the soil are similar to those of the deeper soils. These shallow soils are used principally for pasture and only occasionally for the growing of cultivated crops.

NAPANEE SOILS

The Napanee soils are poorly drained clay soils that occupy the level and depressional areas eastward from Napanee along the lake shore to Leeds Countd They are found in the townships of Adolphustown, South and North Fredericksburg, Ernestown and on Amherst Island. Since much of the agricultural production of the county is dependent upon the productivity of the clay soils, the present and future use of the Napanee soils (which are the most extensive clay soils in the county) is of great economic importance.

The soil materials of the Napanee series are similar to those of the Sidney series that occurs west of the town of Napanee. Although the mode of origin of these two soils may be the same there is a marked difference in their profile characteristics. The Napanee soils are known locally as “the white clays”. This descriptive term characterizes the colour of the surface cultivated soils but the

Plowing Down Grasses and Clovers is Good Practice on Clay Textured Soils

subsoil becomes darker with depth. Chemical analyses show that the surface horizons are low in organic matter and have lost most of their soluble constituents through leaching. In this respect they are similar to the Lansdowne clay soils. The average clay content of the cultivated surface soil is 45 per cent. It is possible that the parent materials of these soils may be of marine origin, connected with deposits of the Champlain Sea. Recent evidence* suggests that the western extension of these marine deposits is in the vicinity of Brockville.

The features that make this soil difficult to cultivate are, high clay content, low organic matter content and poor drainage. An improvement in the organic matter content will also improve the structure of the clay and in addition aid drainage by allowing freer movement of soil water. Perhaps the most serious handicap of these soils is the poor drainage. Up to the present time artificial drainage by the use of tile is not a common farm practice in this region. Investigations* on crop returns obtained from the use of tile drainage have shown some improvement through tiling, but the results have not been too successful. Until such time as drainage can be improved these soils will be used for hay and pasture crops mainly, or crops that can survive under excess moisture conditions.

The Napanee clay-shallow phase soils occur where clay deposits rest upon limestone bedrock, within 12 to 18 inches of the surface. Fortunately such soils are not very extensive and only occur adjacent to limestone outcrop and limestone plains. These soils are suitable only for hay and pasture.

* Tile drainage in Ontario. Agric. Economics Dept., Ont. Dept. of Agric., Toronto.

WAUPOOS SERIES

The Waupoos soils have developed in shallow lacustrine deposits overlying loamy calcareous till.

The topography of the Waupoos soils is gently to moderately sloping.

External drainage is sufficient to carry off much of the surplus water and the internal drainage is much more rapid than in deep lacustrine soils.

The cultivated surface is dark greyish brown and stonefree except in spots where erosion has been severe and the grey, stony underlying till may become incorporated in the plow layer.

The soil profile has developed in the stonefree clay overlying the calcareous till. The clay is seldom more than 24 inches thick.

The Waupoos soils are excellent soils for general farming. They have a good natural fertility and are fairly early soils. They are used for the production of hay, grain and corn.

Good management practices are essential on these soils. Erosion can be controlled by the adoption of rotations which retain this soil in sod for three years out of five. Regular applications of barnyard manure will help to maintain structure and increase fertility.

SOLMESVILLE SERIES

This series of soils has developed on shallow lacustrine deposits overlying stony calcareous till. The lacustrine materials are seldom more than 24 inches thick.

The topography of these soils is gently sloping but is not sufficient to carry away all surplus water, hence the soils are imperfectly drained.

The cultivated surface is dark in colour, indicative of a fair level of organic matter. A greyish brown eluviated horizon, found below the surface layer, contains orange-red mottles; a brownish horizon enriched with some clay and sesquioxides lies immediately above the grey till and is generally 4 to 6 inches thick.

The Solmesville series are good soils for general farming. They will produce good yields of hay and cereal grains. They are not suitable for as wide a range of crops as the well drained Waupoos. Alfalfa will not persist in these soils and they are normally too late in the spring for grain corn. The organic matter level should be maintained by regular applications of barnyard manure and plowing in of crop residues.

LINDSAY SERIES

The Lindsay soils have developed on shallow lacustrine clay deposits, about 15 inches thick, over stony calcareous till. The topography of this series is nearly level; hence external and internal drainage is slow.

The cultivated surface is dark, usually stonefree clay loam neutral in reaction. The subsoil layers are gleyed and mottled.

The Lindsay soils are used generally for hay and pasture. They are late soils and unreliable for the production of cereal grains, and unsuitable for alfalfa although other legumes such as alsike, birdsfoot trefoil and ladino may be grown in these soils.

Lindsay clay-shallow phase is similar to the Lindsay clay except that limestone bedrock underlies the soil at 15 to 18 inches. The phase differs from the shallow Sidney clay in that there are till materials above the bedrock and below the lacustrine clay.

This soil is a pasture soil but is used to a limited extent in producing hay and spring grains. Like other poorly drained shallow soils it is a late wet soil in the spring and droughty in late summer.

TIOGA SERIES

The Tioga soils are well drained sandy soils that have been formed from calcareous sand parent materials. These materials have been deposited in various ways throughout the county south of the Precambrian Shield; some are glacial outwash, such as at Ingle in the northern part of Camden Township, others are river deposits, such as those along the bank of the Napanee River below the town of Napanee. The process of soil development has removed the lime to a depth of 30 inches. The surface soil is moderately acid whereas the subsurface soil is more strongly acid. At increasing depth, the soil is neutral and is alkaline at 28 to 30 inches.

The surface soil is sandy loam but the subsoil is generally a loose, single-grained sand. These soils therefore have a low water-holding capacity and are not as productive as the finer textured soils that occur in adjacent areas. The topography is gently to moderately sloping; most areas are under cultivation and being used in the regular farm crop rotation. In addition to hay and grain crops, this soil is used for fruit and vegetable crops. With the use of barnyard manure and commercial fertilizers, the productivity of these soils can be raised to a fairly high level.

GRANBY SERIES

This soil has been developed on sandy materials and is the poorly drained member of the Tioga catena. The topography of this soil is slightly depressional.

The surface horizon is a very dark greyish brown neutral sandy loam 7 to 9 inches thick. This is underlain by grey layers containing varying amounts of rusty coloured mottled. The unweathered calcareous sand is grey.

In its natural state, this is a poor agricultural soil but if the drainage is improved, good hay and pasture, in addition to cereal crops, may be produced. This soil is used in some areas for the commercial production of sod.

WENDIGO SERIES

The Wendigo soils are sandy soils developed from sand parent materials occurring exclusively within the Precambrian Shield, mainly in Kaladar Township.

The parent materials of these soils originated as glacial outwash and to a lesser extent as river deposits associated particularly with the Skootamatta River. These deposits are generally shallow and poorly sorted with the result that gravels and various grades of sand occur together in stratified layers. The sand deposits occur as individual pockets of only a few acres of size, or as a broad continuous area with many rock knobs and small undrained depressions.

These sandy materials are non-calcareous and the soils developed on them are strongly acid with a typical podzol profile. Since many of these soils have not been cultivated the features of the podzol profile are undisturbed. The grey surface horizon is continuous in grassy open areas and in the wooded or forested areas.

