A GEOGRAPHICAL STUDY OF LAND USE

IN

SOUTH DUMFRIES TOWNSHIP

A Thesis

Presented to

The Department of Geography

McMaster University

Hamilton, Ontario

In Partial Fulfillment

of the Requirements for the Degree

Bachelor of Arts

by

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February, 1958

Received and passed by the Department. April 1958.

L. G. Reeds.

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ACKNOWLEDGEMENTS

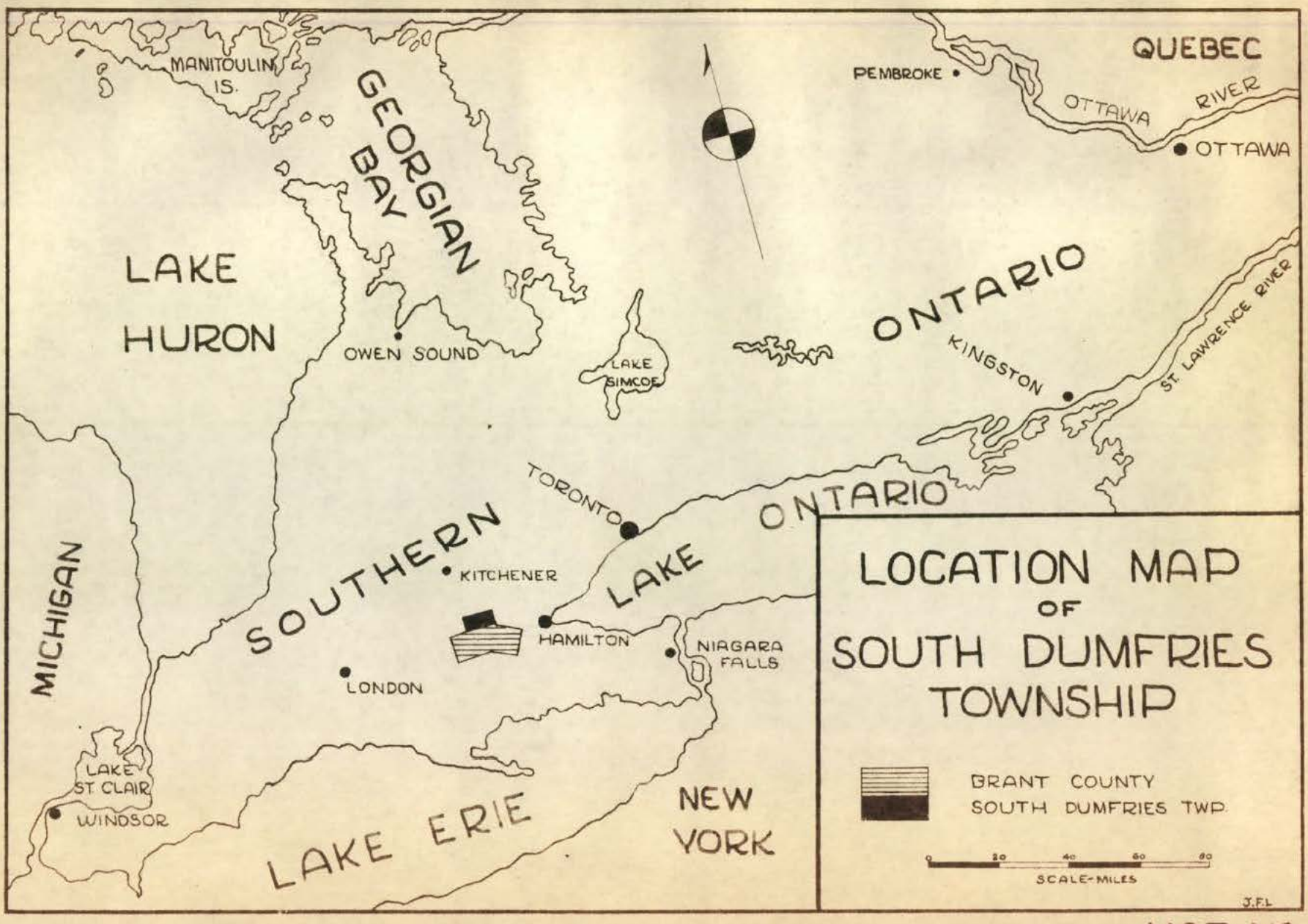
The writer wishes to express his thanks to the following persons who were of assistance in the preparation of this text: Dr. H. R. Thompson for his advice and time in supervising the study; Mr. H. A. Wood for his interest and suggestions; his father who gave financial assistance; his mother who typed the study; his wife who helped with many aspects essential to the preparation of the initial draft; and finally, all residents of South Dumfries Township, particularly Mrs. W. K. Kelman and Mr. W. W. Guthrie, whose co-operation in providing information during interviews helped make this study possible.

PREFACE

Man, in earning a living, seeks to establish a satisfactory working relationship with the natural environment through the use of land in some manner. Adopting this geographical thesis, the following study is an attempt to examine and explain the relationship by describing and accounting for the nature, distribution, and areal differences of land use in South Dumfries Township.

Information for the text was obtained through observation and interviews while in the field. This was supplemented by library research and map work. Statistical data were obtained from the Dominion Census Reports, planimetric measurements,and township assessment figures.

The subject matter has been divided into three chapters, each of which has been subdivided into sections. The physical setting of the township is discussed in Chapter I. Chapter II concerns agricultural land use in the township, whereas, Chapter III is given to a discussion of the various non-agricultural land uses. The final section of the text contains a summary of the work and a synthesis of the factors which have affected man's relationship with the natural environment provided by the Township of South Dumfries.


MANITOULIN IS.
GEORGIAN BAY
LAKE HURON
OWEN SOUND
LAKE SIMCOE
PEMBROKE
QUEBEC
OTTAWA RIVER
OTTAWA
ONTARIO
KINGSTON
ST. LAWRENCE RIVER
TORONTO
LAKE ONTARIO
SOUTHERN
KITCHENER
HAMILTON
NIAGARA FALLS
LONDON
MICHIGAN
LAKE ST. CLAIR
WINDSOR
LAKE ERIE
NEW YORK
LOCATION MAP OF SOUTH DUMFRIES TOWNSHIP
BRANT COUNTY
SOUTH DUMFRIES TWP.
0 20 40 60 80
SCALE-MILES
J.F.L

MAP NO. I

INTRODUCTION TO THE TOWNSHIP

A township may be defined as an administrative unit of land, usually under 100 square miles, which has been subdivided by a surveyor into small blocks for settlement. The resulting checkerboard plan usually determines the road pattern of the township. In South Dumfries Township, east-west roads follow the concession lines, whereas crossroads, following lot lines at various intervals, intersect these in a north-south direction. The plan is not a true checkerboard pattern but has been modified by the physical landscape, particularly by the Grand River, which flows for 9½ miles through the township, bisecting it into an eastern and western half.

South Dumfries Township was surveyed in 1816, at which time it was within the political boundary of Waterloo County. Since 1851, it has formed the most northerly of six townships comprising the County of Brant. The township extends from 43° 15' to 43° 21' north latitude and from 80° 07' to 80° 21' west longitude in Southern Ontario (Map I). It is divided into six concessions and thirty-eight lots which are numbered from south to north and from east to west respectively (Map II). The total area is approximately 72 square miles yet 1% of this lies under the waters of the Grand and Nith rivers and a number of small lakes. The study area has a rectangular shape, the boundaries of which are defined by roads along the western, northern, and southern limits. The eastern boundary, however, follows no well defined physical line. The east-west boundaries are 12 miles long, the north to south ones, six miles. South Dumfries is bounded to the north, south, east, and west respectively by the following townships;

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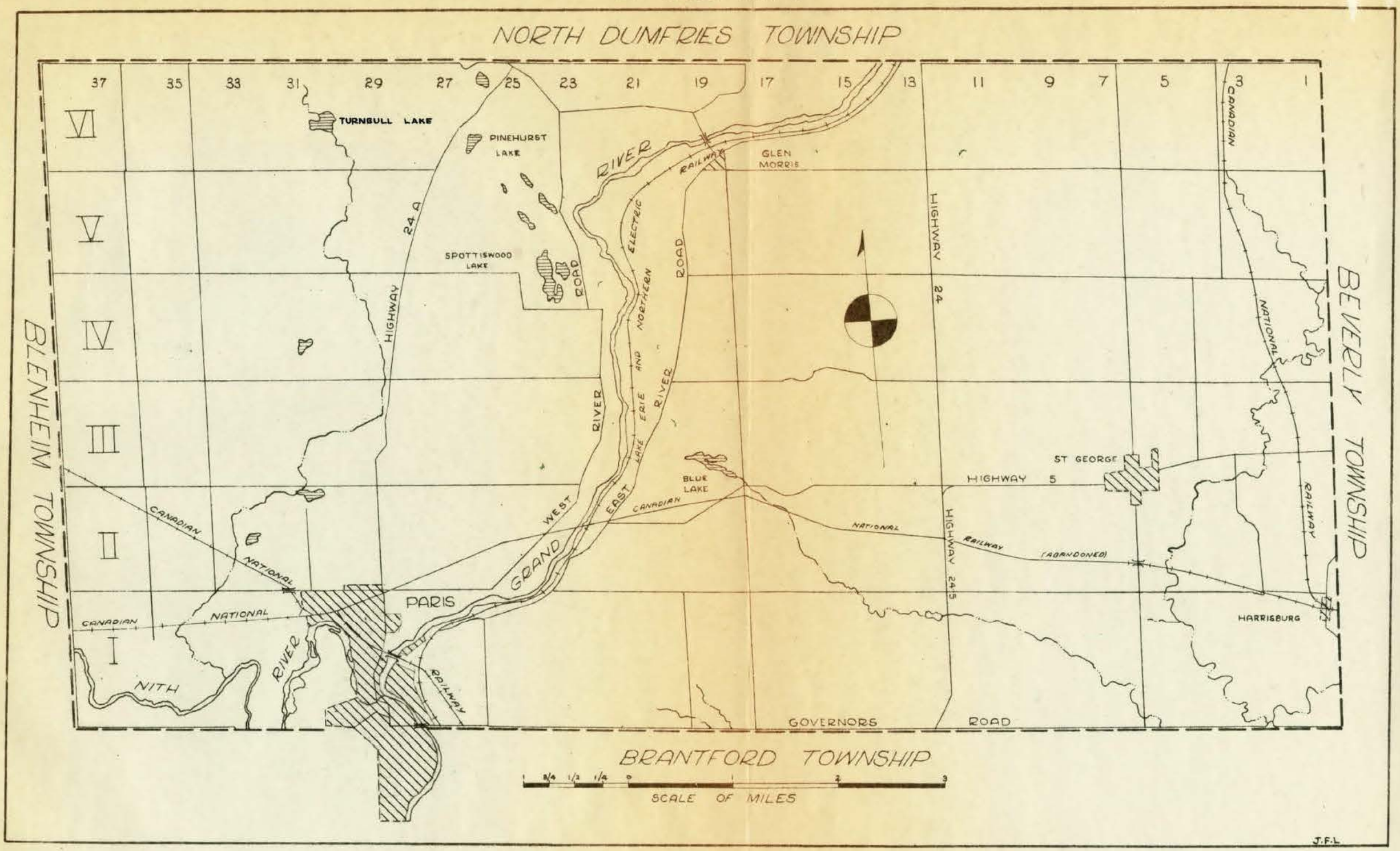
SOUTH DUMFRIES TOWNSHIP

BASE MAP



LEGEND

RAILROAD	+++	STREAM	~~~
ROAD	———	BRIDGE	‖
TOWNSHIP BOUNDARY	– – –	LOT NUMBER	13
URBAN CENTER	▨	CONCESSION NUMBER	I

MAP NO. II

North Dumfries (Waterloo County), Brantford (Brant County), Beverly (Wentworth County), and Blenheim (Oxford County).

The township contains three urban centers: the Police village of St. George, and the hamlets of Glenmorris and Harrisburg. Although not part of the township, yet lying within the study area, is the town of Paris, which in 1956 had a population numbering 5,504. The study area is well serviced by road and rail transportation which link Paris and the township to the larger urban centers of Brantford, Galt, Hamilton, and Woodstock.

CHAPTER I

THE PHYSICAL SETTING OF SOUTH DUMFRIES TOWNSHIP

Introduction

A consideration of the physical landscape is of primary importance to a study of land utilization since it provides the framework within which the latter's variations must be contained. This is particularly true with respect to agricultural land use. Chapter I, therefore, involves a discussion of the following physical components of the township: rock formations, physiography, climate, vegetation, and soils. The concluding section of the chapter is a synthesis of all these in the form of land types.

(1)

Rock Formations of South Dumfries Township

Although a considerable depth of unconsolidated material presently overlies the rock strata flooring the township, bedrock has nevertheless influenced the pattern of land use. The underlying rock formations are Silurian in age, having been deposited in the epicontinental seas which submerged all of Ontario south of the Precambrian Shield during the Paleozoic era. These rocks were deposited as flat lying sedimentary strata which have suffered only a slight tilting

toward the southwest during subsequent geologic time. Two Silurian formations, the Salina and the Guelph, form the bedrock base of the township.

The Salina formation, which overlies the Guelph, forms the bed of the Grand River. The rock outcrops along both its banks at Paris and approximately 2½ miles north of the town along the east bank (Illus. 1). In the remainder of the township, the strata are covered by a deep layer of overburden. Lithologically, the formation consists of thin, grey, calcareous and argillaceous shales. Small quantities of gypsum and salt are present throughout the formation.

The lower and older Guelph formation does not outcrop within the township and its presence is known only from well reports. Although overlain by the Salina in the stratigraphic column, the Guelph formation floors the township east of a line drawn roughly along the position of the Grand River. The formation is a remarkably pure dolomitic limestone.

Although gypsum was mined from the Salina formation for use as fertilizer, the presence and nature of the underlying bedrock has had a more indirect and extensive influence on the township. Much of the unconsolidated material covering the township contains a high proportion of rock fragments derived from the underlying limestone and shale formations. These fragments have formed the parent material from which most of the soils of South Dumfries Township have formed and derived their chief characteristics.

Illus. 1 An outcrop of the gypsum-bearing Salina formation along the east bank of the Grand River. This exposure occurs at Paris, approximately $\frac{1}{4}$ mile north of the Canadian National Railway bridge.

(2)

Physiography of South Dumfries Township

Introduction

South Dumfries Township has been divided into seven physiographic regions which are shown on Map III. The boundaries of these regions have been delineated on the basis of mode of formation, nature of component materials, topography, and relief. The existing landforms of the township are a complex assemblage of glacial, glacio-fluvial, deltaic and beach deposits which have suffered subsequent modification mainly by fluvial erosion and masswasting.