The Wendigo soils should be considered as non-agricultural. In the early settlement of this region, these sandy areas were chosen as possible sites for farming; many of the roads that exist at the present time tend to join together the various small sand plain areas. Eventually they were abandoned for farming and some natural reforestation has taken place. Information gathered from local residents points to the fact that many of the best native stands of pine were to be found on these sandy soils.

The areas that consisted predominantly of sand were mapped as Wendigo loamy sand. Other areas, however, are shown on the map as Wendigo-Rocky phase. The latter areas consist of small pockets of Wendigo loamy sand together with rough knobs and hills of rock outcrop.

BANCROFT SERIES

A small acreage of this soil is mapped in the northern part of the county along the border between Hastings County and Lennox and Addington County.

The soil parent material is a fine non-calcareous sand along the slopes of a large post-glacial spillway and around large rock outcrops which interfered with the free flow of the water.

The surface in undisturbed areas consists of forest litter of twigs and leaves mostly of coniferous origin. A grey, leached, strongly acid A_e horizon of 1-2 inches underlies the forest litter. A reddish brown B horizon enriched with humus and iron occurs below the A_e layer. The B horizon fades in intensity of colour with depth grading into a greyish brown non-calcareous sandy parent material.

Potatoes are grown in some areas with considerable success but landscape features such as steep topography and rock outcrop prevent a fuller utilization of this soil for agriculture.

BOOKTON SERIES

The Bookton soils occur over a wide area in Southern Ontario but there is only a small acreage in Lennox and Addington County. Bookton sandy loam is the only type mapped in the county.

The Bookton soils have developed on 3 feet or less of calcareous sand, over lacustrine clay.

The moderately sloping topography associated with the Bookton provides good drainage within the soil.

The cultivated surface is a friable sandy loam of low to medium organic matter content. Subsurface horizons consist of a pale brown layer of sand or loamy sand 15 inches thick over clay. The upper portion of the clay is brown containing clay, iron, and other materials leached out of the sandy overburden. Grey calcareous clay underlies the 6 or 7 inches of brown clay.

Bookton sandy loam is a good agricultural soil and can be used to grow any crop that is climatically adaptable to the area. Its main requisites are regular applications of manure and fertilizer suitable to the requirements of the crop.

BERRIEN SERIES

These soils have developed on calcareous sand of medium texture overlying lacustrine clay.

The topography of the Berrien soils is gently sloping. This slope is insufficient to carry away all surplus water and imperfect drainage conditions exist in the soil.

The cultivated surface is fairly dark in colour indicating a fair level of organic matter. The subsurface layers of the Berrien are similar to those of the Bookton but are more weakly expressed and are mottled reddish brown.

A considerable proportion of this soil is being used for growing small fruits and vegetables in the county and it is a good soil for this purpose. It can also be used for the production of red and alsike clover, timothy and oats. The Berrien soils have a low natural fertility and require applications of barnyard manure and other fertilizer supplements.

WAUSEON SERIES

The Wauseon soils have developed on a calcareous sand overlying calcareous lacustrine clay at 20-24 inches.

The topography of the series is level or depressional. Surface drainage is poor and the drainage conditions within the soil are poor.

The cultivated surface horizon is deep and dark indicative of a high organic content level. Soil reaction is alkaline. Underlying layers are grey and mottled.

Some of the Wauseon soils are used for vegetable growing. They are late cold soils and not satisfactory for general farming except some hay and pasture.

CRAMAHE SERIES

The Cramahe soils are developed in mixed calcareous sand and gravel scattered through the southern part of the county.

The topography is generally hilly and both internal and external drainage are good.

The surface is very dark brown gravelly, friable, alkaline, sandy loam, 4 inches thick. This is underlain by a dark yellowish brown horizon (Bm_1), friable, stony and calcareous. The Bm_2 horizon is reddish-brown, friable, calcareous, sandy loam, 3 inches thick. The unweathered calcareous sand and gravel underlying the B is grey.

The coarseness of the materials and steep slopes make cultivation impractical. Such soils are only fair pasture soils but the areas of Cramahe gravel are important sources of building materials.

WHITE LAKE SERIES

Most of the White Lake soils are found in the northern half of the county. The soil is developed on calcareous gravel derived from limestone rocks of Precambrian age.

The soil parent materials are composed of gravel formed from many kinds of rocks such as granite, sandstone, and crystalline limestone. The gravel is poorly sorted, ranging in size from fine gravel to large boulders. The topography is irregular, moderately to steeply sloping. The soil has the characteristics of a minimal Podzol in the surface horizons with evidences of a Grey-Brown Podzolic textural horizon in the lower part of the profile. Soil reaction in the upper part of the profile is moderately acid but neutral below 15 inches.

The White Lake soil is commonly used for the production of cereals, hay and pasture. It is one of the few soils in the Precambrian Shield that can be cultivated although it is low in fertility and tends to be droughty. The gravelly materials are extensively used for construction purposes.

ST. PETER'S SERIES

The St. Peter's soil is a coarse, gravelly, soil that occurs exclusively within the Precambrian Shield in the townships of Denbigh and Abinger. The soil materials consist of gravel and sand deposited by fast-flowing streams and form much of the river terrace deposits and alluvial flood plains of the Mississippi River.

These are granitic materials and soil development has produced a typical Podzol soil profile. Although most of the surface horizon has been destroyed by various activities of man, the reddish brown B horizon is always present. The total depth of the soil profile is less than 12 inches.

Some agricultural use is made of these soils because in many areas they are the only boulder-free soils that exist. Cultivation however is limited to a few acres per farm and the crops that are grown are chiefly hay and oats.

FARMINGTON SERIES

The Farmington soils constitute the third largest acreage of soils in the county. They are found only in the southern half of the county on large continuous blocks of limestone table lands or on isolated segments of such table lands.

As shown on the geological map, Figure 3, the southern border of the Precambrian Shield, which is a region of hard granite-like rocks, cuts across the county in the northern sections of Camden and Richmond Townships. The portion of the county lying to the south of this border is a region with limestone bedrock. Nearly all of the agricultural soils in the county are on this limestone plain. This particular pattern of distribution of soil materials is a result of the nature of the bedrock and the distinctive action of the continental glacier. The main movement of the continental glacier was from north to south. In the area of hard Precambrian rocks, little soil material was produced but in the area of soft limestone the glacier ground the rock and produced the materials for the agricultural soils of the southern portions of the county. Adjoining the Precambrian border there is a belt of limestone plain that was either scraped bare of

Farmington Soils Have Good Grazing Potential soil materials or on which little of the disintegrated rock material was deposited. On these areas that have only a thin covering of soil materials of limestone origin, the Farmington soils occur.

The limestone rock surface is flat; hence the soil surface is also flat, except for local breaks or scarps in the rock surface. Variations in the soil are mainly variations in depth of deposit. Thus, it is possible to find areas of considerable size that have a soil covering of 4 inches and others with 12 inches of soil materials. These differences in depth may constitute the difference between an agricultural and a non-agricultural soil. In this area, soils with a depth of 12 inches do not have sufficient moisture reserve to ensure crop production. However it is only during the wettest seasons that the Farmington soils will give an adequate growth of spring seeded grains or hay. As a consequence, most of these soil areas are used as grazing land. Native grasses such as Canada Blue and to a lesser extent Kentucky Blue and Brown Top constitute the principal grass species.

These soils have little profile development. Because of proximity to bedrock the soil material has a high content of bases and may be calcareous even at the surface. The organic matter content is generally high and is present even in the subsoil so that the entire profile is dark brown. Only rarely do these soils show the mottled effects that are so commonly produced by imperfect drainage. It is possible that there are sufficient fractures and crevices within the rock surface to permit the excess water to seep away from the soil.

The Farmington soils constitute the problem soils in this as well as many other counties in the Province. They have limited use for agricultural purposes and have a low carrying capacity as grazing land. Their potential for forestry is limited. The plant species that occur most commonly are eastern cedar, dwarf juniper and creeping juniper. These trees soon become prevalent on abandoned land.

MUCK

The organic soils in the county are designated as Muck or Peat. The Muck soils are black, fairly well decomposed organic materials that occur in the limestone plain area of the southern half of the county and in certain portions of the Precambrian Shield. The occurrence of this soil appears to be associated very largely with the distribution of limestone or of calcareous soils.

A boring made through a body of Muck usually reveals various layers of other materials such as silt, woody remains of trees and layers of peaty material that have not completely decomposed. These layers are frequently a foot or more in thickness. The depth of Muck deposits may vary from one to several feet. These deposits occur in the depression in all soil areas and therefore may be underlain by limestone bedrock or by till or lacustrine clays.

Since these soils are located in depressional areas they are always poorly drained and there is little opportunity to improve their drainage by artificial means. The larger areas of Muck soils usually have some natural drainage outlet, such as streams, and all that may be required to improve the drainage is to deepen and extend the outlet into the main body of muck.

The Muck soils in this county have not been developed for agriculture. To assess their value for agriculture it would be necessary to investigate each individual area in regard to its vegetative cover, composition of the muck and possibilities of drainage.

PEAT

The Peat soils occur only in the northern part of the county. The surface of the peats is generally brownish in colour. They are less decomposed than muck soils and the plant remains are usually fibrous and. relatively fresh. Sedges and sphagnum moss are common components of the peat bogs.

The peat areas are not used for agriculture and most carry little if any commercial wood products.

MARSH

Marshes are generally flooded areas supporting water-loving plants but have not as yet developed into organic bogs. These areas have less than a foot of organic accumulation.

Their chief value at present is in providing a wildlife habitat.

ROCKLAND

A large acreage in the northern part of the county has been mapped as Rockland.

This land. was differentiated. from Monteagle sandy loam-rocky phase on the basis that it has a much smaller percentage of Monteagle soils among the rocks and. therefore has no potential for any type of agricultural endeavour.

1. A Landscape View of Rockland Showing the High Percentage of Rock Outcrop

The area contains over fifty per cent of rock outcrop together with shallow Monteagle soils, muck and peat. There may be small areas of Wendigo sand included in this mapping unit.

Most of this area is under tree cover and should be considered only as forestry and recreational land.

ROCK OUTCROP

A small acreage has been mapped as Rock Outcrop. Bare rock constitutes over 75 per cent of the area and it has no potential as either forestry or agricultural land.

EMILY LOAM-SHALLOW PHASE & MOSCOW CLAY

The Emily loam-shallow phase soils and the Moscow soils have been described. previously in this report. A combination of these two series constitutes a complex in which the two soils occur together in such a way that it is impractical to map them separately.

In farming operations these soils are cultivated as a unit in which the Emily soil occurs on the gently sloping ridges and. the Moscow clay on the flats and depressions. It is fortunate that this complex of soils is not very common because it is not a good. combination for agricultural use.

GUERIN LOAM-LYONS LOAM COMPLEX

This complex is mapped north and. east of Napanee. It occupies a fairly large area and is composed of about 70 per cent Guerin and 30 per cent Lyons. The poorly drained Lyons loam occurs in small draws and depressions.

The topography of the complex varies from nearly level to undulating. The underlying limestone bedrock is occasionally found close to the surface,

Much of the complex is used *as* pasture at present, but can be utilized for the production of hay and grain.

MONTEAGLE-ROCK-PEAT COMPLEX

This complex of soils and rock outcrop covers a very large percentage of the county. It predominates over the major part of the Precambrian Shield. The coarse gravelly soil materials are irregularly distributed among the granite and metamorphic rock outcrop and may be several feet in depth or may be a thin veneer of soil overlying bedrock. Muck and Peat occur in the poorly drained depressions.

Precambrian Landscape. Monteagle Sandy Loam-Rocky Phase in Background, Gravelly Outwash in Foreground

The soils that occur in pockets within this region belong to the Monteagle sandy loam. Neither the Monteagle sandy loam nor this complex can be considered agricultural land. Some small areas are used as grazing land but most of it is forested. There is limited possibility of using this land for grazing in the future.

MOSCOW CLAY-SHALLOW PHASE & OTONABEE LOAM COMPLEX

This complex of soils is mapped just north of the village of Moscow. The Moscow clay is about 2 feet thick overlying limestone bedrock. The Otonabee loam occurs on small ridges rising above the lacustrine clay flats. Some of these ridges or knolls have fairly steep slopes and are rather severely eroded.

This complex is inferior in productivity to the Moscow soils alone. The presence of small knolls and ridges add to the difficulty of cultivation and in cropping practice it is not possible to isolate one soil from another. This problem is most noticeable in the case of annual cultivated crops.

MOSCOW CLAY-OTONABEE LOAM COMPLEX

This complex of soils is mapped west of Moscow. The Moscow clay predominates with fairly small Otonabee ridges dotting the landscape. About 35 per cent of the area is Otonabee and the remaining 65 per cent is Moscow clay. This complex makes a good combination of soils for general farming providing early soils (Otonabee) and late highly productive soils (Moscow).

The Otonabee soils of this complex are used to grow alfalfa, fall wheat, and spring grain, and for early and late pastures. The Moscow clay soils are excellent soils for clover and timothy hay, spring grains and summer pasture.

OTONABEE LOAM & SOLMESVILLE CLAY

A small acreage of this complex is mapped in the western border of the county north of Kingsford. It is composed of low ridges with Otonabee loam soils surrounded by gently sloping areas of Solmesville clay.

This complex is used for general farming and can be rated as good to fair agricultural land. Alfalfa can be seeded on the Otonabee areas and clovers and grasses on the Solmesville.

OTONABEE LOAM-MOSCOW CLAY COMPLEX

This complex has a fairly wide distribution in the Enterprise-Camden Lake area. The landscape pattern is one of till ridges with clay deposits in the depressions, between the ridges.

This is a fairly good combination of soils for general farming because it combines a well drained, early, soil with a late but productive soil. These soils are utilized for the production of hay and grain crops associated with general farming.

OTONABEE LOAM-SHALLOW PHASE & MOSCOW CLAY-SHALLOW PHASE

The soils in this complex are 12 to 18 inches thick overlying limestone bedrock. Both loam and clay loam materials occur, the former occupying the higher topographical positions. Small areas of Farmington are components of this complex.

These soils can be cultivated and produce fair crops on the average. The main limiting factor is moisture during the midsummer months and in those areas adjacent to Varty Lake production could be greatly increased by irrigation

OTONABEE LOAM-NAPANEE CLAY

This complex is mapped near Conway in South Fredericksburg Township. The topography is irregular, moderately sloping and the Napanee clay is found in the depressions surrounded by Otonabee soils. The only problem with this complex is the necessity of cultivating both soils at the same time and seeding is therefore delayed on the Otonabee soil until the associated Napanee soil is dry enough to cultivate.