Glacial and Glacio-Fluvial Deposits

Although there were at least three glaciations which affected the township during the Pleistocene epoch, the existing glacial landforms date from the most recent or Wisconsin glacial period. Ranging in thickness from 2,000 to 3,000 feet, the Ontario-Erie lobe of the Wisconsin glacier advanced in a northwesterly direction through the lowlands of Southwestern Ontario. During this advance, it deposited a thin layer of ground moraine over the whole of South Dumfries Township. The lobe continued to advance until it met the Lake Huron ice lobe which was moving in a southeasterly direction. The two lobes merged to form a single ice sheet covering the whole of Southern Ontario. As the general atmospheric circulation changed, the climate became warmer and the ice sheet began to waste,

SOUTH DUMFRIES TOWNSHIP

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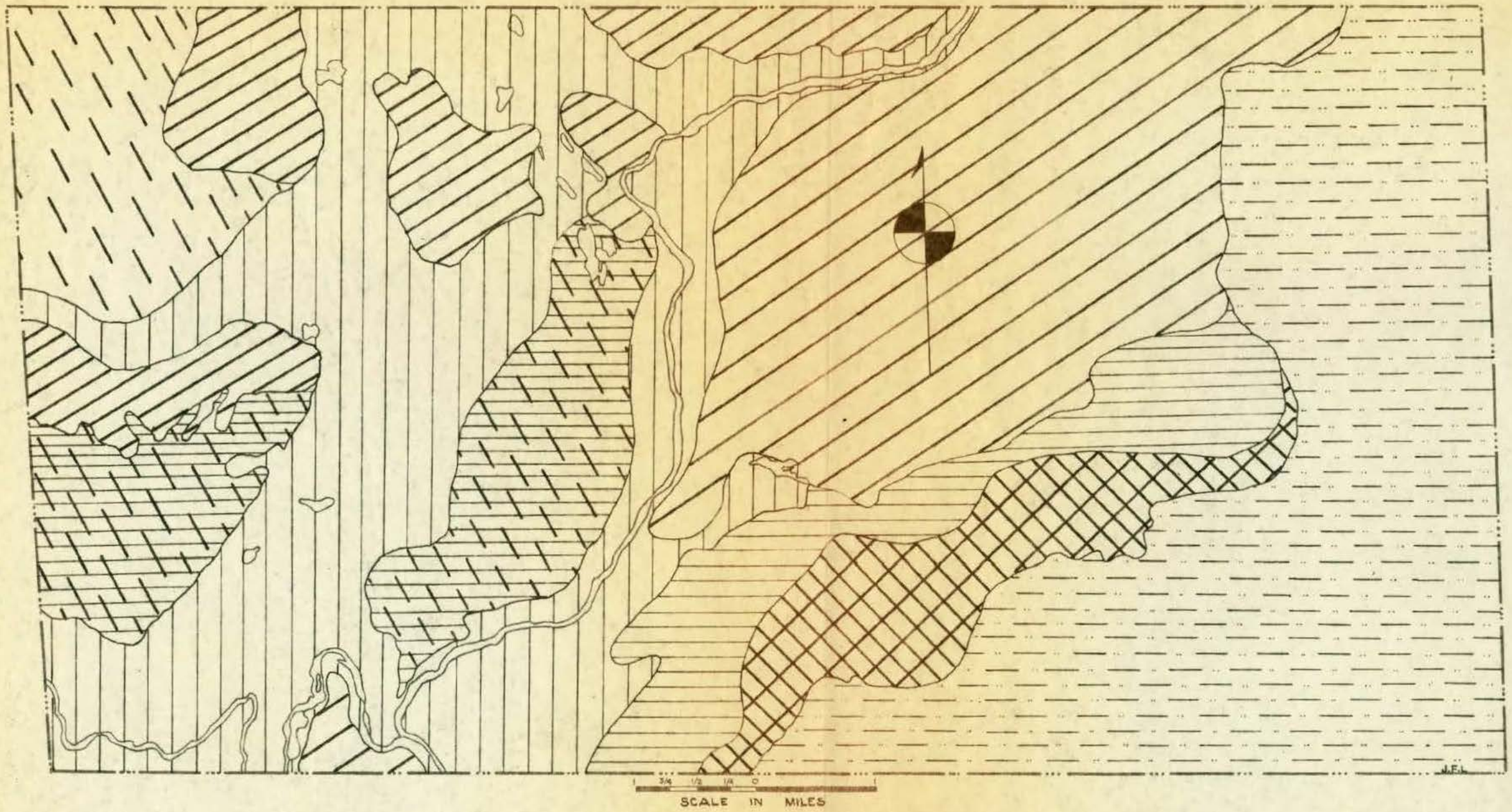
PHYSIOGRAPHY



LEGEND

END MORAINE

SAND PLAIN

END MORAINE
(WAVE MODIFIED)

WARREN SANDS
& GRAVELS

SPILLWAY

END MORAINE
(MELTWATER MODIFIED)

END MORAINE
(MELTWATER & WAVE MODIFIED)

MAP NO. III

to split, and finally to retreat.

The glacial landforms of South Dumfries Township were formed in association with a wasting or retreating ice sheet. This retreat, however, was interrupted by a number of short but strong re-advances of the ice which pushed up material previously deposited by its meltwaters, and moulded them into stony ridges of end moraine. The long axes of these moraines ran roughly parallel to the ice front. This action of the ice produced a belt of end moraine along the western edge of South Dumfries Township. Following its formation, the glacier retreated, whereupon meltwaters issuing from the ice front modified the relief of the moraine. The central and northerly section of this moraine, however, stood above the meltwaters and escaped modification.

During the westward retreat, the wasting ice sheet exposed and then covered the previously deposited ground moraine with a thin layer of outwash materials. The recession continued until the ice front lay along a line following the present Grand River. From this position, the ice sheet advanced a second time to form the Paris end moraine. This moraine, which was similar in relief to the western moraine, also suffered meltwater modification in its southerly extent.

The composition of the modified end moraine is a medium textured limestone till. The till displays a lack of sorting and contains stones ranging in size from fine grit to large boulders. These stones are mainly sub-angular to semi-rounded and are scattered irregularly throughout a matrix of sand, silt, and clay. The flat to gently rolling topography of the moraine varies in elevation from 850 feet to 925 feet.

After the formation of the Paris moraine, the ice sheet retreated rapidly to a position near the eastern edge of the township. From here, the glacier made its final yet strongest advance in the township to form the well defined and extensive Galt moraine. Lying two miles to the west of the Paris moraine, it stands up as a rugged, stony ridge of loose, unassorted loamy till. Swamps occur between the morainal knobs where the surface drainage has been impeded. The largest of these swamps are found in concessions four and five.

The strongly rolling topography of the Galt moraine suffered no modification since it stood above the glacial meltwaters at elevations ranging from 875 feet to 1000 feet. The composition of this unmodified end moraine is light textured limestone till containing stones which are largely angular to sub-angular in shape.

Following the formation of the Paris moraine and prior to the building of the Galt moraine, the Wisconsin glacier had retreated very rapidly. Great torrents of meltwater flowed from the ice front into a preglacial stream valley which is now occupied by the Grand River. During the late Pleistocene epoch, the Grand River valley formed a glacial spillway (Illus. 2). Partly erosional and partly depositional in origin, the spillway was carved by torrential meltwaters which broadened and terraced the preglacial stream valley. The formation of terraces resulted from the erosional force of the meltwaters during various stages in the development of the spillway. The uppermost terraces represent the period of maximum melting and maximum volume of water. This water was charged with glacial debris which was deposited as roughly sorted sand and gravel along the terraces. The gravels were thoroughly rounded by the abrasive action of the fast flowing spillway waters (Illus. 3).

Illus. 2 The broad valley of the Grand River is typical of glacial spillways. The valley was carved by torrential meltwaters pouring off the wasting ice sheet.

Illus. 3 A cross-section of a Grand River spillway terrace. The well-bedded stones have been thoroughly rounded by the action of water.

The Nith River, a tributary of the Grand, also functioned as a glacial spillway during the late Pleistocene epoch, yet it was much smaller in size.

To the west of the Grand River, meltwaters carved a number of smaller spillways. The most easterly of these flowed into the Grand River spillway but those farther west followed gaps through the moraine ridges. On emerging from these gaps, they joined and flowed southward in a single spillway which was broad rather than deep, and covered the westerly portion of the Paris moraine with well sorted, gravelly material. At present, a small stream flowing south from Turnbull Lake occupies the old spillway channel.

Large blocks of ice which had broken off the front of the wasting ice sheet were often transported by the spillway waters. These blocks were deposited along the terraces, together with the sands and gravels. As the ice melted, depressional areas formed which were roughly the shape of the ice blocks. Receiving drainage from the surrounding higher land, the depressions formed small kettle lakes. Turnbull, Spottiswood and Pinehurst lakes, all of which are located in abandoned spillway channels, were formed in this manner.

Deltaic and Beach Deposits

As the glacier retreated southeast of the township, a series of proglacial lakes temporarily inundated the lowlands of Southwestern Ontario. Meltwaters which had filled the Lake Erie basin were unable to drain to the east since the glacier still occuped the basin of Lake Ontario. Depression of the earth's crust by the great mass of

ice resting upon it, tilted the Lake Erie basin to the northeast and caused submergence of the southern section of the township. The waters formed proglacial lakes which left abandoned shorelines and beach ridges as proof of their former existence in the township (Map 4). The earliest and highest of these lakes was called Lake Whittlesey, whose waters reached a height of 925 feet. The shoreline of Lake Whittlesey drawn on Map 4 traces the 925 foot contour through the township. There seems to be tangible evidence that the waters of this lake covered part of South Dumfries Township. Below the 925 foot contour, the relief of the Galt moraine has been modified (Illus. 4). An examination of the stones within the till reveals the rounding and flattening characteristic of wave action along lake shorelines (Illus. 5). On the west side of the Grand River and northeast of Spottiswood Lake, the topography resembles a wave cut bluff. The base of this bluff occurs at the 925 foot contour.

A second proglacial lake left more conclusive evidence of its presence in the township, since it remained longer and formed pronounced beach ridges (Illus. 6). This younger and lower lake was called Lake Warren. The location of its shoreline is shown on Map 4. Lake Warren is characterized by twin shorelines. The upper, which is 10 to 15 feet above the lower shoreline, occurs at approximately 850 feet above sea level. Prior to this study, the shoreline had been located and traced east of the Grand River.* More intensive field work by the author has revealed its presence west of the river as well. Only that part of the shoreline extending from Highway 24-A to the Grand River has, however, been checked in the field (Illus.6). Western extensions of the shoreline shown on Map 4 follow the 850 foot contour,

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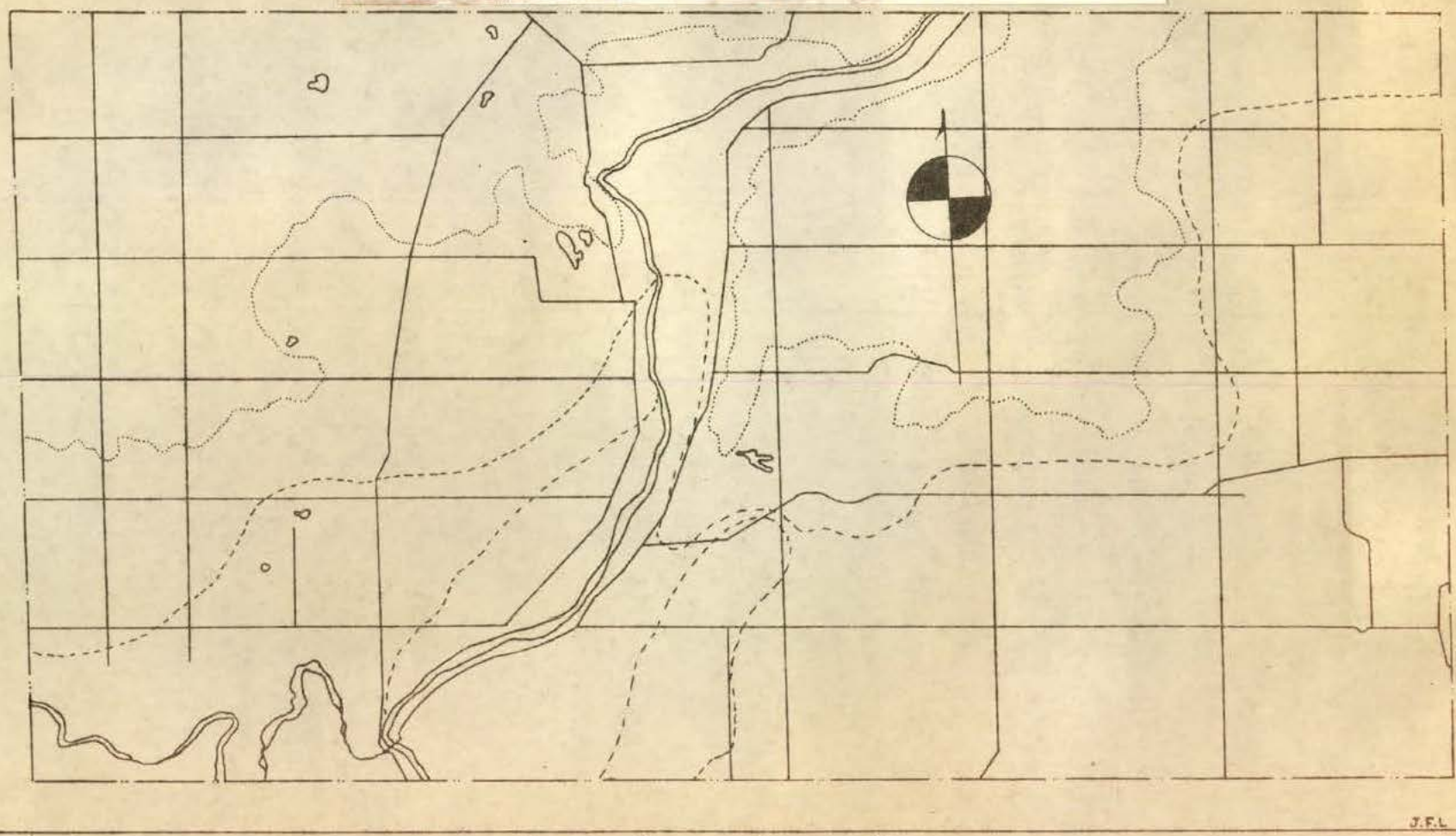
* L.J.Chapman and D.F.Putnam, The Physiography of Southern Ontario, (Toronto, University of Toronto Press, 1951).

PROGLACIAL LAKE SHORELINES



SCALE IN MILES

LEGEND

LAKE WARREN ------

LAKE WHITTLESEY ~~~~

MAP NO. IV

Illus. 4 The topography of the Galt moraine is generally strongly rolling, yet some sections have been modified by the incursion of proglacial Lake Whittlesey.

Illus. 5 Below the 925' contour, the water of Lake Whittlesey has modified the till comprising the Galt end moraine. Many of the stones which were originally sub-angular to semi-rounded, have been rounded and flattened by wave action.

the elevation at which the beach ridge is strongly developed.

The beaches are composed of rounded and flattened pebbles and cobbles which have been packed into a sandy matrix by wave action along the lake shore (Illus. 7). The topography of the shoreline is often steeply sloping.

The waters of Lake Warren and Whittlesey submerged the Paris, Galt,and western moraines below the 925 foot contour line. Wave action considerably affected the relief and topography of these moraines by modifying the submerged knobs and distributing reworked materials to the intervening lower sections.

As streams became active after the recession of the ice, they drained from the higher Galt moraine into Lake Warren. Youthful streams cutting down into the moraine transported sands and gravels which were deposited in the form of deltas along the shores of Lake Warren. The gravels were deposited first as foreset beds.(Illus.8). Sands were carried farther out into the lake and deposited as bottomset beds covering the ground moraine (Illus. 9). Under periglacial conditions, the streams, however, were not always perennial but were subject to alternate periods of freezing and thaw. During periods of freeze, rivers were inactive permitting fine silts to settle to the bottom of the lake.