This complex is used for general farming. Alfalfa will do well on the Otonabee while clovers perform better on the Napanee.

ROCK OUTCROP-MOSCOW CLAY

The small acreage of this complex is over fifty per cent rock outcrop with Moscow clay between the outcroppings.

This is non-agricultural land except for grazing. The Moscow clay provides good natural pasture. The rock outcrops are relatively small and cattle can pasture around these without difficulty. The carrying capacity of the complex is less than half of that of the Moscow series.

TWEED SANDY LOAM-ROCK OUTCROP-MONTEAGLE SANDY LOAM

This is a fairly large area in which crystalline limestone outcroppings occur very frequently. The soil in this area contain a large amount of limestone materials. The topography of the area which is irregular moderately to steeply sloping reflects the bedrock relief.

Tweed sandy loam is formed on calcareous sandy loam till. The surface soil is dark and fairly well supplied with organic matter. The B horizon is 6 to 8 inches thick and reddish brown. The combined thickness of the A and B horizons varies from 1 foot to 18 inches.

Cultivation is restricted to small fields by the numerous rock outcrops and for this reason the Tweed is poor farm land. However, it is the best pasture land within the Shield and could be used for the establishment of large pasture farms.

BOTTOM LAND

The Bottom Land consists of low-lying land along stream courses which is periodically flooded by overflow from the stream channel. These flood waters frequently deposit layers of sediments. The soils are immature and do not show any profile development. In the mapping of these lands no separation was made on the basis of texture and so they may range from sandy loams to clay loams.

Bottom Land often provides excellent pasture. Some Bottom Land can be cultivated and will produce good crops of hay, spring grains and corn.

LAND USE RATINGS FOR THE SOILS OF LENNOX AND ADDINGTON

The soils of Lennox and Addington County have been arranged into six groups on the basis of their productivity. Each soil has been assessed on its capability to produce the crops most commonly grown in the county.

These ratings are based on external characteristics such as topography and degree of stoniness. Drainage, which is closely linked with topography, is an important factor because of the effect of soil moisture relationships upon the ability of plants to thrive at various levels of soil moisture.

Internally, soil texture and structure are important factors to consider in rating soils and also the inherent fertility of the soils as determined by chemical analysis.

TABLE 5

CROP ADAPTABILITY RATINGS FOR THE SOILS OF LENNOX AND ADDINGTON COUNTY

Good Cropland

Soil Types and Phases	*Oats*	*Alfalfa*	*Mixed Hay*	*Corn*	*Pasture*
Bondhead loam	G	G	G	G	G
Bondhead sandy loam	G	G	G	G	G
Otonabee loam	G	G	G	G-F	G
Waupoos clay loam	G	G-F	G	G	G
Gananoque clay	G	F	G	G-F	G

Acreage of Good Cropland—21,400 acres = 2.8 per cent of total land area.

Under average conditions of management these soils are the best in the county. The Bondhead and Otonabee soils are well drained, early, soils and can be used for the growing of a wide range of crops. The Waupoos and Gananoque are moderately well drained, somewhat later than the Bondhead and Otonabee but inherently more fertile.

TABLE 6

CROP ADAPTABILITY RATINGS FOR SOILS OF LENNOX AND ADDINGTON COUNTY

Good to Fair Cropland

Soil Types and Phases	*Oats*	*Alfalfa*	*Mixed Hay*	*Corn Ensilage*	*Pasture*
Elmbrook clay	G-F	F	G	G-F	G
Lansdowne clay	G-F	F	G	G-F	G
Otonabee loam-stony phase	G-F	G-F	G	G-F	G
Guerin loam	G-F	F	G	G-F	G
Emily loam	G-F	F	G	G-F	G
Solmesville clay	G-F	F	G	G-F	G
Bookton sandy loam	G-F	G-F	G	G-F	G

Acreage of Good to Fair Cropland—32,000 acres = 4.2 per cent total land area.

Imperfect drainage is the limiting factor for all these soils with the exception of the Otonabee-stony phase and Bookton soils. The stony Otonabee phase is placed in this group because of the necessity of continual stone removal.

TABLE 7

CROP ADAPTABILITY RATINGS FOR SOILS OF LENNOX AND ADDINGTON COUNTY

Fair Cropland

Soil Types and Phases	*Oats*	*Alfalfa*	*Mixed Hay*	*Corn Ensilage*	*Pasture*
Newburgh fine sandy loam	F	F	F	G-F	G-F
Piccadilly loam	F	F-P	F	F-P	F
Tioga sandy loam	F	F-P	F	F	F
Moscow clay loam	F	F-P	G-F	F	F
Berrien sandy loam	F	P	G-F	F	G-F

Acreage of Fair Cropland—10,500 Acres = 1.4 per cent total land area.

Low moisture-holding capacity restricts the productivity of the Newburgh and Tioga soils. Poor drainage is the limiting factor in crop production of the Piccadilly and Moscow soils.

TABLE 8

CROP ADAPTABILITY RATINGS FOR SOILS OF LENNOX AND ADDINGTON COUNTY

Fair to Poor Cropland

Soil Types and Phases	*Oats*	*Alfalfa*	*Mixed Hay*	*Corn Ensilage*	*Pasture*
Sidney clay	F	P	F	F-P	G-F
Hinchinbrooke silt loam	F-P	P	F	F-P	G-F
Napanee clay	F	P	F	F-P	G-F
Lindsay clay loam	F	P	F	F-P	G-F

Acreage of Fair to Poor Cropland—56,800 acres = 7.6 per cent of total land area.

The first four soils in this group are poorly drained and this is the limiting factor in their productivity. Improved drainage may give them a rating of good to fair cropland. The Rubicon soils are low in fertility and imperfectly drained.

TABLE 9

CROP ADAPTABILITY RATINGS FOR SOILS OF LENNOX AND ADDINGTON COUNTY

Poor Cropland

Soil Types and Phases	*Oats*	*Mixed Hay*	*Pasture*
Otonabee loam—steep phase	P	F-P	F
Bondhead loam-shallow phase	P	P	F-P
Bondhead sandy loam-shallow phase	P	P	F-P
Otonabee loam-shallow phase	P	P	F-P
Emily loam-shallow phase	P	P	F-P
Guerin loam-shallow phase	P	P	F-P
Lyons loam	P	F-P	G-F
Wauseon sandy loam	P	F-P	F
Lyons loam-shallow phase	P	P	F-P
Lindsay clay loam-shallow phase	P	P	F-P
Dummer loam	P	F-P	F
Lansdowne clay-shallow phase	P	P	F
Granby sandy loam	P	F-P	F-P
White Lake gravelly sandy loam	P	F-P	F-P
Cramahe gravelly sandy loam	P	P	F-P
St. Peters gravelly sandy loam	P	P	P
Moscow clay-shallow phase	P	P	F
Napanee clay-shallow phase	P	P	F
Sidney clay-shallow phase	P	P	F

Acreage of Poor Cropland—50,200 acres = 6.4 per cent of total land area.

Many of the soils in this class are shallow or steep phases and are not suitable for intensive farming. Lyons loam is poorly drained and usually quite bouldery making cultivation difficult.