As the glacier receded from the basin of Lake Ontario, isostatic rebound raised the earth's crust, causing the proglacial lake waters to drain from the township back into the Lake Erie basin. This left the Warren deltaic sands exposed, chiefly to fluvial erosion by streams which once flowed into the lake. The resulting dissection of

Illus. 6 An abandoned beach of proglacial Lake Warren. The waters of this lake covered the township for long periods, permitting the formation of pronounced beach ridges along the shore line. This ridge occurs in Concession III, west of the Grand River.

Illus. 7 An exposure in the Warren Shoreline. Well-rounded and flattened pebbles and cobbles are packed into a sand matrix. The beach is tilted slightly to the northeast as a result of isostatic rebound of the earth's crust after the recession of the Wisconsin ice sheet.

Illus. 8 A deltaic formation formed by streams emptying into Lake Warren. The tilted layers represent the foreset beds which advanced outwards into the lake. These are composed of coarse, sorted material.

Illus. 9 The bottomset beds of the delta consist of fine sand and silt. These were deposited in deeper water in front of the foreset beds. Contemporaneous slumping has resulted in contortion of the layers.

part of the sand plain resulted in the formation of a number of steep sided stream valleys. The streams presently flowing in some of these broad valleys are misfits, being much smaller than those which formed them. Many of the valleys are now dry, the only evidence of stream dissection being the accordant tops of the interfluve areas. The topography of this area is undulating to strongly rolling and below 850 feet in elevation.

These variations in physiography affect agricultural land use and to some extent, urban land use in South Dumfries Township. The extent of this influence will be discussed in the following chapters.

(3)

The Climate of South Dumfries Township

The most fundamental limitation to the nature of agricultural land use is the climate. In South Dumfries Township, the chief factors controlling climate are proximity to the path of cyclonic storms and latitude.

The township lies in the path of the majority of cyclonic storms passing from east to west across Southern Ontario. Consequently, the most notable feature of the climate is its changeability. The occurrence of high and low pressure systems produces weather which fluctuates widely in cycles ranging from one to five days. Precipitation in the township results largely from the frontal activity associated with these moving low pressure systems. The total average annual precipitation in the township is about 31.70". This rainfall is evenly distributed, tending to a slight summer maximum. The seasonal distribution and amount of precipitation are shown in the following table (see also Appendix A-i).

Season	% of Total Precipitation
Winter	22.7
Spring	24.7
Summer	28.1
Fall	27.6

The position of the township at approximately 42° north latitude determines the amount and seasonal distribution of solar insolation. The latter determines the temperature. Average seasonal temperature figures are shown on the following table.

Season	Temperature in Degrees Fahrenheit
Winter	22
Spring	43
Summer	67
Fall	48

The temperature also determines the length of the growing season. Below 42° F., plant metabolism is too slow to effect plant growth. The occurrence of the monthly mean of 42° F. is used, therefore, to establish the length of the growing season. In South Dumfries Township, the latter has a duration of 192 to 200 days.

Somewhat similar to this and also influencing agriculture, is the frost free period. Frost is fatal to the tender crops and knowledge of its occurrence is essential to their cultivation. The last spring frosts occur from May 11 to May 20, and the first fall frosts are experienced from September 28 to October 3, giving the township a total of 133 to 147 frost free days.

Köppen* has developed a classification of climate on the basis of temperature and precipitation. According to this system, South Dumfries Township is described as having a D, f, b climate (Appendix A-ii).

All these elements mentioned above do not, however, constitute climate. C. W. Thornthwaite** has developed a more rational

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*Kendal, Glendinning, MacFadden, Introduction to Geography, (1951, pp.667-668)

**C.W.Thornthwaite, An Approach Toward a Rational Classification of Climate, (The Geographical Review, Vol.xxxviii, No. 1, 1948 pp.55-94)

approach to a classification of climate. This is more quantitative in nature and considers potential evapotranspiration, temperature efficiency, water need, and precipitation effectiveness, all of which are fundamental to plant growth. *

Knowledge of precipitation figures is not sufficient to tell whether a climate is moist or dry. We must know if precipitation exceeds or is less than the water needed for evaporation and transpiration i.e., potential evapotranspiration. The Thornthwaite system has been applied to climatic data recorded at Brantford (Appendix A-i). Since Brantford is only seven miles to the south of the township, these data were considered to be representative of the thesis area.

In times of precipitation, water is stored in the soil. The water storage capacity of average agricultural soils, such as those found in South Dumfries Township, is approximately 10 cms. or 4" of water. Holding this amount of moisture, the soil is said to be at field capacity. In South Dumfries Township, there is no evapotranspiration during the four winter months since temperatures average below 32° F. Soil moisture, therefore, remains at field capacity. In the spring months, the PE exceeds precipitation. The moisture in excess of precipitation is obtained only by drawing on water stored in the soil. By the end of June, all soil moisture in storage is lost to the atmosphere through evapotranspiration and during the months of July, August, and September, there is a water deficit of 6.1 cms. (Fig. 5). It is not until November that the soils are again charged with moisture and reach field capacity of 10 cms.

This ecological approach to a study of climate enables one

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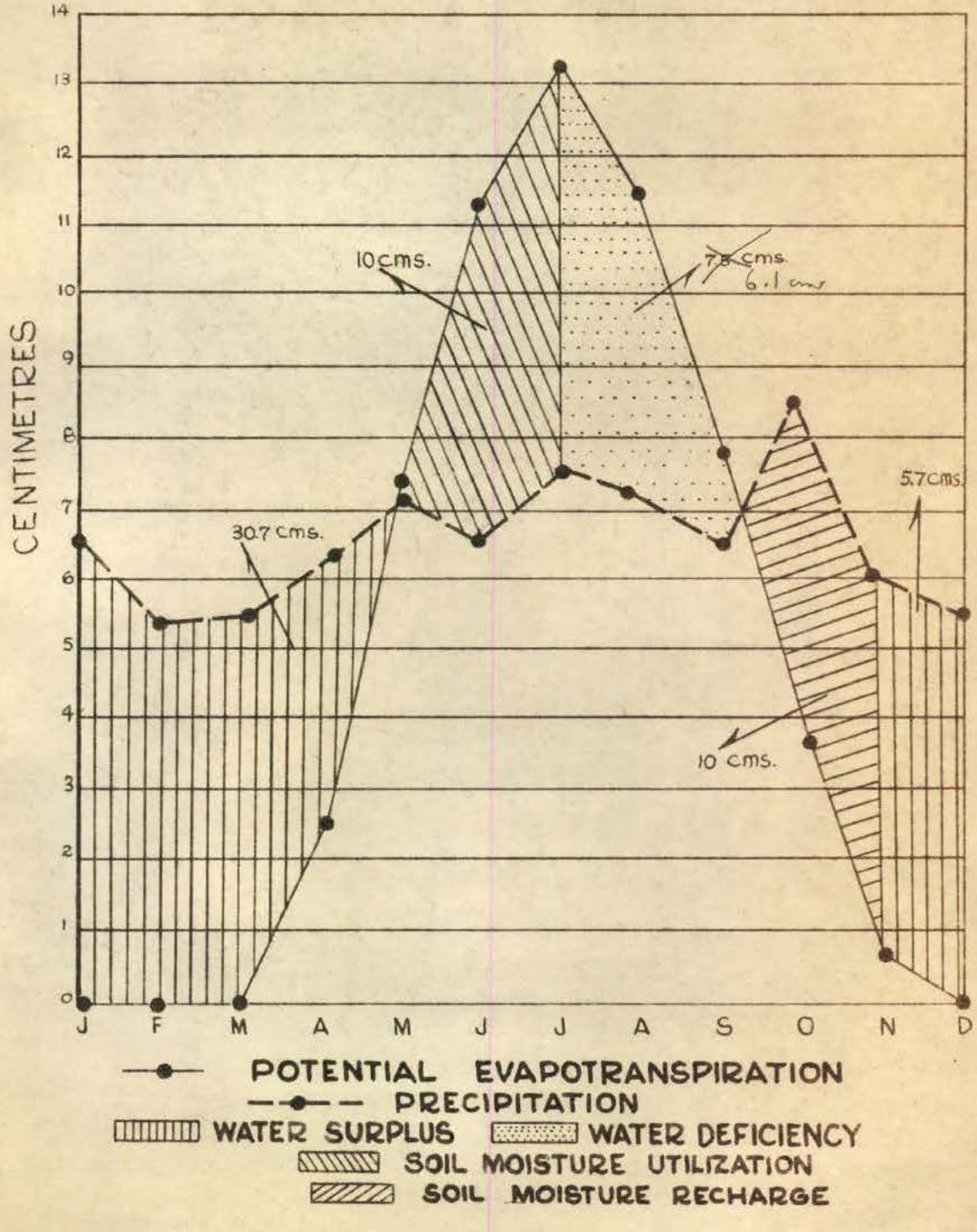
* See Appendix A-iii

MOISTURE BALANCE

OF

BRANTFORD



J.F.L

FIGURE V

to determine the periods of maximum potential evapotranspiration. Thornthwaite states that "potential evapotranspiration is an index of thermal efficiency. It is not merely a growth index, but expresses growth in the terms of water needed for growth." * Using this knowledge, planting dates can be adjusted to enable crops to take full advantage of the periods of maximum thermal efficiency while they are in the vegetative or growth stage. In South Dumfries Township, however, these periods occur during the summer months when there is a moisture deficit. If water could be supplied by irrigation during these periods, crops would mature more quickly.

Thornthwaite has developed a classification of climate, which places South Dumfries Township within the humid mesothermal climatic category having little to no water deficiency and a summer concentration of PE (Appendix A-iii). The small moisture deficit occurring during the summer months is not a limiting factor to general farming. It is, however, important to specialized agriculture in the township, such as fruit and vegetable farming. Climate as a factor influencing agricultural land use can, therefore, be fully understood only when approached ecologically as in the Thornthwaite system.

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* C.W.Thornthwaite, op. cit., p. 81

(4)

The Natural Vegetation of South Dumfries Township

Climate is the principal agent responsible for the distribution and form of the natural or climax vegetation, i.e., the group of plants best suited to the area and most able to maintain themselves.

Since the encroachment of civilization and the increase in population of the township, much of the climax vegetation has been removed. Only relatively small patches of forest remain. The clearing of woodland in South Dumfries Township since early settlement is shown by the following figures:

Date	Acres of Woodland	% of Township *
1850	12,008	25.0
1860	8,794	18.5
1890	7,485	15.6
1910	4,239	8.8
1920	5,063	10.5
1930	4,256	8.8
1940	4,350	9.6
1951	4,849	10.9
1956	4,707	9.8

Increases in acreage after 1910 are a result of reforestation. Since that date, the acreage in forest has remained fairly constant due to the employment of conservation practices.

The forest is more demanding in its environmental requirements than either the grasses or the shrubs. Subsoils must be permanently moist with the maximum precipitation occurring in the warm season. Since there is little or no moisture deficiency in South

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* 47,908 acres (calculated by planimetric measurement)

Dumfries Township, the climate is ideally suited to the growth of a forest cover. The physical environment has, therefore, a controlling effect on the characteristics and distribution of vegetation and similar environments tend to produce plant associations in which the same species are found. Although much of the forest has been cleared in South Dumfries Township, the prevailing association is broad leaved with a small admixture of conifers. Halliday* places the northern one-half of the township within the Huron-Ontario section of the Great Lakes - St. Lawrence Forest Region. The southern one-half lies in the Niagara section of the Deciduous Forest Region. The difference between the two is the greater occurrence of conifers in the former. Deciduous trees, however, predominate in both sections.

The common associations found throughout the township are the sugar maple-beech association which is found on the well drained soil types (Illus. 10). Included with the association are basswood, ironwood, white ash and some oak. Occasionally, white and red pine are found on the lighter soils. The largest stands of the sugar maple-beech association occur on the Dumfries loam and the Burford loam. Most of the trees on the latter type are found along the banks of the Grand River.

The soft maple-elm association prevails on the imperfectly drained soils. These soils have developed mainly on the flat lying areas where surface runoff and downward percolation of water are slow. Ash, ironwood, and large-toothed aspen also occur in the association.

The elm, ash, and cedar association occurs on the poorly drained soils of South Dumfries Township. These soils have developed along stream beds (Illus. 11), and in the swampy, inter-knob depressions of the Galt moraine. Silver maple and beech are often found with the

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* W.E.D.Halliday, A Forest Classification of Canada, (Bulletin 89, Ottawa).

Illus. 10 The sugar maple-beech association dominates the well drained, medium textured limestone tills.

Illus. 11 Cedar claims the poorly drained sections. This small stand was located in a depression, formerly a small spillway.

dominant species. All these types are adapted to excessive moisture conditions.

In 1956, only 9.8% of the township was forested. At present the majority of the remaining large stands are found throughout the Galt moraine and along the Grand River valley. These areas are characterized by steeply sloping topography and soils which are either poorly drained or excessively stony. Small farm woodlots are scattered throughout the township.

(5)

Soils of South Dumfries Township

Introduction

During the late Pleistocene epoch, the bedrock of South Dumfries Township was shattered by glacial plucking and frost wedging. The shattered fragments, which composed a large proportion of the glacier's load, were transported, modified and then deposited as glacial drift. This drift and the sands deposited in proglacial Lake Warren formed the parent material from which the major soil types in the township have formed.

Classification and Description of Soils

Under the combined influence of climate, topography, vegetation, and soil organisms on parent material through time, different layers or horizons develop, which when observed in cross-section, are referred to as a soil profile. Three distinct kinds of profile occur in South Dumfries Township, each of which belongs to a different Great Soil Group. These include the Grey Brown Podzolic, Dark Grey Gleisolic, and Bog Great Soil Groups.

The Grey Brown Podzolic soils have developed under well drained conditions from a calcareous parent material. The process of podzolization has depleted the Upper or A horizon of basic minerals, leaving it a pale brown colour. The Dark Grey Gleisolic soils have formed under conditions of poor drainage. This type is distinguished by the appearance of a rusty bluish grey mottling in the subsoil. The

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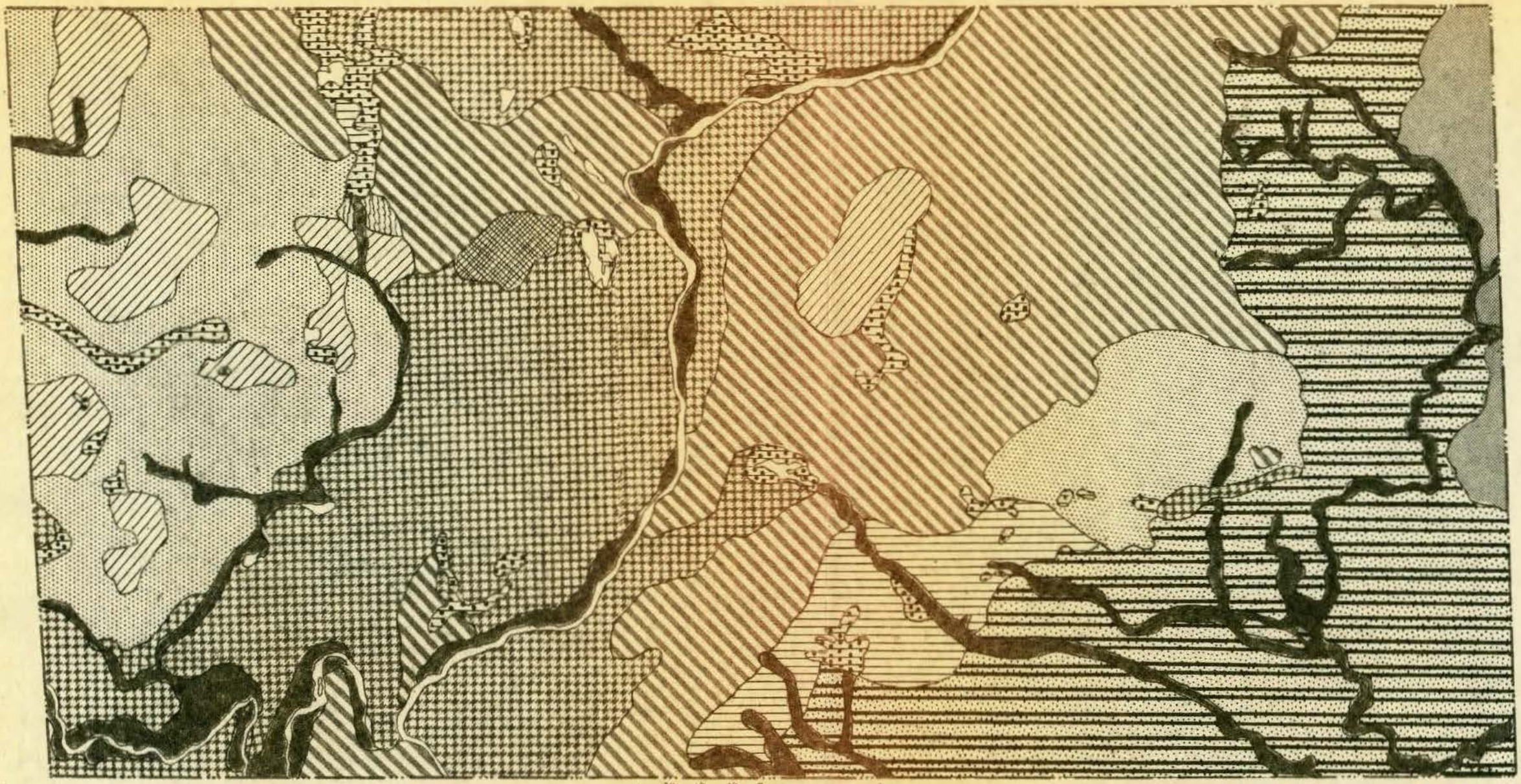
SOUTH DUMFRIES TOWNSHIP

MAP SHOWING SOIL TYPES



AFTER BRANT COUNTY SOIL REPORT
O.A.C. GUELPH ONT.

KEY TO SOIL TYPES

BOTTOM LAND	MUCK	BRANTFORD CLAY LOAM	LONDON LOAM	GUELPH LOAM	BURFORD LOAM	BRANTFORD LOAM	DUMFRIES LOAM	GRANBY SANDY LOAM	FOX SANDY LOAM

MAP NO. VI

Bog soils consist of organic accumulation, usually from one to more than three feet in depth. Where the organic matter is well decomposed, the soils are referred to as Muck. These two soils have formed under exceptionally poor drainage conditions. The distribution of soil types is shown on Map VI. A description of the generalized soil profiles is contained in Appendix B-ii.

The Grey Brown Podzolic Soils

Dumfries Loam

Dumfries loam (Illus. 12), has the greatest areal extent of the Grey Brown Podzolic soils, covering 13,124 ac., or 29% of the township area. Formed on light textured limestone till, the parent material contains many stones, most of which are angular to sub-angular in shape. Erosion of this soil type is a problem due to the steeply sloping topography and rapid surface runoff.

Brantford Loam

Second in areal extent in the township, this soil type occupies 10,675 ac., or 22.6% of the total area. The soil has developed from deltaic sands and lacustrine silts (Illus. 13). The surface is smooth to rolling with some steep slopes near stream courses. Natural drainage is fair on the flatter sections but excessive on the steep slopes.

Burford Loam

Third in areal extent, Burford loam occupies 9,907 ac., or 20.9% of the township area. The soil has developed from well sorted gravelly deposits representing old beaches and outwash plains (Illus.14). The gravels are grey in colour having been derived largely from the under-

Illus. 12 Soil profile of the Dumfries Loam. The parent material of this soil was deposited as a light textured limestone till. The stones occurring in the C horizon are usually sub-angular to semi-rounded.

Illus. 13 Soil profile of the Brantford Loam. The parent material, a fine sand, was deposited as a delta in Lake Warren. Note the compact silty B. horizon which often retards the downward percolation of water.

lying dolomitic limestone. In some areas, notably along the Grand and Nith Rivers, the surface soil contains a large number of stones. Generally, the upper horizons are relatively stone free. Excellent internal drainage is provided by these gravelly conditions.

Guelph Loam

Fourth in areal extent, Guelph Loam occupies 6,745 ac. or 14.2% of the township area. The soil (Illus. 15) has formed on medium textured limestone till. External drainage is good, whereas internal drainage is only fair. Erosion on this soil type is moderate due to the smooth to moderately sloping topography.

Fox Sandy Loam

Sixth in areal extent in the township, this soil is found on 1,491 ac. or 3.1% of the total area. The well sorted, sandy parent material was deposited in still or slowly moving water. Fairly steep slopes occur where these soils have been dissected by streams. Drainage is good to excessive and erosion becomes a problem if the soil is left uncovered.

The Gleisolic Great Soil Group

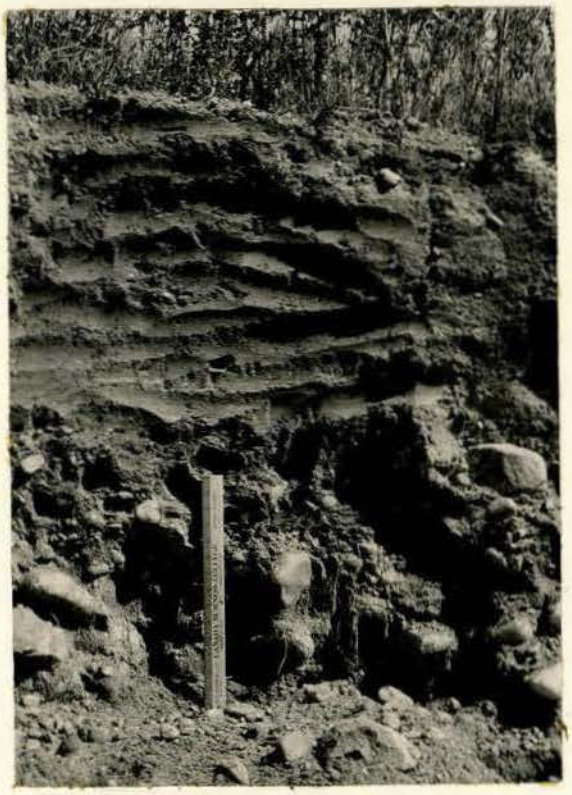
London Loam

This soil type occupies 2,160 ac. or 4.3% of the township area and is fifth in areal extent. It has developed on medium textured limestone till. The topography is smooth and erosion is slight due to the low surface runoff. Internal drainage is imperfect.

The Bog Great Soil Group

Muck

This soil is common within the Galt moraine where drainage



Illus. 14 The Burford loam is formed on gravelly and cobbly outwash material. The internal drainage is excellent. Along the Grand River, the profile is shallow and parent material may be near the surface.

Illus. 15 The A and B horizon of Guelph loam. This soil has a deep profile formed on medium textured limestone tills.

is impounded in low lying areas. The topography is level to depressional. The profile of muck soil does not exhibit the characteristic layering common to the mineral soils but usually consists of organic matter in varying stages of decomposition. A second minor soil type occurring in the township is bottomland, which has developed from alluvial material. These soils lie along stream courses and generally are not old enough to have developed a mature profile. This type is found in the stream dissected areas of the township, chiefly along the tributaries of Fairchild's Creek, and along the Grand and Nith Rivers.

Since soils form the medium for plant growth, variations in their nature often affect the pattern of agricultural land use. In South Dumfries township, these variations have resulted largely from differences in parent material, topography, and drainage conditions.

(6)

Land Types of South Dumfries Township

Introduction

South Dumfries Township has been divided into land types having similar soils, relief, topography, and drainage conditions. These land types are actually patterns of surface features and correspond closely to the physiographic regions (Map 3). In the following discussion, the land types are treated in order of areal extent. Their location is shown on Map 7.

1. Dumfries Land Type

This is the largest unit and occupies 11,603 ac. or 25% of the township area.* The boundary of the land type closely approximates the boundary of Dumfries loam. The parent material of this soil, a light textured limestone till, was deposited as end moraine and the latter forms the major physiographic component of the land type. The rough topography of the end moraine is characterized by many morainal knobs and ridges (Illus. 16). Steeply sloping hillsides are numerous and erosion is a problem where the soils are left bare. Swamps occur in some of the inter-knob areas which receive seepage and external drainage from the higher elevations. Elevations range from 925' to 1025'. Below the 925' contour, a small section of the land type has been modified by wave action of proglacial Lakes Warren and Whittlesey. The topography is more gently rolling and elevations

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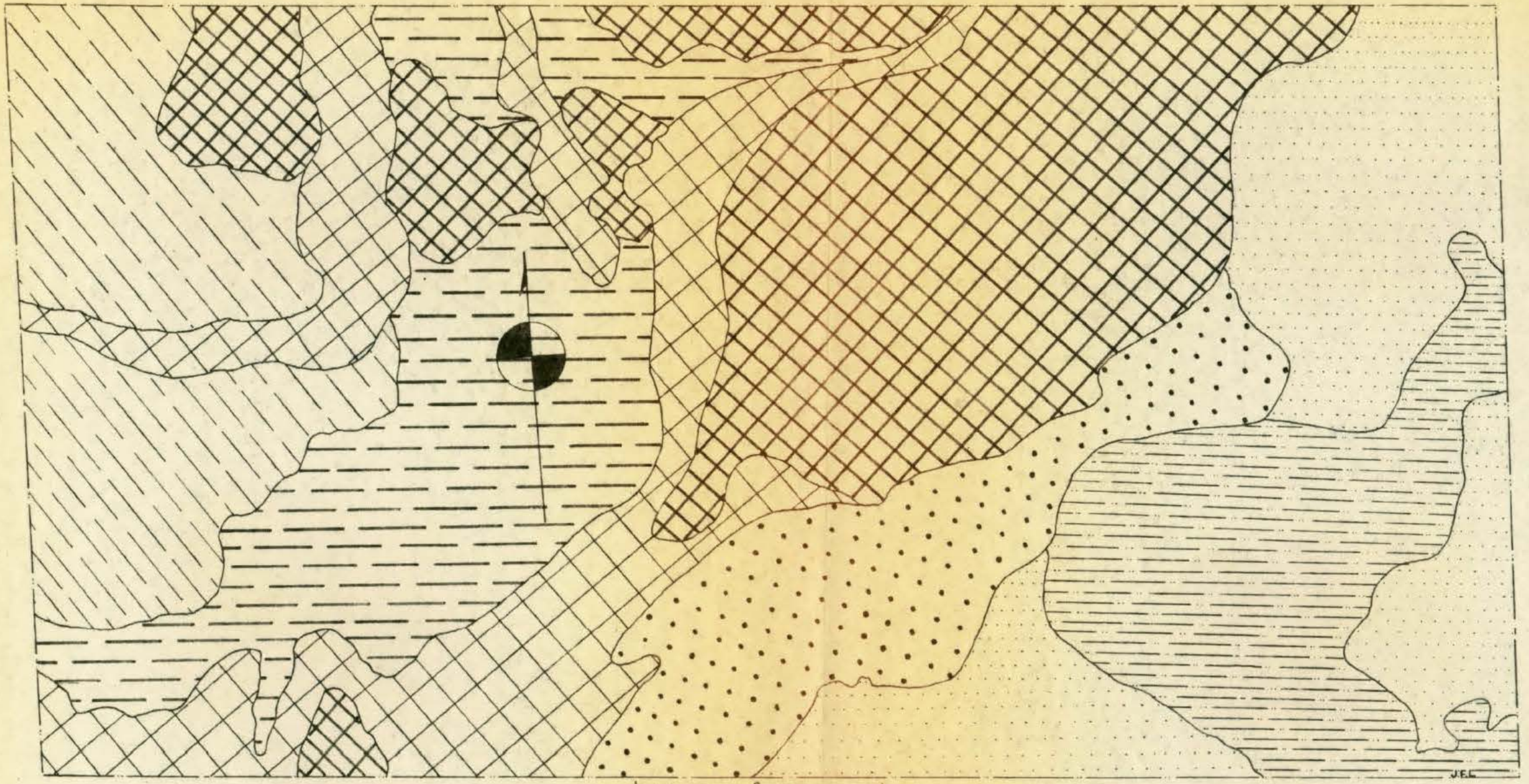
* 47,908 ac. - calculated by planimetric measurement and including all water bodies.

SOUTH DUMFRIES TOWNSHIP

LAND TYPES



LEGEND

GUELPH LAND TYPE

PARIS PLAINS LAND TYPE

GRAND RIVER LAND TYPE

DUMFRIES LAND TYPE

WARREN LAND TYPE

HARRISBURG LAND TYPE

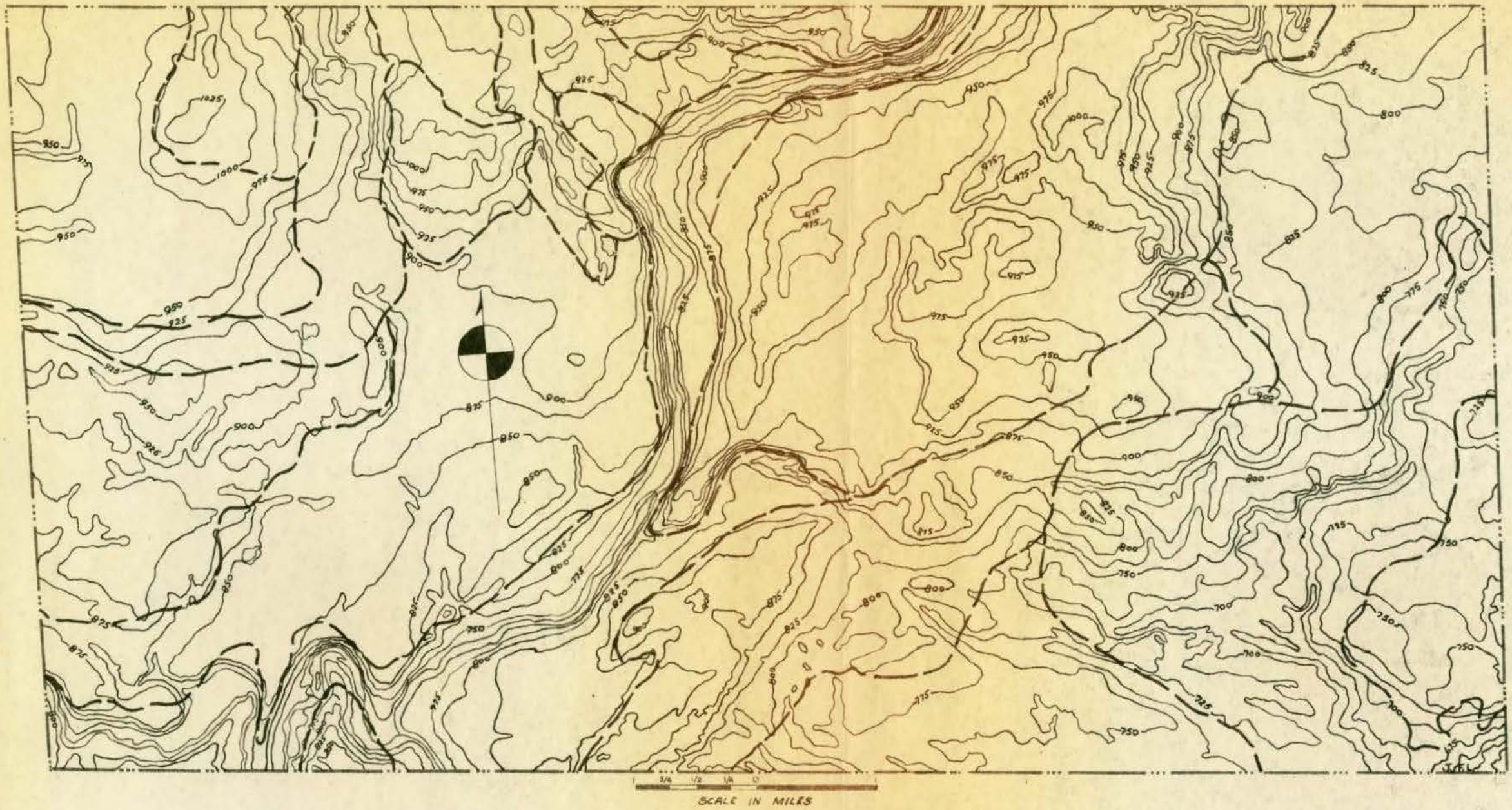
ST. GEORGE LAND TYPE

MAP NO. VII

40

SOUTH DUMFRIES TOWNSHIP

CONTOUR MAP



CONTOUR INTERVAL - 25 FEET

LAND TYPE BOUNDARY ~ - ~

MAP NO. VIII

range from 875' to 925'.