The White Lake and St. Peters soils are coarse textured. The former is usually hilly and the latter, though level, is an acid, low fertility soil.

TABLE 10

CROP ADAPTABILITY RATINGS FOR THE SOILS OF LENNOX AND ADDINGTON COUNTY

Submarginal Land

Soil Types, Phases and Complexes	*Pasture*
Bottom land	G-F
Monteagle sandy loam	F-P
Dummer loam-shallow phase	F-P
Moscow clay-rocky phase	F-P
Farmington loam	F-P

Wendigo loamy sand	P
Wendigo loam sand-rocky phase	P
Monteagle sandy loam-rocky phase	F-P
Tweed sandy loam-rocky phase	F
Rock land	P
Bancroft sandy loam	P
Marsh	
Peat	
Muck	
Rock Outcrop	

Acreage of Submarginal Land—549,700 acres = 73.4 per cent total land area.

TAXONOMIC CLASSIFICATION, PROFILE DESCRIPTIONS AND ANALYTICAL DATA

BANCROFT SERIES

Classification: Order—Podzolic
Great Soil Group—Podzol
Soil Group—Orthic Podzol
Family—Wendigo

Horizon	*Description*
F*	leaf litter, twigs, etc.
Ae— 0- 3 inches	white (10YR8/2) sand; single grain structure; loose consistency; pH 4.6.
Bhf1— 3-10 inches	yellowish red (5YR5/6) sandy loam; weak granular structure; very friable; pH 4.8.
Bhf2—10-18 inches	yellowish brown (10YR5/4) sand; weak granular structure; pH 5.0.
C—18 + inches	greyish brown sand; pH 5.6.

BERRIEN SERIES

Classification: Order—Podzolic
Great Soil Group—Grey Brown Podzolic
Soil Group—Gleyed Grey Brown Podzolic
Family—Berrien

Horizon	*Description*
Ap— 0- 7 inches	very dark grey (10YR3/1) sandy loam; crumb structure; very friable consistence; pH 7.1.
Ae— 7-24 inches	yellowish-brown (10YR5/4) sandy loam; mottled in lower part of horizon; granular structure; friable; pH 7.2.
Btg—24-25 inches	dark brown (10YR4/3) loam; subangular blocky structure; friable consistency; mottled; pH 7.4.
IIc—25 + inches	grey clay; stonefree; calcareous; pH 8.2.

* See glossary of horizon designations at back of report.

BOOKTON SERIES

Classification: Order—Podzolic
Great Soil Group—Grey Brown Podzolic
Soil Group—Brunisolic
Family—Bookton

Horizon	*Description*
Ap— 0- 6 inches	very dark grey (10YR3/1) sandy loam; fine crumb structure; very friable consistency; pH 6.9.
Ael— 6-20 inches	yellowish brown (10YR5/6) sandy loam; weak platy structure; very friable; pH 6.6.
Ae2—20-22 inches	pale brown (10YR6/3) sandy loam; platy structure; friable; pH 6.6.
IIBt—22-25 inches	brown (7.5YR5/4) clay; subangular blocky structure; firm consistency; pH 7.2.
IIC—25 + inches	grey clay; stonefree; calcareous; pH 8.2.

BONDHEAD SERIES

Classification: Order—Podzolic
Great Soil Group—Grey-Brown Podzolic
Soil Group—Brunisolic
Family—Guelph

Horizon	*Description*
Ah— 0- 3 inches	very dark greyish brown (10YR3/2) sandy loam; crumb structure; friable.
Ael— 3- 8 inches	dark brown (10YR4/3) sandy loam; fine crumb structure; very few stones.
Ae2— 8-17 inches	dark greyish brown (10YR4/2) sandy loam; fine crumb structure; few stones.
Bt—17-21 inches	dark greyish brown (7.5YR4/2) clay loam; subangular blocky; friable; some stones.
BC—21-28 inches	greyish brown (10YR5/2) moderately stony till, with some thin strands of B horizon.
C—28-36 inches	greyish brown (10YR5/2) moderately stony till.

PROFILE ANALYSIS

Horizon	*Sand* 2-0.05 m.m.	*Clay* .002 m.m.	*pH*	*O.C.* per cent	*Exchangeable Cations me/100 gm.* Ca.	Mg.	K	C.E.C.	*Base Saturation* per cent
Ah	54	16	6.0	4.3	9.4	1.5	.33	1.27	88
Ael	53	17	5.55	.62	2.9	0.8	.16	5.8	54
Ae2	57	18	6.45	.20	4.9	0.4	.13	5.8	93
Bt	45	33	7.1	.52	16.9	0.6	.29	16.4	100
BC	56	22	7.8	.12	12.8	0.4	.14	5.5	100
C2	54	24	7.8	.08	12.8	0.6	.13	4.8	100

CRAMAHE SERIES

Classification: Order— Brunisolic
Great Soil Group—Brown Forest
Soil Group—Orthic
Family—Sargent

Horizon	*Description*
Ah— 0- 4 inches	very dark brown (10YR2/2) gravelly loamy sand; crumb and granular structure; very friable consistency; free carbonates present; pH 7.5.
Bml— 4- 8 inches	dark yellowish brown (10YR4/4) gravelly sandy loam; weak subangular blocky structure; very friable; stony; pH 7.6.
Bm2— 8-11 inches	reddish brown (5YR4/3) gravelly sandy loam; subangular blocky structure; friable; stony; pH 7.8.
C—11 + inches	grey sand and gravel; calcareous; pH 8.2.

DUMMER SERIES

Classification: Order—Brunisolic
Great Soil Group—Brown Forest
Soil Group—Degraded Brown Forest
Family—Osprey

Horizon	*Description*
Ah— 0- 3 inches	black (10YR2/0) loam; crumb structure; friable consistency; stony; free carbonates present; pH 7.4.
Bml— 3- 5 inches	very dark greyish brown (10YR3/2) loam; granular structure; friable; stony; free carbonates present; pH 7.4.
Bm2— 5- 9 inches	brown (7.5YR3/2) clay loam; subangular blocky structure; friable; stony; free carbonates present; pH 7.8.
C—9 + inches	greyish brown (10YR5/2) loam; very stony; calcareous; pH 8.3.

ELMBROOK SERIES

Classification: Order—Podzolic
Great Soil Group—Grey-Brown Podzolic
Soil Group—Gleyed Grey-Brown Podzolic
Family—Haldimand

Horizon	*Description*
Ap— 0- 5 inches	very dark brown (10YR2/2) clay; fine angular blocky structure; friable consistency; pH 7.0.
Ae— 5- 9 inches	dark greyish brown (10YR4/2) clay; med. angular blocky structure; firm consistency; slight mottling; pH 6.8.

Bt— 9-15 inches	dark brown (7.5YR3/2) clay; coarse angular blocky structure; hard; pH 7.2.
Bmg—15-24 inches	dark greyish brown (10YR4/2) clay; mottled; coarse angular blocky structure; firm consistency; pH 7.2.
C—24 + inches	dark grey (10YR4/1) clay; stonefree; calcareous; pH 8.2.

EMILY SERIES

Classification: Order—Brunisolic
Great Soil Group—Brown Forest
Soil Group—Gleyed Brown Forest
Family—Matilda

Horizon	*Description*
Ap— 0- 6 inches	very dark brown (10YR2/2) loam; granular structure; friable consistency; pH 7.2.
Bml— 6- 9 inches	very dark greyish brown (10YR3/2) loam; granular structure; friable; pH 7.2.
Bm2g— 9-12 inches	very dark greyish brown (10YR2/2) clay loam; weak subangular blocky structure; mottled; free carbonates; pH 7.4.
C1—12-15 inches	greyish brown (10YR5/2) loam; very weak subangular blocky structure; mottled; calcareous; pH 7.8.
C2—15 + inches	grey (10YR5/1) loam; stony; pH 8.2.

FARMINGTON SERIES

Classification: Order—Brunisolic
Great Soil Group—Brown Forest
Soil Group—Orthic
Family—Farmington

Horizon	*Description*
Ah— 0- 3 inches	dark grey (10YR4/4) loam; crumb structure; friable; pH 6.8.
Bml— 3- 8 inches	yellowish brown (10YR5/3) loam; subangular blocky structure; friable; pH 6.8.
Bm2— 8-10 inches	brown (7.5YR5/4) loam; subangular blocky structure; friable; pH 7.0.
Cr—10 + inches	limestone bedrock.

GANANOQUE SERIES

Classification: Order—Podzolic
Great Soil Group—Grey Wooded
Soil Group—Orthic Grey Wooded
Family—Haileybury

Horizon	*Description*
L— 1- 0 inches	undecomposed twigs, leaves, etc.
Ael— 0- 2 inches	light brownish grey (10YR6/2) clay; medium subangular blocky structure; friable.
Ae2— 2- 6 inches	light grey (10YR7/2) clay; medium subangular blocky with some indications of platy structure; firm consistency.
BA— 6-12 inches	light grey (10YR7/2) coating over dark brown (10YR4/2) clay, medium blocky structure; hard consistency.
Bt—12-22 inches	very dark greyish brown (10YR3/2) clay; strong medium blocky structure.
BC—22-28 inches	greyish brown (10YR5/2) clay; coarse blocky structure tending to columnar; hard consistency.
Cl—28-36 inches	grey (10YR5/1) clay; fine to medium blocky structure; hard consistency; calcareous.
CK—36-48 inches	grey (10YR5/1) clay; carbonate enriched.
C2—48 + inches	greyish brown (10YR5/2) clay; calcareous.

PROFILE ANALYSIS

Horizon	*Depth*	*pH*	*O.M.*	*Clay* .002-.001 mm.	.001 mm.	*Total*	*Free iron* per cent	*Caco 3* per cent
Ael	0-2″	5.3	4.6	16	44	60	1.7	.21
Ae2	2-6″	5.5	1.45	17	40	57	1.9	.21
BA	6-12″	5.4	0.46	8	70	78	2.6	.21
Bt	12-22″	5.8	0.32	10	78	88	2.7	.21
BC	22-28″	7.0	0.18	14	66	80	1.9	.54
Cl	28-36″	7.	0.10	11	64	75	1.2	16.5
CK	36-48″	—	—	—	—	—	—	57.2
C2	48″+	8.1	0.10	13	64	77	1.0	17.0

GRANBY SERIES

Classification: Order—Gleysolic
Great Soil Group—Dark Grey Gleysolic
Soil Group—Orthic Dark Grey Gleysolic
Family—Granby

Horizon	*Description*
Ap— 0- 9 inches	very dark brown (10YR2/2) sandy loam; fine crumb structure; very friable consistency; pH 7.3.
Bmgl— 9-17 inches	grey (10YR6/1) sand; mottled; single grain structure; loose consistency; pH 7.4.
Bmg2—17-27 inches	light brownish grey (10YR6/2) sand; mottled; single grain structure; free carbonates; pH 7.6.
C—27 + inches	grey sand; calcareous; pH 8.2.

GUERIN SERIES

Classification: Order—Podzolic
Great Soil Group—Grey-Brown Podzolic
Soil Group—Gleyed Grey-Brown Podzolic
Family—Guerin

Horizon	*Description*
Ap— 0- 8 inches	very dark grey (10YR3/2) loam; crumb structure; very friable consistency; pH 7.2.
Ael— 8-15 inches	yellowish brown (10YR5/8) loam; crumb structure; very friable consistency; pH 7.2.
Ae2—15-20 inches	yellowish brown (10YR5/6) loam; mottled; crumb structure; very friable; pH 7.2.
Bt—20-26 inches	yellowish brown (10YR5/8) loam; mottled; weak subangular blocky structure; friable; pH 7.4.
C—26 + inches	greyish brown till; calcareous; pH 8.2.

HINCHINBROOKE SERIES

Classification: Order—Gleysolic
Great Soil Group—Dark Grey Gleysolic
Soil Group—Orthic Dark Grey Gleysolic
Family—Osgoode Family

Horizon	*Description*
Ap— 0- 8 inches	dark greyish brown (10YR3/1) loam; subangular blocky structure; friable consistency; pH 6.8.
Aeg— 8-12 inches	grey (10YR5/1) sandy loam; mottled; subangular blocky structure; very friable; pH 6.5.
Bmgl—12-22 inches	greyish brown (10YR4/2) fine sandy loam; mottled; crumb structure; very friable; pH 6.6.
Bmg2—22-28 inches	grey (10YR5/1) silt; severely mottled; subangular blocky structure; friable; pH 6.8.
C—28+ inches	greyish brown (10YR5/2) silt; calcareous; pH 7.8.

LANSDOWNE SERIES

Ap— 0- 6 inches	light grey (10YR7/2) (dry) clay; medium blocky structure.
Ae— 6- 9 inches	white (10YR8/1) (dry) clay; coarse platy aggregates; mottling at junction with B.
Btg— 9-17 inches	pale brown (10YR6/3) clay; fine to medium blocky aggregates; more readily crushed than those above; mottled.
BC—17-48 inches	very pale brown (10YR7/3) clay; medium blocky aggregates; firm consistency.
C2—48 + inches	light grey (10YR7/2) clay; medium blocky aggregates; hard concretions; free carbonates.

Soil Horizons	*Depth*	*pH*	*O.M.*	*Clay*
Ap	0–6″	5.2	5.6	52
Ae	6–9″	5.2	0.8	73
Btg	9–17″	7.1	0.3	79
BC	17–48″	—	—	—
C2	48″+	7.9	0.2	77

LINDSAY SERIES

Classification: Order—Gleysolic
Great Soil Group—Dark Grey Gleysolic
Soil Group—Orthic Dark Grey Gleysolic
Family—Lindsay

Horizon	*Description*
Ap— 0- 6 inches	very dark grey (10YR3/1) clay loam; subangular blocky structure; friable consistency; stonefree; pH 7.4.
Bmg— 6-12 inches	pale brown (10YR6/3) clay loam; mottled; subangular blocky structure; friable; few stones; pH 7.6.
IIC—12 + inches	grey clay loam; mottled; stony; calcareous; pH 8.2.

LYONS SERIES

Classification: Order—Gleysolic
Great Soil Group—Dark Grey Gleysolic
Soil Group—Orthic Dark Grey Gleysolic
Family—Lyons

Horizon	*Description*
Ap— 0- 8 inches	black (10YR2/1) loam; crumb structure; very friable consistency; few stones; pH 7.2.
Bmgl— 8-13 inches	grey (10YR5/1) loam; mottled; medium subangular blocky structure; friable; pH 7.2.
Bmg2—13-18 inches	grey (10RY5/1) loam; mottled coarse subangular blocky structure; free carbonates present; pH 7.4.
C—18 + inches	grey (10YR5/1) loam; stony; pH 8.2.