2. Grand River Land Type

Covering 7,110 ac. or 15% of the township area, the boundaries of this land type correspond closely to the boundaries of the major glacial spillways. The latter include those now occupied by the Grand and Nith Rivers, and two smaller spillways to the northwest. Four soil types are present, yet Burford loam has the greatest areal extent. The soil, which has developed along the flat to gently sloping and sometimes terraced sides of the Grand and Nith spillways, is formed on glacio-fluvial sands and gravels. The soil profile is very shallow and the stony parent material is often quite close to the surface (Illus. 17). On the higher slopes, the profile is deeper and stones are less frequent in the upper horizon. Drainage conditions are good. The two smaller spillways are underlain by imperfectly drained soils and muck and may contain sluggish streams, swamps or kettle lakes. Many sections of the land type are steeply sloping and have been left forested. Elevations vary from 750' in the river valleys to 925' in the smaller spillway channels.

3. Harrisburg Land Type

This land type occupies 7,014 ac. or 15% of the township area. The predominant soil type is Brantford loam which has formed from sandy parent material deposited by streams flowing into Lake Warren. Drainage conditions of this soil are only fair due to the presence of a compact, silty B horizon, which retards the downward percolation of water. The area, which has been largely undissected, has a gently rolling top-

Illus. 16 The Dumfries land type. Occupying the largest area in the township, the topography is rolling to rough with many steep slopes. Swamps are not uncommon in the inter-knob areas.

Illus. 17 The Grand River land type is characterized by the shallow nature of the overburden and by steep slopes which occur along the river terraces. Much of this land type is forested or used for long-term pasture.

ography and elevations ranging from 750' to 850' (Illus.18). A few steep slopes occur, however, along small stream valleys.

4. Paris Plains Land Type

Having an areal extent of 6,867 ac., the land type occupies 14% of the township area. One soil type, Burford loam, underlies the entire unit. The glacio-fluvial parent material of this soil has weathered sufficiently to form a deep profile, the upper horizon of which is only moderately stony. The smooth to gently rolling topography (Illus.19), has resulted from meltwater modification of end moraine, glacio-fluvial deposition and subsequent wave modification by proglacial lakes. Very few surface streams have formed due to the rapid internal drainage of the soil and the smooth topography. Although elevations within the land type vary from 825' to 975', much of the area lies below the 925' contour.

5. Guelph Land Type

Lying along the western edge of the township, the Guelph land type consists of 5,497 ac. or 11% of the township area. Two soil types predominate, the Guelph loam, which is the largest in areal extent, and the London loam. The boundary of the land type follows closely the boundary of the Guelph loam. Although both soils have formed on medium textured limestone till, drainage conditions distinguish the two types. The Guelph loam has formed on a rolling surface and has fair to good drainage, whereas the gleizolic London loam, which has developed on a flat surface, is poorly drained. The land type evolved as end moraine, the relief of which was subsequently modified by meltwater, wave action,

Illus. 18 The Harrisburg land type is characterized by a gently rolling topography which has been little affected by stream dissection.

Illus. 19 The Paris Plains land type has been modified by outwash material and wave action of proglacial lakes. The topography is smooth to gently rolling.

or, as in the southern one-half, by both of these factors. The topography is gently rolling to rolling in the southern one-half and smooth to undulating in the north (Illus. 20). Elevations range from 875' to 975'.

6. St. George Land Type

Having an areal extent of 5,318 ac., this unit forms 11% of the township area. The only soil type occurring is Brantford loam, which is similar to that found in the Harrisburg land type. Topographic differences, however, distinguish the two. In the St. George land type, topography is steeply sloping (Illus. 21) as a result of stream dissection by the tributaries of Fairchild's Creek. External drainage is rapid on the steep-sided stream valleys, necessitating a permanent sod cover to prevent erosion. The interfluve areas have good internal drainage, whereas the flat valley floors, which contain immature soils developed from recently deposited alluvium, are poorly drained. Elevations in the land type vary from 725', the lowest point in the township, to 800'.

7. Warren Land Type

The Warren land type has an area of 4,499 ac., and covers 9% of the total township area. Three soils comprise the land type. These include Guelph loam, Fox Sandy loam, and Dumfries loam. The parent material of the former two types has been affected by the presence of the proglacial lake waters. Water has modified the relief of the Dumfries loam area (Illus.22), yet it was not submerged long enough to affect

Illus. 20 The smooth northern portion of the Guelph land type. The boundary of this land type closely approximates the boundary of the Guelph loam soil type.

Illus. 21 The steeply sloping topography of the St. George land type has resulted from stream dissection of the Warren sand plain. Many of the valleys, however, are no longer occupied by the streams which carved them.

Illus. 22 The Warren land type is the most diverse in soils. Topography is generally undulating yet some steep slopes occur, especially along the edge of the Warren shoreline.

the structure of the parent material. Parent materials consist of medium textured limestone till, sand and gravel beach deposits, and light textured limestone till, respectively. Topography is undulating to rolling, yet some steep slopes occur along the south side of the Warren shoreline and along a number of stream valleys. Drainage conditions are highly variable, being good to excessive, depending on topography. Elevations vary from 800' on the sandy loam soils and from 850' on the loam soil to 950'.

This section on land types has largely been a synthesis of physiography and soils. In a portion of the following chapter an attempt will be made to correlate agricultural land use with the physical environment through the use of the land type.

CHAPTER II

AGRICULTURAL LAND USE IN SOUTH DUMFRIES TOWNSHIP

(I)

History of Settlement and The Evolution of Agricultural Land Use 1796-1920

Early in the 17th century, the land now within the political boundary of the County of Brant formed a small portion of Attiwandaron or Neutral Indian territory. These sedentary people practised a subsistence type farming based mainly on the cultivation of maize. Through a series of conquests, the possession of this land passed through a number of tribes before it was purchased by the British Government.

In 1796, as a remuneration for participation in the Revolutionary wars, the government granted a tract of land, as Indian reserve, to the Six Nations Tribes. This tract extended from the mouth of the Grand River to its source and included six miles on the east and west sides of the river. Under the leadership of Colonel Joseph Brant, the Six Nations Tribes obtained permission from the government to sell a part of the reserve. In 1798, negotiations were carried out to dispose of six blocks, totalling 352,707 acres. One of the blocks, estimated to contain 94,305 acres, was to form the Township of Dumfries. This land was purchased by Philip Stedman for

a price slightly less than $50.00 per acre. With the death of Stedman, the deed to the entire property was purchased by a William Dickson for little more than $1.00 per acre. By special act of the Upper Canada Legislature, this became known as the Township of Dumfries, taking its name from Dickson's birthplace, Dumfries, Scotland. At this time, it included what is now North and South Dumfries.

The greatest obstacle to agricultural development at this time was the forest. The entire township was unbroken forest, thickly timbered with pine, cedar, and elm, intermingled with oak, beech, and maple. Lumbering, however, never assumed a dominant position in the economy of the township and was merely a by-product of the land clearing process. This was partly due to the absence of soft, workable pine and partly to distance from markets. From 1817 on, the cutting of timber was done largely by individuals clearing their own farms. The wood was used mainly for fuel and as settlement progressed, for building homes and fences.

The first settlements in the township were around the village of St. George. The excellent quality of the soils and abundant water supply had attracted settlers as early as 1814, before Dickson had acquired what is now township property.

By the end of the year 1816, the township had been surveyed. A dispute then arose as to who was the rightful owner, and the ensuing unsettled state considerably retarded settlement. By 1817, there were only 38 actual settlers, most of whom were in the St. George district. Small scale farming was the rule in this early period. The initial crop was a subsistence one, usually potatoes. As larger areas were

cleared, wheat was grown as a cash crop. By 1818, the population had risen to 150 persons.

From 1820 to 1825, the settlement of Dumfries was slow and farm sites were widely scattered. In 1821, the population was less than 150. By 1824, there were several farmsteads in the north-west corner of the township. Yields recorded in this area were 18 bushels of wheat per acre, 25 bushels of barley per acre and 30 bushels of oats per acre.

After 1825, settlers began to arrive more frequently. These persons were almost exclusively Scottish and chose to locate on the flatter Paris Plains. This was an extensive stretch of almost perfectly level land located north of what is now the town of Paris. The area was covered with a heavy oak forest, which to the settlers, indicated a deep, fertile soil. Soils were described as sand loams and clays. The first to acquire farmsteads on the Plains possessed considerable capital. They saw early the advantages of using machinery and the Plains area was one of the first to use reaping machines rather than the conventional cradle for cutting wheat.

During this period, a lack of suitable transportation routes was keenly felt. The only route to the larger markets of Dundas and Hamilton was along the Governor's Road, which was hardly more than a narrow path. Soils were well adapted to the production of wheat and other cereals and farm produce was increasing annually. The farmer, however, was unable to market his crop to receive cash returns. Much of the business at this time therefore, was carried on by barter, since money was rarely seen.

Many of the principal settlers arrived in 1830, and during the later part of the decade, the northeast part of the township was settled. By 1841, all of the township was established. On the date of the first census in 1851, the total population numbered 4,297 persons (Fig. IX).

In the parliamentary session of 1850, a bill creating new counties throughout Ontario was passed. One of these was the County of Waterloo. In 1851, Dumfries Township, in the County of Waterloo, was divided into a northern and a southern section, the south being attached to Brant County, the north to Waterloo County.

In the year 1849, there had been considerable improvement in roads, especially the Governor's Road. With the outbreak of the Crimean War in 1851, and the increase in demand for farm produce, these improvements in transportation facilitated shipment to the larger urban centers. Many farmers in the township became wealthy during this period. In 1854, the Great Western Railroad was constructed, bringing added prosperity to farming.

By 1860, machinery was appearing in the form of harvesters, but their use was limited to the areas of more flattish relief. In the following year, township population declined approximately 9% to a figure of 3,916. These persons were absorbed largely by the town of Paris. From 1870 to 1876, farming in the township experienced poor crops. Livestock prices had fallen owing to American competition and the depression of 1873. Conditions improved during the late 1870's largely as a result of the export of cattle and sheep to

POPULATION TRENDS IN SOUTH DUMFRIES TOWNSHIP 1851-1956

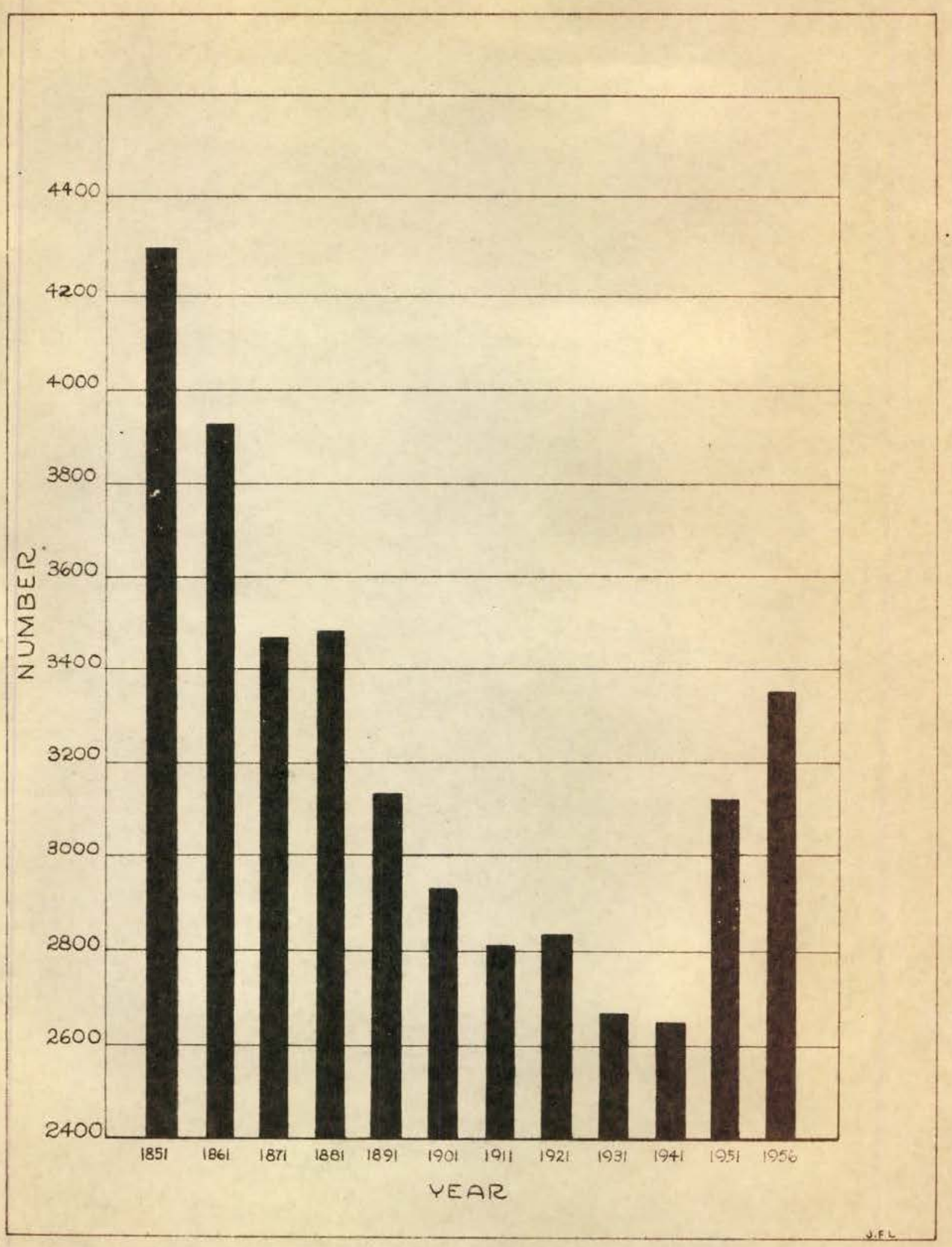


FIGURE IX

the British Isles. By 1881, the township's population had declined still farther to 3,490, a drop of 10% since 1861. Farming techniques had been very unscientific, as little attention was paid to conserving soil fertility. Only a few farmers were still using gypsum. It was fortunate that at this time, urban centers were beginning to grow and more attention was paid to dairy farming. The increase in livestock provided the manure needed to replenish the overworked soils.