MONTEAGLE SERIES

Classification: Order—Podzolic
Great Soil Group—Podzol
Soil Group—Orthic Podzol
Family—Wabi

Horizon	*Description*
F— 1- 0 inches	organic layer containing leaves, twigs, and moss.
Ae— 0- 3 inches	light grey (10YR6/1) sand; single grain structure; loose consistency; pH 4.6.
Bhfl— 3-12 inches	dark reddish brown (5YR 3/4) sandy loam; granular structure; friable; some iron concretions; pH 4.8.

Bhf2—12-22 inches | yellowish brown (10YR5/6) sandy loam; weak granular structure; friable; stony; pH 5.3.

C—22 + inches | light olive-brown (2.5YR5/4) sandy loam; very stony; pH 5.4.

MONTEAGLE SANDY LOAM

Horizons	*Sand* 2-.05	*Silt* .05-.002	*Clay* .002	*pH*	*O.C.*	*Exchangeable Cations M.E./100 gm. soil* Ca.	Mg.	K	H+	C.E.C.	*Base Saturation* per cent
Al	—	—	—	4.5	—	—	—	—	—	—	—
Ae	63	26	11	4.75	1.17	1.0	0.08	0.06	4	4.9	23
Bhfl	65	21	14	4.75	2.40	0.6	0.48	0.04	11	12.0	9
Bhf2	81	8	11	5.3	0.69	0.3	0.24	0.02	4	5.0	11
C	70	19	11	5.4	0.09	0.25	0.16	0.07	2	2.0	20

MOSCOW SERIES

Classification: Order—Gleysolic
Great Soil Group—Dark Grey Gleysolic
Soil Group—Orthic Dark Grey Gleysolic
Family—Brookston

Horizon	*Description*
Ap— 0- 7 inches	very dark greyish brown (10YR3/2) silty clay; angular blocky structure; friable consistency; pH 7.0.
Bmg— 7-23 inches	dark greyish brown (10YR4/2) silty clay; mottled; subangular blocky structure; friable; pH 7.5.
C—23 + inches	light brownish grey (10YR6/2) silty clay; subangular blocky structure; very friable; pH 8.0.

NAPANEE SERIES

Classification: Order—Gleysolic
Great Soil Group—Dark Grey Gleysolic
Soil Group—Orthic Dark Grey Gleysolic
Family—St. Rosalie

Horizon	*Description*
Ap— 0- 6 inches	dark greyish brown (10YR4/2) clay; mottled; medium angular blocky structures hard consistency; pH 5.8.
Bmgl— 6-16 inches	very dark grey (10YR3/1) clay; mottled; medium to large angular blocky structure; hard consistency; pH 6.2.
Bmg2—16-25 inches	dark-grey (10YR4/1) clay; mottled; large angular blocky structure; hard consistency; pH 7.0.
C—25 + inches	grey (10YR5/1) clay; mottled; calcareous; stonefree; pH 7.9.

PROFILE ANALYSIS

Horizon	*Sand per cent*	*Silt per cent*	*Clay per cent*	*O.M. per cent*	*pH*
Ap	3.1	43	54	5.9	5.4
Bmgl	1.8	10	88	0.6	6.0
Bmg2	1.3	15	84	0.5	7.2
C	1.2	21	78	0.2	7.6

NEWBURGH SERIES

Classification: Order—Podzolic
Great Soil Group—Grey-Brown Podzolic
Soil Group—Brunisolic
Family—Honeywood

Horizon	*Description*
Ap— 0- 6 inches	dark greyish brown (10YR4/2) fine sandy loam; subangular blocky structure; very friable consistency; pH 6.3.
Ae— 6-12 inches	light grey (10YR7/2) fine sandy loam; weak platy structure; very friable; pH 6.6.
Btl—12-17 inches	brown (10YR4/3) silt loam; medium subangular blocky structure; friable consistency; pH 6.3.
Bt2—17-25 inches	very dark greyish brown (10YR3/2) silty clay loam; angular blocky structure; friable; pH 6.6.
C—25 + inches	dark greyish brown (10YR4/2) silt loam; pH 8.0.

OTONABEE SERIES

Classification: Order—Brunisolic
Great Soil Group—Brown Forest
Soil Group—Degraded Brown Forest
Family—Otonabee

Horizon	*Description*
Ah— 0- 4 inches	very dark grey (10YR3/1) loam; granular and crumb structure; soft; pH 7.2.
Bm— 4- 8 inches	brown (7.5YR4/4) loam; weak, fine subangular blocky structure; very friable consistency; pH 6.8.
Btj— 8-12 inches	very dark brown (10YR2/2) clay loam; fine subangular blocky structure; firm consistency; few stones; calcareous; pH 7.4.
BC—12-16 inches	dark greyish brown (10YR4/2) loam; weak medium subangular blocky structure; friable; calcareous; pH 7.6.
C—16 + inches	greyish brown (10YR5/2) loam; stony; calcareous; pH 8.3.

PICCADILLY SERIES

Classification: Order—Podzolic
Great Soil Group—Grey-Brown Podzolic
Soil Group—Gleyed Grey-Brown Podzolic
Family—Tuscola

Horizon	*Description*
Ap— 0- 4 inches	grey (10YR5/1) loam; fine subangular blocky structure; friable consistency; pH 6.2.
Aeg— 4-10 inches	light grey (10YR7/2) silt loam; mottled; platy structure; friable; pH 6.2.
Btg—10-16 inches	dark greyish brown (10YR4/2) silty clay loam; mottled; subangular blocky structure; friable; pH 6.8.
Cg—16 + inches	dark grey (10YR4/1) silt loam; mottled; stonefree; pH 8.0.

SIDNEY SERIES

Classification: Order—Gleysolic
Great Soil Group—Dark Grey Gleysolic
Soil Group—Orthic Dark Grey Gleysolic
Family—Lincoln

Horizon	*Description*
Ap— 0- 6 inches	very dark grey (10YR3/1) clay; medium to coarse angular blocky structure; firm consistency; stonefree; pH 6.8.
Bmgl— 6-12 inches	dark brown (10YR4/3) clay; mottled; massive structure; plastic; stonefree; pH 7.0.
Bmg2—12-18 inches	greyish brown (10YR5.2) clay; mottled; plastic; massive structure; pH 7.4.
C—18 + inches	light brownish grey (10YR6/2) clay; calcareous; pH 8.0.

SOLMESVILLE SERIES

Classification: Order—Podzolic
Great Soil Group—Grey-Brown Podzolic
Soil Group—Gleyed Grey-Brown Podzolic
Family—Perth

Horizon	*Description*
Ap— 0- 7 inches	very dark brown (10YR2/2) clay loam; fine subangular blocky structure; friable consistency; stonefree; pH 7.3.
Ae— 7-10 inches	dark greyish brown (10YR4/2) clay loam; subangular blocky structure; firm; pH 7.3.
Bt—10-14 inches	very dark greyish brown (10YR3/2) clay; mottled; subangular blocky structure; firm; calcareous in lower part of horizon; pH 7.4.
IIC—14 + inches	greyish brown loam till; stony; mottled; pH 8.2.