In 1881, a report published by the Ontario Agricultural Commission described the township as having soils which were $\frac{1}{4}$ clay loam and $\frac{3}{4}$ sand loam. One thousand acres of the township were classed as bottomland, 900 acres as swamp, and 100 acres so hilly as to be objectionable to cultivation. All farmers reported the use of improved farm machinery such as reapers, mowers, and seed drills. Yields were 18 bushels per acre for wheat, 35 bushels per acre for oats, and 25 bushels per acre for barley. The chief products of the township were described as being wheat and barley, although the area was equally adapted to the growing of oats and grain. *

By 1900, the present pattern of diversified agriculture was emerging. The distribution of these specialized agricultural land uses has not been entirely at random. The physical environment has a much greater effect on specialized farming than on the general or mixed farming economy. Land use is now more closely linked to the land type.

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* Ontario Agricultural Commission Report, (1881, Vol. I, pp.1-5)

In 1920, South Dumfries Township was described as "a splendid farming section, the district east of the Grand River being more rolling and in sections, heavier than west of the river. This district is noted for its flocks of sheep and herds of Shorthorn cattle. Eastern South Dumfries is almost entirely dairy." *

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* D. Reville, History of the County of Brant, (Vol. 1, p. 293, 1920)

AGRICULTURAL LAND USE IN SOUTH DUMFRIES TOWNSHIP

(2)

Trends in Agriculture 1851-1951

Through an examination of population figures, field crop, and livestock statistics,* an attempt has been made to explain the trends in agriculture since 1851.

At the date of the first census in 1851, the population of South Dumfries Township was approximately 24% greater than that of 1951. Many persons had settled on submarginal land which should never have been cleared of its forest cover. Wheat was the dominant grain crop at this time, occupying an acreage which exceeded that of 1951 by approximately 51%. Many of the areas growing wheat were either steeply sloping or had stony soils and could not be cultivated with present equipment. Tractors cannot navigate steep slopes, and machinery suffers damage from stones. These submarginal wheat areas were largely within the Galt moraine and along the Grand River. Soils were fertile, well drained, and suited to wheat production, yet when the sod cover was broken, erosion had serious effects. Many of the settlers were unfamiliar with climatic conditions in Southern Ontario, and especially with the sudden downpours of rain.

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* Dominion Bureau of Statistics, Canada Census Reports, (Department of Trade and Commerce, 1851-1951) - See Appendix D.

These contrasted to the drizzle of their native land, which causes very little soil erosion even on steep slopes. Erosion and a general decline in fertility resulted in the reversion of these sections to natural pasture. Wheat acreage has experienced a steady decline since 1851, and 100 years later occupied only 3,916 acres. It was and still is the major cash crop, however, yet its production is subject to great fluctuations in demand.

The acreage given to barley was only 318 acres in 1851. The crop experienced a great boom in 1891, which was largely due to its use in making alcohol. Local distilleries were great handlers, while some was exported to the United States. The land devoted to barley at present consists only of 162 acres. Most barley is sown as a compound mixed grain, rather than as an individual crop. Acreage given to rye has generally been less than 500 acres. It, like barley, is now sown in a mixed grain crop.

Oats has always occupied a large acreage in the township, since it formed the major feed for horses. These animals dominated the early agricultural scene. As gasoline drawn machinery was adopted, the number of horses declined, yet oat production still remained fairly steady. This was the result of an increase in dairying and of the use of oats as cattle feed.

Significant trends are evident also in the livestock figures. In 1851, sheep were the dominant livestock, numbering 10,210. These were raised largely for their wool. One of the major industries in the township at that time, the German Woollen Mill, carded and spun much of the wool produced. The Scottish settlers

were familiar with the methods of sheep raising, and their animals grazed largely on the rough, well-drained areas of the moraine. The number of sheep decreased at the turn of the century as a result of a decline in the use of wool and its replacement by cotton. Since 1931, there has been an increase in sheep numbers, though their meat now takes precedence over the wool.

Horses have declined considerably in numbers. It was largely due to these animals that many steeply sloping sections could be cultivated. Even now, the remaining animals are to be found in the more rolling sections of the township. The number of hogs in the township has remained fairly constant. Numbering 3,888 in 1851, their total rose to 4,770 in 1950, with many fluctuations in the intervening years. These animals are raised only for their meat, and production is subject to fluctuations in the demand for pork products. Many farmers who have specialized in the production of fluid milk were forced to discontinue hog raising. At present, the latter is usually found in conjunction with mixed farming. Berkshires are the dominant breed.

Cows were common among the early settlements, yet their numbers were small. Each farm had several cows for its domestic supply of milk, butter, and cheese. By 1851, the acreage in pasture was nearly equal to land in crops. This was largely due to sheep grazing rather than cattle, and as sheep declined, more land was returned to cultivation. By 1891, the amount of land in pasture was only 4,535 acres, but as the production of fluid milk became

profitable, this figure rose to 12,160 acres by 1912. The number of cattle has continued to increase in the township, and in 1951 numbered 7,410. This figure includes beef cattle as well as milk cows. The 1951 pasture figure is 13,133 acres or approximately 27% of the cleared township area.

Agriculture in South Dumfries Township has become transformed through technological advances and responses to changes in the economic climate. Large urban centers have created a demand for meat and milk products, which has resulted in the development of dairy farming and the raising of beef cattle in addition to the general or mixed type of farming.

AGRICULTURAL LAND USE IN SOUTH DUMFRIES TOWNSHIP

(3)

Present Agricultural Land Use in South Dumfries Township

Introduction

A number of agricultural regions have been constructed for Southern Ontario on the basis of land use.* Hartshorne and Dickens include South Dumfries Township within two regions, the hay-pasture-livestock-dairy specialty region, and the hay-pasture-livestock-meat specialty region. According to the work of Whittlesey, the township lies in the commercial livestock and crop farming region, and the commercial dairying section. Regions constructed by Baker place the township within the Hay and Dairy Belt of North America.

In 1951, 39,275 acres of South Dumfries Township were cleared, 60% of which was planted in crops. Hay was the major crop occupying 18% of the cleared land. Oats was second in areal extent being grown on 14% of the cleared land, whereas wheat and mixed grains occupied 9.1% and 9.9% respectively. Pasture, however, was the most extensive type of agricultural land use, occupying 33% of the cleared land. The remainder was used for the growth of corn, barley, rye (grown as an individual crop), fruit, and vegetable crops.

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* J.R.Whitaker, Distribution of Dairy Farming in Peninsular Ontario, (Economic Geography, Vol. 16, pp. 75-76)

This examination of statistics reveals the predominance of fodder and grain crops in the land use pattern which is, in turn, indicative of livestock production. Livestock figures placed the number of cattle in the township at 7,140, 52% of which were milk cows and 10% were beef cattle. Hogs were second with 4,730, followed by sheep which numbered 3,330.

Farm sizes varied considerably throughout the township in 1951, the average size being between 100 and 200 acres. Of the total number of farms, 23% were under 69 acres, 65% were between 70 and 239 acres, and only 12% exceeded 240 acres.

The Nature of Agricultural Land Use - 1957

The nature of agricultural land use within the township is represented cartographically in the form of a land use map (Inside Back Cover). Several explanations are necessary for a full appreciation of the legend. Areas classified as grain also include land which has been plowed and sown with winter wheat.* Grain, however, is the predominant crop in terms of acreage. The category "idle land" does not include land lying fallow but rather land which has been completely abandoned agriculturally. "Rotation pasture" includes a number of land uses. It may refer to improved, short-term pasture, or land lying fallow which may be used as rough pasture. Long-term pasture includes what is often referred to erroneously as permanent pasture or natural pasture. This is a misnomer since the pasture is never permanent and is often sown with a prepared pasture mixture.

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* In general usage, the term "grain" refers only to the feed grains such as barley, oats and rye

The following is a discussion of the major types of agricultural produce in South Dumfries Township.

Oats and Mixed Grains These crops claim the largest acreage in the township due to their use as livestock feed. Mixed grains include barley and rye, which may be sown with the oats. The last is the largest individual grain crop by area. These grains are sown in the spring as soon as the weather conditions permit cultivation. In South Dumfries Township, this is generally the first two weeks in May. Their high protein content makes them excellent milk and egg producing feeds. Mixed farming areas in the township often grow large quantities to be sold as a cash crop to dairy or beef farmers. Since at least 30% of the land is usually left in pasture on these farms during the summer months, acreage is limited for the growth of winter feed crops. Most are not able to produce all of their own feed and must purchase additional amounts.

Hay Hay, claiming the second largest acreage, is grown chiefly as a fodder crop but may be pastured. Mixed clovers predominate in the hay, but some alfalfa and timothy are also common. Red clover is particularly well adapted to the soil types of the township. Besides being a major fodder crop, hay is an important soil conditioner and forms the mainstay of the rotational system. A four year system is used in the township, namely hay, corn, grain, and wheat.

Wheat Most wheat is grown as a cash crop. If the price is not suitable, it may be fed to livestock, particularly beef cattle. Since it is rich in carbohydrates, it fattens cattle

quickly. Spring wheat from Western Canada is used as feed, whereas the softer, better quality winter wheat grown in the township is for milling into flour. In South Dumfries Township, wheat is sown from September 7 to 15. Since it is fall sown, this enables the farmer to spread his labour over a longer period and to avoid the rush of spring work. Most of the wheat finds a market in Brantford, yet some grown on the Paris Plains goes to the flour mill in Paris.

Corn No figures are available for corn in the 1951 census. In 1957, however, it was grown extensively throughout the township (See Land Use map). At present, two varieties, husking corn and ensilage corn, are being grown in the township, both of which are fodder crops. Husking corn has been introduced only recently. It is planted about the first of May and must be fully mature before it is picked. The latest hybrid strains mature faster and avoid frost damage. Husking corn is a standard hog feed and is now being fed to dairy cattle as well, because of its protein value. Ensilage corn forms one of the best roughages for dairy cattle, being particularly useful for feeding during the summer months when pasture is scarce.

Pasture Two major types of pasture occur in the township, long-term pasture and rotational or short-term pasture. The long-term type is common on the more steeply sloping areas. Although sometimes called natural or permanent pasture, it is often sown with grass and legumes and left for five years or until the cover becomes poor. Improved pasture is sown with similar mixtures but is usually rotated with another crop within two years. In both beef and milk

production, the quality of pasture is extremely important and usually gives returns proportionate to the labour and capital put into it.

Canning Crops Peas are an important canning crop sown in the spring, and are ready for harvest by June. These are grown on the heavier, wetter soils in the township, most of the production occurring east of the Grand River. Conditions are too dry, however, on the Galt moraine. Sweet corn is also grown for canning and for sale on the cob. The peas and canning corn are purchased by Canada Packers and York Cannery. Cob corn is either sold to markets in Brantford or crated and shipped to Toronto.

There are also specialized vegetable farms in the township. The largest has approximately 98 acres and grows cabbages, potatoes, asparagus and cauliflower, most of which are marketed in Kitchener and Brantford.

Fruit is grown as a cash crop, but like vegetable farming, it is on a small scale. The largest fruit farm is approximately 75 acres. Spy, Delicious, and MacIntosh apples are grown. Peaches are also grown, among which, the Red Haven and Jubilee varieties predominate. Yields are 40 to 45 bushels per acre. Most of the fruit is sold at the Kitchener-Waterloo market.

The D, f, b climate of South Dumfries Township is well suited to a general or mixed type of farming. The rainfall is evenly distributed and the total amount is sufficient for most crops. Drier conditions in the late summer and early fall facilitate the ripening of the wheat and grain crops. Climate becomes a more critical factor

with respect to the specialized forms of agriculture. Fruit farming is a risk since there is a danger of frost damage, particularly during the spring when the trees are in blossom. Vegetable farming is also affected by the climate. Vegetable crops are very sensitive to moisture deficiencies. The latter occur in the township during the months of July, August and September. Although the crops would not be damaged, the length of the growing season would be longer than if soil moisture were at or near field capacity. Since the periods of moisture deficiency are also periods of maximum thermal efficiency, * the addition of water by irrigation would shorten the length of the growing period, enabling the farmer to market the crop much earlier.

Livestock Dairy cattle are the most important livestock; they numbered 3,904 in 1951 or 52% of the total number of cattle. The major brands are Holsteins, Ayrshires, Dual Purpose Shorthorns, and some Jerseys and Guernseys. Holsteins, however, are by far the most numerous. Fluid milk production finds markets chiefly in Hamilton, Toronto, and Brantford. Most is shipped in bulk by truck. Small quantities are also supplied to the Paris dairies and to the Malcolm Co. in St. George.

Beef Cattle The raising of beef cattle is a recent introduction to the township. Most are feeder cattle (Illus. 23), which are bought during the fall from Western Canada or Manitoulin Island. These animals are fed roughage and grain, which are converted into beef during the winter months. In the spring, the cattle

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* See Appendix A-iii

are marketed through the Toronto stockyards, United Farmers Organization, and Canada Packers. The major types of beef cattle found in South Dumfries Township are Herefords and Shorthorns.

Poultry, Sheep, and Hog Production All are carried on as a part of mixed or general farming in the township. Poultry farming has changed considerably in intensity. With the advent of the electric light, and high protein feeds, egg production has increased. Most of the eggs are marketed through retail outlets in Paris and Galt, but some are sent to Toronto as well.

Hog raising has changed very little since the close of the ninteenth century and is still a major part of mixed farming. Hog products are marketed through the large meat packing firms in Toronto.

The number of sheep in the township has remained fairly constant with an equal demand for both meat and wool.

AGRICULTURAL LAND USE IN SOUTH DUMFRIES TOWNSHIP

(4)

Land Types and Present Agricultural Land Use

Introduction

The physical environment sets limitations within which agricultural land use must be contained. In the following discussion, land types will be treated as the physical frame work governing variations in land use.

Dumfries Land Type The undulating to rolling topography of this land type is the limiting factor to land use. Of the total area, 25% has been left forested, and 19% is in long-term pasture. Where the land is cultivated, control of erosion and fertility maintenance present problems. When the fertility is maintained by the use of commercial fertilizers and barnyard manures, the excellent drainage conditions produce good yields of grain. This crop is grown on 12% of the land type. The remaining 44% is dominated by fodder crops of hay and rotation pasture, especially the former. Many inter-knob areas are swamp land and are consequently useless for agriculture. Much of the land in the northernmost parts of the land type is farmed only part of the time, since many of the owners have taken jobs in Galt. One farm of 96 acres has been completely

abandoned, the owner choosing to work in Brantford. In this land type, mixed farming predominates, the emphasis being on beef cattle. The most suitable form of land use on the steeply sloping areas is long-term pasture, whereas hay and grain crops are grown on the more gently rolling areas.