ST. PETERS SERIES

Classification: Order—Brunisolic
Great Soil Group—Podzol
Soil Group—Orthic Podzol
Family—Wendigo

Horizon	*Description*
F— 1- 0 inches	organic layer of partially decomposed leaves, twigs, etc.
Ae— 0- 1 inches	light grey (10YR6/1) sand; single grain structure; loose consistency; pH 4.5.
Bhfl— 1- 8 inches	reddish brown (5YR3/4) sand; granular structure; very friable; pH 4.8.
Bhf2— 8-18 inches	yellowish brown (10YR5/8) sand; single grain structure; loose consistency; pH 5.0.
C—18 + inches	greyish brown gravel; pH 5.4.

TIOGA SERIES

Classification: Order—Podzolic
Great Soil Group—Podzol
Soil Group—Bisequa Podzol
Family—Tioga

Horizon	*Description*
(F)—	thin layer of partially decomposed leaves, twigs, etc.
(Ah)— 0- 3 inches	black (10YR2/1) sandy loam; fine crumb structure; very friable consistency; pH 5.0.
(Ae)— 3- 4 inches	grey (10YR5/1) sand; single grain structure; loose consistency; pH 4.2.
(Bhfl)— 4- 9 inches	strong brown (7.5YR5/6) sand; single grain structure; loose consistency; pH 5.8.
(Bhf2)— 9-13 inches	brownish yellow (10YR6/6) sand; single grain; loose consistency; pH 6.0.
Ae—13-28 inches	light yellowish brown (10YR6/4) sand; single grain structure; loose consistency; pH 6.5.
Bt—28-32 inches	brown (10YR5/3) sandy loam; weak subangular blocky structure; friable consistency; pH 7.2.
C—32 + inches	grey (10YR5/1) sand; single grain structure; loose consistency; calcareous; pH 7.8.

TWEED SERIES

Classification: Order—Brunisolic
Great Soil Group—Brown Forest
Soil Group—Orthic Brown Forest
Family—Tweed

Horizon	*Description*
Ah— 0- 4 inches	very dark greyish brown (10YR3/2) sandy loam; crumb structure; friable consistency; pH 6.8.

Bm— 4-12 inches	dark reddish brown (5YR3/4) sandy loam; fine granular structure; friable consistency; pH 7.2.
Cr—12 + inches	crystalline limestone; the surface usually broken and weathered.

WAUPOOS SERIES

Classification: Order—Podzolic
Great Soil Group—Grey-Brown Podzolic
Soil Group—Orthic Grey-Brown Podzolic
Family—Huron

Horizon	*Description*
Ah— 0- 3 inches	very dark grey (10YR3/1) clay loam; fine subangular blocky structure; friable consistency; stonefree; pH 6.8.
Ae— 3- 8 inches	brown (10YR4/3) clay loam; medium subangular blocky structure; firm consistency; stonefree; pH 6.7.
Bt— 8-16 inches	dark brown (10YR3/3) clay; angular blocky structure; firm consistency; pH 7.4.
IIC—16 + inches	greyish brown (10YR5/2) loam; stony; calcareous; pH 8.3.

WAUSEON SERIES

Classification: Order—Gleysolic
Great Soil Group—Dark Grey Gleysolic
Soil Group—Orthic Dark Grey Gleysolic
Family—Granby

Horizon	*Description*
Ap— 0- 8 inches	very dark grey (10YR3/1) sandy loam; crumb structure; free carbonates present; pH 7.4.
Bmg— 8-20 inches	grey (10YR5/2) sand; mottled; single grain structure; loose consistency; free carbonates; pH 7.6.
C— 20+ inches	greyish brown (10YR5/2) clay; mottled.

WENDIGO SERIES

Classification: Order—Podzolic
Great Soil Group—Podzol
Soil Group—Orthic Podzol
Family—Wendigo

Horizon	*Description*
F— 1- 0 inches	loose covering of needles, moss, twigs.
Ae— 0- 2 inches	white (10YR8/1) sand; single grain structure; loose consistency; pH 4.7.
Bhfl— 2- 6 inches	very dark greyish brown (10YR3/2) sandy loam; crumb structure; friable; pH 5.0.

Bhf2— 6-11 inches	dark yellowish brown (10YR4/4) sandy loam; crumb structure; very friable; pH 5.4.
BC—11-17 inches	yellowish brown (10YR5/6) sand; single grain structure; loose consistency; pH 5.6.
C—17 + inches	pale brown (10YR6/3) sand; pH 5.6.

WENDIGO SANDY LOAM

Horizons	*Sand*	*Silt*	*Clay* .002m.m.	*pH*	*O.C.*	*Exchangeable Cations M.E./100 gm. soil* Ca.	Mg.	K	H+	C.E.C.	*Base Saturation* per cent
F	—	—	—	5.3	—	—	—	—	—	—	—
Ae	60	28	0	4.7	0.99	0.7	0.6	0.06	4	5.6	22
Bhfl	60	28	12	5.0	2.2	1.7	0.08	0.03	12	14.4	12
Bhf2	66	28	6	5.4	0.6	0.7	0.2	0.01	4	4.4	19
C	92	4	4	5.6	0.06	0.3	0.1	0.02	4	0.8	47

WHITE LAKE SERIES

Classification: Order—Podzolic

Great Soil Group—Podzol

Soil Group—Bisequa Podzol

Family—Wendigo

Horizon	*Description*
(F)— 2- 0 inches	loose leaf mat mostly coniferous.
(Ae)— 0- 2 inches	light grey (10YR6/1) sand; loose single grain structure; pH 5.0.
(Bhf)— 2-10 inches	brown (10YR5/3) sandy loam; weak crumb structure; numerous small pebbles; pH 5.8.
Ae—10-21 inches	pale brown (10YR6/3) loamy sand; crumb to single grain structure; some large cobbles; pH 6.4.
Bt—21-24 inches	very dark brown (10YR2/2) gravelly sandy loam; fine subangular blocky structure; very friable; very stony; pH 7.2.
C—24 + inches	Multicoloured gravel all sizes; calcareous; pH 8.2.

GLOSSARY OF HORIZON DESIGNATIONS

Organic Horizons

L—an organic layer in which structures are definable

F—an organic layer in which structures are definable with difficulty.

H—an organic layer in which structures are undefinable.

Master Mineral Horizons

A—Horizons formed at or near the surface in the zone of maximum removal of materials in suspension or solution and/or maximum accumulation of organic matter. It includes:

1. horizons in which organic matter has accumulated (Ah) or which have been cultivated (Ap).
2. horizons that have been eluviated of clay, iron, aluminum, and/or organic matter (Ae).
3. horizons transitional to the underlying layer (AB) (AC).

B—A mineral horizon or horizons characterized by one or more of the following:-

1. An illuvial enrichment of clay (Bt), iron (Bf), or organic matter (Bh).
2. a horizon with a change in colour and/or structure only (Bm).
3. horizons transitional to the underlying layer (BC).

C—A mineral horizon comparatively unaffected by the leaching processes.

1. material of similar lithologic composition to that of the solum (C).
2. material of different lithologic composition to that of the solum (IIC).
3. an inherited consolidated layer (rock), (Cr).