Warren Land Type This land type lies to the south of the Dumfries unit. It is underlain by three soil types, two of which are well adapted to the growing of wheat and grain. These include the Dumfries loam and Fox sandy loam. Drainage conditions are excellent for the crops, which occupy 25% of the total area. The two soil series, however, have some steeply sloping areas which are left in long-term pasture. This form of land use comprises 12% of the land type. Hay crops occupy 10% of the land type and form the predominant crop on the Guelph loam soils. A more level topography distinguishes it from the Dumfries-Fox portion. This section of the Warren land type is the most diversified in the township, containing the largest fruit and vegetable farms. Dairying is also common, in conjunction with these other uses (Illus. 24), as the gently rolling land is well suited to improved pasture. Only 7% of the total area remains in woodland. Mixed farming with emphasis on fruit, vegetables, and wheat as cash crops is the dominant form of agriculture.

St. George Land Type Much of this area is steeply sloping due to stream dissection, and is unsuited to cultivation. The predominant land use is long-term pasture which forms 22% of the land type. Grain and wheat occupy only 2% of the area. The largest

Illus. 23. Feeder beef cattle are common in the Guelph and Dumfries land types. Herds are too large to be maintained the entire grazing period since large acreages of pasture would be required.

Illus. 24 Dairy farms often display excellent barns. This farm is located in the Warren land type near St. George.

acreages are claimed by the fodder crops, hay and corn. Woodland comprises only 3% of the land type. Fluid milk production dominates this area.

Grand River Land Type Much of this land type has soils which are too shallow and too low in fertility to produce crops. Wooded areas are extensive and cover 16% of the total area. These are found largely along the margins of the Grand and Nith rivers and in the Spottiswood and Turnbull Lake area. Where the soils are shallow, the predominant form of land use is long-term pasture, which is found on 13% of the land type. Where the soils are deeper, excellent crops of wheat are grown. Most of the land type, however, contains submarginal agricultural land and should be left in forest.

Paris Plains Land Type Underlain by Burford loam, this area is generally a mixed farming section. The smooth to gently sloping topography and the rapid internal drainage of the soil provide excellent conditions for the growth of cereal crops. The chief limiting factor is low fertility, since the soil lacks sufficient quantities of potash and organic matter. Ninety-five per cent of the area is cultivated, 22% is in wheat and grain, 11% is in corn, and 10% is in long-term pasture. Only 2% is wooded. Hay and rotation pasture claim the largest acreages. Mixed farming predominates in this land type although there is some dairy farming. Most of the farm income is derived from the sale of wheat and grain as cash crops.

Guelph Land Type — The soils of this land type are well adapted to the production of grain. This is grown as a feed crop and most is used domestically. Since the Guelph soil type is low in phosphate, organic matter, and potash, the application of fertilizers containing these elements is, therefore, necessary to maintain yields. Grain has the largest cash crop acreage in the land type, occupying 28% of the area. Of the remaining area, 5% is divided between hay, corn, and rotational pasture, 10% is long-term pasture, and 5% is forested. In the northern part of this land type, feeder beef cattle are numerous (Illus. 23). This is chiefly a mixed farming area with emphasis on beef cattle.

Harrisburg Land Type — The Harrisburg land type is underlain by Brantford loam. Drainage conditions are only fair as a result of a compact, silty, B horizon and the wet soil is well adapted to canning crops, particularly peas. The gently rolling topography is suited to cultivation and only 5% of the land type remains in forest, most of which is in the form of small farm woodlots. Some steep slopes occur along stream valleys and these are used for long-term pasture. Eight per cent of the land type is given to this use. Grain and corn are the predominant crops, occupying 20% and 15% of the land type, respectively. Most of the grain is used for livestock feed yet some is sold as a cash crop. The remaining 46% of the land type is given to hay and rotation pasture. General or mixed farming is the major form of agriculture in the Harrisburg land type yet peas and sweet corn are grown and sold as a cash crop.

The land use pattern and the type of agriculture vary within each of the land types, yet no absolute line of demarcation can

be drawn between them. The entire township might be best described as a hay-pasture-dairy-beef region.

CHAPTER III

NON-AGRICULTURAL LAND USE IN SOUTH DUMFRIES TOWNSHIP

(1)

Recreational Land Use

Introduction

Recreational land use claims less than 1% of the total area of South Dumfries Township. The combined area of the three major recreational sites does not exceed 140 acres. These include Pinehurst Lake Park, Braeside Pentacostal Camp, and the Paris Golf Club.

The topographic features of several sections of the township provide an excellent physical setting for recreational land use. These features have been recognized by the Grand Valley Conservation Authority which has designated 1,437 acres in the vicinity of Spottiswood and Pinehurst Lakes as conservation land. The aim is to preserve this area as a combined conservation authority, parkland, and forest.* At present, only the land surrounding Pinehurst Lake has been developed.

Pinehurst Lake Park

The park, which is located 4½ miles north of the town of Paris, covers approximately 144 acres. This area lies within the Dumfries land type and is characterized by rough, steeply sloping topography. The focal point of the park is Pinehurst Lake

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* Department of Planning and Development, Conservation Branch, The Grand Valley Conservation Report, 1954

(Illus. 25). Park facilities include a pavilion, a sports field, camping sites, picnic areas, a boat rental service and swimming. Centrally located with respect to the major population concentrations of the Middle Grand River, and situated adjacent to Highway 24-A, the park is easily accessible to persons living in Paris, Galt, Brantford, Guelph, Kitchener, and Waterloo.

Although as yet undeveloped, the Authority has proposed a second recreational area embracing 181 acres surrounding Spottiswood Lakes (Illus. 26). Both lakes have a combined area of 34 acres. The largest of these is filled in with sediment and would need to be deepened to improve its recreational potential. The smaller lake is deep, warm, and suitable, therefore, for swimming. The topography of this proposed site is similar to the Pinehurst area, and both will be joined by footpaths. The remaining area, comprising approximately 1,044 acres, will be developed and maintained primarily as an Authority forest until the demand for recreational space increases.

The development of parkland will remove very little first class land from agricultural production. At present, only 83 acres or 7% of the park area consists of land which is regularly cultivated. Pasture land and woodland are the predominant types of land use occupying approximately 82% of the total park area. Some good pasture land will be taken, yet much of the area is unsuited to agriculture, having excessively steep slopes and bouldery soils.

Braeside Pentacostal Camp

Operated by the Pentacostal Church, this camp is situated

Illus. 25 Pinehurst Lake Park. The kettle lake and rolling morainic topography provide an excellent physical setting for recreational land use.

Illus. 26 Spottiswood Lakes. These form the largest of the kettle lakes in the township, having a combined area of 34 acres. Surrounding the lake, 181 acres have been proposed as parkland by the Grand Valley Conservation Authority.

on 14 acres of land on the East River Road, two miles north of Paris. The organization owns an additional 75 acres of land which will be used for camp purposes should expansion be necessary. This land is presently being farmed. The flat, well drained site overlooks the Grand River. Land is available within the camp site for playing fields but there are no swimming facilities. Sleeping accommodations are provided by about 80 cabins and 10 tents. There are also a large number of private cottages on the camp site. The camp season consists only of the month of July, during which time the total attendance is approximately 1,000 persons.

Paris Golf Club

Located $\frac{1}{4}$ mile east of Paris along the West River Road, the course covers about 80 acres. This nine hole course originated in 1924 and present facilities include an excellent club house. The naturally rolling site, which is a small unmodified portion of the Paris moraine, is well suited to this type of use.

At present, recreation land is relatively insignificant in terms of acreage in South Dumfries Township. Future increases in the population of surrounding urban centers, however, will be accompanied by an increase in demand for recreational space. A long range planning policy is, therefore, of utmost importance to preserve areas in the township which are ideally suited to recreational land use.

NON-AGRICULTURAL LAND USE IN SOUTH DUMFRIES TOWNSHIP

(2)

Land Use in The Small Urban Centers

Introduction

Although the landscape of South Dumfries Township is predominantly rural, approximately 106 acres are occupied by three small urban centers. In order of size and importance, these are the villages of St. George, Glenmorris, and Harrisburg.

HARRISBURG

Site and Location The village is situated on the west bank of Fairchild's Creek, in Lot 1, Concession 1. In 1855, the site was at the junction of the Great Western, the Hamilton-Brantford, and the Wellington-Grey and Bruce railway lines. The village lies 3 miles from St. George, 8 miles from Brantford, and 10 miles from Paris.

History of Settlement The growth of Harrisburg was associated with the building of the Great Western Railway, which was completed in the year 1853. A branch of this line ran from Harrisburg to Brantford. In 1855, a second branch, the Wellington-Grey and Bruce line was laid running north from Harrisburg. Since the village was situated at the junction of these three rail lines, a rapid growth was anticipated. In the same year, the village was surveyed into

approximately 130 building lots. In 1882, Harrisburg functioned as a rail center and was much busier than at present, containing four hotels and two stores. The population numbered about 150 persons, many of whom were employed by the railway.

By 1900, Brantford was agitating to have all main line traffic re-routed from Harrisburg to pass through the town. In 1904, main line traffic was not only re-routed but the branch was moved eastward from Harrisburg to Lynden. Main line freight, however, still passed through Harrisburg. When these lines were taken over by the Canadian National Railway, all traffic was routed through Brantford and then northwest to Paris. The Great Western line, which previously ran through Paris, was discontinued beyond St. George station. With these changes, Harrisburg had lost its locational advantages and its function as a rail center.

Present Land Use Harrisburg is now a partially defunct rural service center, consisting only of a number of homes, a general store, and a church. The land use of Harrisburg is shown on Map X. The present population is approximately 60 persons. The village has no industry and most of the residents are employed in Brantford, 8 miles to the southwest. The proprietor of the only commercial establishment, a general store, was interviewed to determine the extent of Harrisburg's trade. The storekeeper reported that trade came from as far as St. George, 3 miles to the northwest, and Copetown, 3½ miles to the southeast. Much of the trade comes from within the village itself.

Residential buildings in the village are largely of frame

construction and most are in need of repair (Illus. 27). Since the site is hampered by an inadequate water supply, it is unlikely that further residential expansion will take place. The site offers no attractions to commercial interests since it is distant from the major highways and the village itself offers only a small market. Harrisburg is also close enough to St. George to feel its competition.

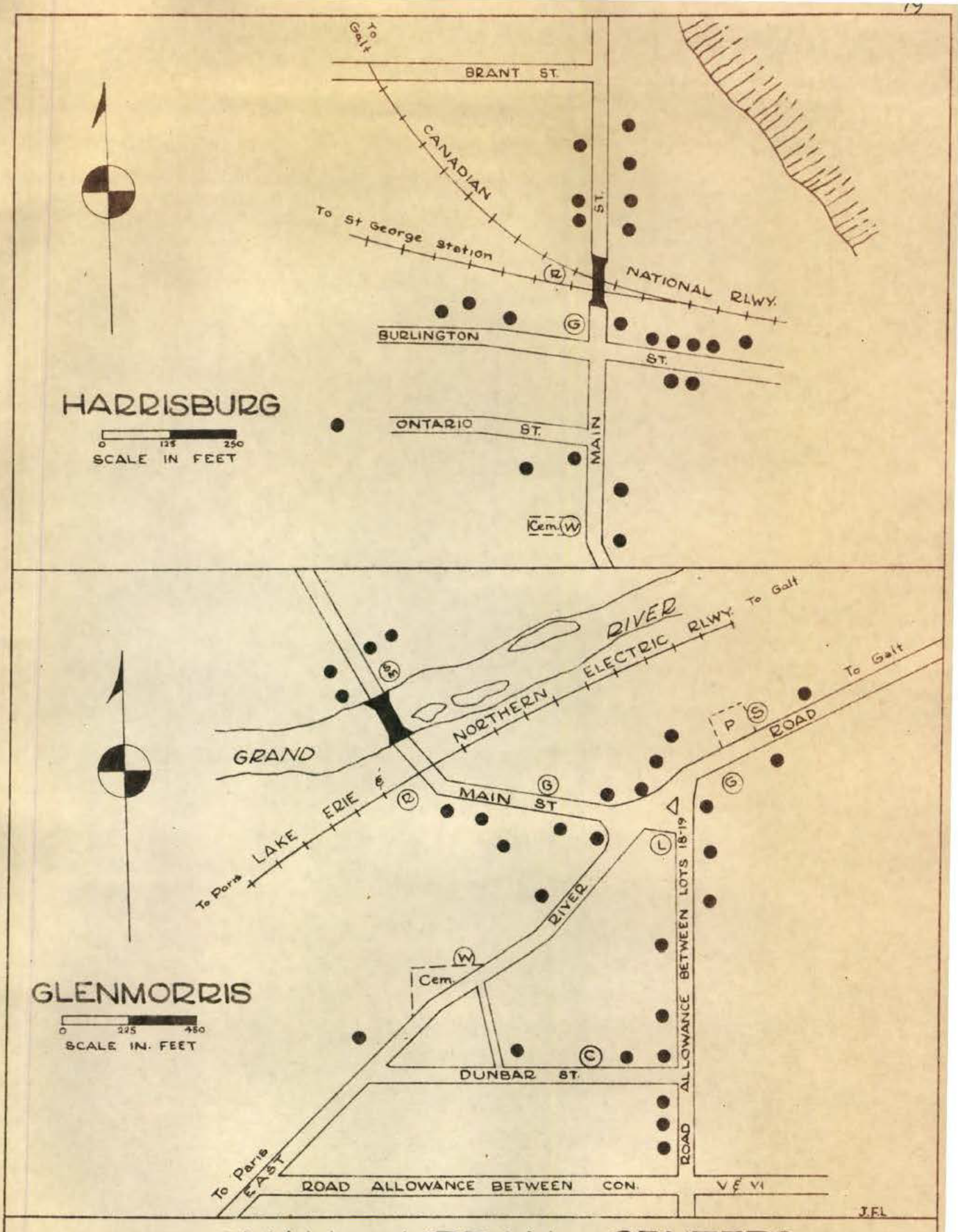
Harrisburg no longer enjoys the early advantages associated with railway trade. Its site is now a disadvantage and its present function may well cease as competition from St. George and particularly from Brantford is more keenly felt.

GLENMORRIS

Site and Location The site of Glenmorris is the east bank of the Grand River at the junction of the East River or Paris Road and the road between Concessions V and VI. It is located in the north central portion of the township, 6 miles from Paris and 12 miles from Brantford and Galt. The present village covers 9.1 acres and contains a population of approximately 80 persons.

History of Settlement The village was founded in 1848 by an early settler in South Dumfries Township. The choice of location was prompted by a bridge which had been built across the Grand River in 1831. No other crossing point was available between Paris and Galt. In 1851, Glenmorris served as a post-office village and bore the name of Middleton.

Early growth was associated with industry and commerce. Grist mills were in operation as early as 1831 and by 1857, Glenmorris



SMALL URBAN CENTERS

KEY

- (R) RAIL STATION
- (S) SCHOOL
- (SM) SAW MILL
- (W) CHURCH
- CEM. CEMETERY
- (L) LIBRARY
- RAILWAY
- RESIDENCE
- RAVINE
- (C) COMMUNITY BLDG.
- P PLAYGROUND
- (G) GENERAL STORE
- BRIDGE

MAP NO X

was a small industrial community. Industries in that and subsequent years have included a distillery, a cheese factory, a cabinet shop, saw mills, and recently, a varnish factory. Three hotels, a drug store, a dry goods store, and a number of blacksmith shops provided goods and services for the village and surrounding district. In the early 1900's, a branch of the Imperial Bank of Canada located in Glenmorris. The village was well served by both road and rail transportation. The East River Road was one of only three gravelled roads in the township at this date. Rail facilities were provided by the Grand Valley Electric railroad which was replaced by the Lake Erie and Northern Electric line in 1915. Glenmorris, with all these locational advantages, formed the business center for the northern portion of South Dumfries Township.

Present Land Use. The present land use of Glenmorris is shown on Map X. The pattern is in no way indicative of its early importance. It now functions solely as a small service village containing 2 general stores, a post office, a public school, a rail station, a church, a library, and one industry, a saw mill.

The commercial influence of Glenmorris does not extend beyond a radius of two to three miles. Trade is dwindling and one general store is considering closing. Since much of the trade comes from within the village, there is not enough to sustain two stores.

Residential land use displays higher quality buildings, in better repair than those found in Harrisburg. Most, however, are at least 30 years old and of frame construction (Illus. 28). The only first class home is found along the East River Road.

Illus. 27 Harrisburg was a prosperous railway town in the 1850's. With the change in routes of the major lines, the settlement experienced a considerable decline.

Illus. 28 Glenmorris was a small but thriving industrial and commercial village in the 1850's. Industry has, however, migrated to the larger urban centers and Glenmorris is now only a rural service village.

Glenmorris is no longer the business center for the northern portion of South Dumfries Township. The last large industry moved to Galt in 1946. No goods are produced in Glenmorris at present, and all supplies are shipped in by the Lake Erie and Northern Electric rail line.

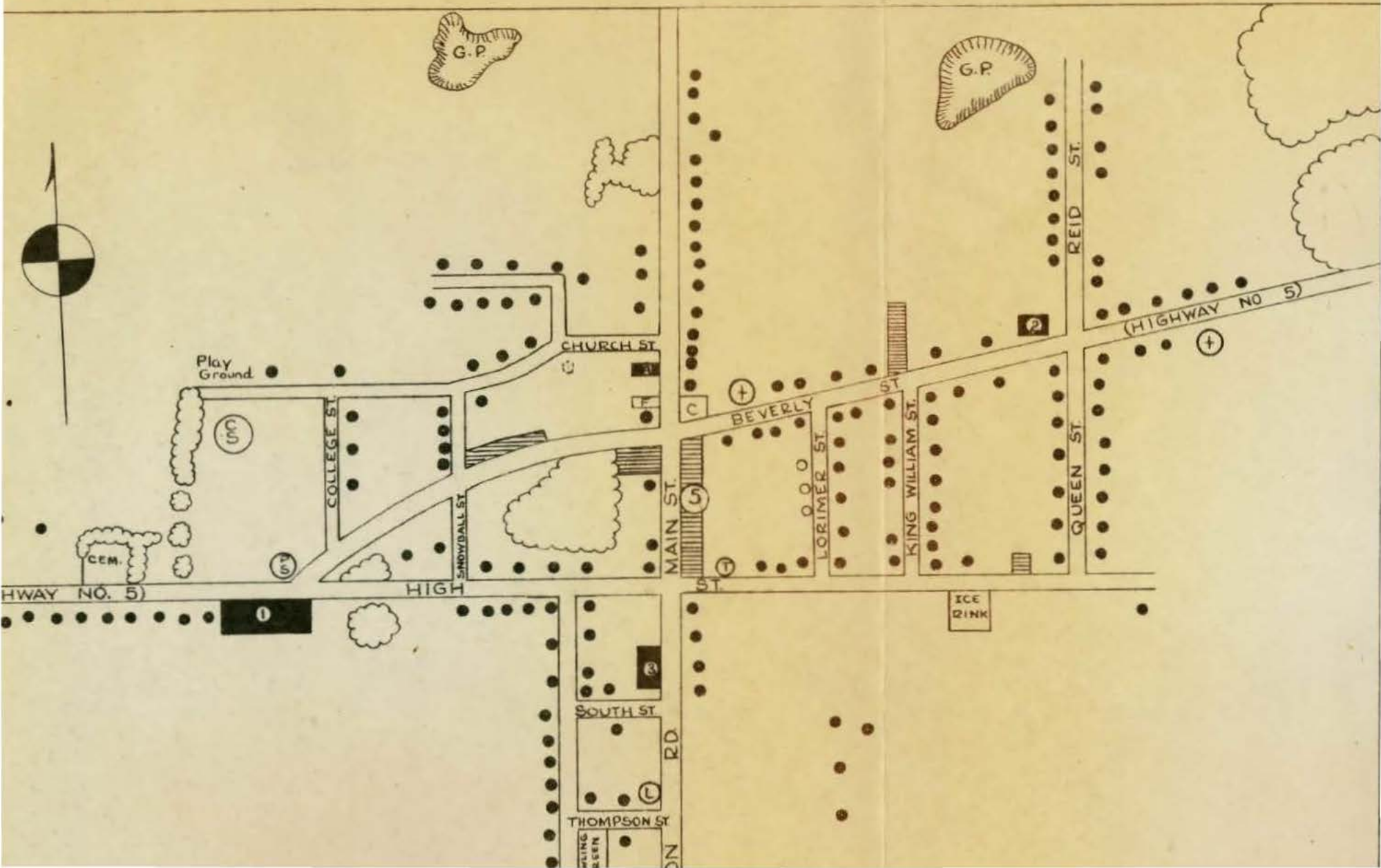
The decline of the village has been the result of several factors. With the increase in size of both Paris and Galt, industries chose to locate in these centers, where the labour supply and market were greater. The roads, which once contributed to the growth of the village, have now contributed to its decline. Paving of the East River Road has decreased the time-distance factor between Paris and Galt. These larger urban centers, which offer a greater range of stores and generally lower prices, have attracted many persons who previously patronized shops in Glenmorris. This competition is largely responsible for the decline in population and importance of Glenmorris.

ST. GEORGE

Site and Location The village of St. George is situated at the junction of Highway No. 5 and Station Road (Map XI). It is located in part of Concessions II and III, Lots 5, 6, 7, and 8. St. George is 9 miles from Brantford and 8¾ miles from Paris. Covering an area of approximately 78 acres, the village had a population numbering 646 in 1955.

History of Settlement The site of the present village was the earliest settled section of the township. The first house was

ST. GEORGE
LAND USE



built in 1814. The site was chosen because of the excellent farmland surrounding it, and an abundant supply of water.

The early economy was based on grain milling and the sawing of timber. The water supply attracted these mills as early as 1817. In 1827 the village took the name Bauslaugh Mills after a prominent mill owner. The locations of nearly all the mills were dictated by water courses. Most were situated below the hill at various locations on Station Road (Map XI) and water from above Highway No. 5 was channelled down to them. In the following years, industry played a leading role in the village's economy. Among the more important industries were a cheese factory, a wagon factory, a cabinet works, and a foundry manufacturing farm implements.

In 1853, the Great Western Railway was built through St. George. The railway shipped in wheat which was processed and then shipped out. Products transported from the cheese factory also went by rail. The present St. George station, located $\frac{3}{4}$ miles south of Highway No. 5, is the terminus of the old Great Western line which previously ran to Paris. Rail facilities are still used but road transportation is far more important to St. George.

Present Land Use St. George is the only urban center which has retained its early industrial function. It presently serves as the business center for the eastern part of South Dumfries Township. Commercial land use includes the following: two gas stations, a bank, a post office, 3 grocery stores, a paint shop, a confectionery store, a general store, and an electrical appliance shop. Several interviews were conducted to determine the extent of the influence

exerted by the central business district of St. George (Illus. 29). A bank manager estimated that the zone of influence extended 4 miles to the east as far as Troy, 5 miles to the north into North Dumfries Township, 3 miles to the southeast up to and including Harrisburg, and 2¼ miles south to the Governor's road. The western boundary of the trade area follows an irregular pattern because of the importance of Highway No. 5 and 24-5 as a direct and fast route to Brantford (Illus. 30). From the junction of Highway No.24-5, the city is only 4 miles distant. This distance can be travelled by car in approximately 3.3 minutes. Since Brantford has the greater choice of shops, its broader trade area competes with that of St. George. One shopkeeper in St. George indicated that the sale of goods had been seriously affected by competition from Brantford where shops could sell similar goods at lower prices. This competition, however, varies according to the nature of the product, food being the least affected.

Industry still holds a place in the economy of St. George. Industrial land uses include Malcolm Condensing Co., Aluminum Sash Co., the St. George Feed Mill and Sunnyhill Dairy. The Malcolm company is the largest and most important (Illus. 31). This company produces condensed and evaporated milk and some butter. Previously, it had located in Sheffield and had moved to St. George in 1907 to take advantage of the abundant water supply required for the condensing process. As a result of its location on Highway No. 5, most of the milk processed by the company is trucked, only small amounts being transported by rail. The milk is obtained from farms within a thirty-five mile radius of St. George. The product is marketed largely in Hamilton, London, and Windsor. Employing 32 persons, the company is the mainstay of St. George's economy. A recent

Illus. 29 The central business district of St. George. The trade area of St. George must compete with that of Brantford and Paris.

Illus.30 Highway No.5 and No.24-5 channels traffic into Brantford from the township. This has had an adverse affect on commerce in St. George.

Illus. 31 The Malcolm condensing plant forms the mainstay of St. George's economy. Located along Highway No. 5, transportation of raw materials and finished product is chiefly by truck.

industry, Aluminum Sash Co., employs 14 persons, most of whom are from St. George.

The St. George Seed and Feed Mill is a remnant of the early grist mill economy. Built in 1889, the mill produces flour and feed. Its raw materials, however, are not locally produced but come from the Canadian West. The mill employs only 6 persons.

Residential land use in St. George displays the highest quality buildings of the small urban centers. Although most are from 40 to 70 years old, they are in good repair. A number of first class new homes have been built in the village. The only concentrated area of these is found north of Church Street (Map XI).

The growth of St. George will depend upon the intensity of competition from the large urban centers. St. George can resist this competition only by strengthening its own economy through the addition of further light industries. Its present location on Highway No. 5, providing excellent transportation, is well suited to expansion of this nature. Growth of the village, however, will have topographic limitations, since in every direction except to the northwest the land is steeply sloping and unsuited to building.

NON-AGRICULTURAL LAND USE IN SOUTH DUMFRIES TOWNSHIP

(3)

The Evolution of Land Use in The Town of Paris

Introduction

An urban agglomeration such as Paris performs various functions for the groups living in it. Each of these functions involves a different form of land use. This study will propose to describe and account for the nature and distribution of urban land use in Paris.

Paris, the second city in size and importance in Brant County, is situated at the confluence of the Nith and Grand Rivers. These rivers have divided the town into three distinct physical units. West of the Grand and north and south of the Nith River are the Lower and Upper towns respectively. East of the Grand is a portion of Paris known as the Flats. The Lower Town, the Flats, and the Upper Town north of Dundas Street lie within South Dumfries Township. The remainder is within Brantford Township. In 1957, the town annexed 800 acres of land, yet the town proper has an areal extent of only 492 acres.

Paris is traversed by three highways, Number 24-A, Number 2, and Number 5. Rail transportation is provided by the Canadian National and Canadian Pacific Railways. The town lies 21 miles east of Woodstock, 6 miles north of Brantford, 18 miles south of

Galt, and 24 miles west of Hamilton.

The seeds of Paris were sown as early as 1794. This date marks the completion of a segment of Dundas Street or the Governor's road, which ran from Coote's Paradise at Dundas to the Grand River. At this time, the townsite was a small part of property owned by the Six Nations Indians. In 1798, the land around the forks of the Grand River was sold as part of a larger block which was purchased by speculators and held until its sale would realize the maximum profits.

In 1816, the land was bought by William Dickson, who in 1821 sold the property consisting of lots 29, 30, 31 and 32 in South Dumfries Township, to William Holmes. The Upper Town was held separately by Robert Rosbrugh. Holmes was aware of gypsum deposits along the banks of the Nith River and that the commodity was in great demand at this time for use as land fertilizer. A plaster mill which Holmes built was powered by water channelled through a small raceway extending from the Nith to the Grand River. By 1829, however, there had been no further growth at the forks of the Grand. In this year, the mill and plaster rights were purchased by an American named Hiram Capron. It was largely through this man's energies that the present town developed. In 1831, the site was surveyed into lots and a saw and a flour mill were built. By 1833, the settlement began to grow rapidly and a small business section developed along Dumfries and Dundas Streets in the Upper Town. Most of the goods and services were associated with agriculture and agricultural produce. Shops

included a tannery, a wagon shop, a blacksmith shop, a distillery, and a woollen mill. During this period, the site had been known as the Forks of the Grand. After much deliberation, this was changed to Paris because of the abundant supply of plaster occurring along the banks of the Nith and Grand Rivers.

Because of its location along two rivers, water power played an important part in the development of Paris. By 1838, the Nith River was already supplying power to seven industries.

In its early years, Paris had been an isolated community depending largely on its own hinterland for trade. From 1848 onwards, an effort was made to improve roads. The Paris to Brantford and Paris to Ayr roads were metalled and then established as toll roads.

By 1850, the settlement was organized as a village, having a population of approximately 1000 persons. In the following year, the population had risen to 1890 and Paris was incorporated as a town.

In 1853, industrial growth was encouraged by the construction of a dam and race. The race was dug along the west side of Willow Street in the Flats, and marked the first attempt to harness the waters of the Grand River. The race produced 800 h.p., which soon attracted industries in the form of a foundry, a flour mill,and a plaster mill. Concentration of industry along the race also encouraged the establishment of shops and the building of homes in the Lower Town. Upper Town residents soon experienced a decline in business. In an attempt to regain their former position, they built a race along the Grand River in the Upper Town. This race, however, was never used.

In 1854, a further stimulus to growth was provided by the

railways. In this year, both the Great Western Railway and the Buffalo-Goderich line were opened. The two met at the Paris Junction and the Town of Paris became an important rail shipping center. The main commodities were flour, wheat, and gypsum.

In the following years, a number of new industries were attracted by the availability of water power. In 1857, the Paris Foundry and Agricultural Works were established, employing 30 to 40 persons. In 1864, a tobacco factory, employing 35, located in Paris. In 1867, the largest industry in Paris, Penman's Ltd., was established along the east bank of the Nith River. The company used water power supplied by the Nith and employed 125 persons (Illus. 32). Between 1851 and 1871, the population had increased 39%, and by the turn of the century it had almost doubled in size (Fig. XII).

In 1902, the Great Western Railway was re-routed through Brantford, and along the Buffalo-Goderich line to Paris. In the same year, the Grand Valley Electric line was built from Paris to Galt, and by 1913, the Lake Erie and Northern-Electric Railway had been built from Brantford to Paris. This line then purchased the Paris to Galt section of the Grand Valley line, providing rail connection between Galt and Brantford.

By this date, Paris had emerged as an industrial and commercial town possessing excellent advantages for industry in the form of water power and transportation. In 1915, however, Paris joined the hydro-electric system, which destroyed its locational advantages with respect to water power. Industries were thus no longer restricted to riverine sites.

POPULATION TRENDS

PARIS ONTARIO

1851 – 1956

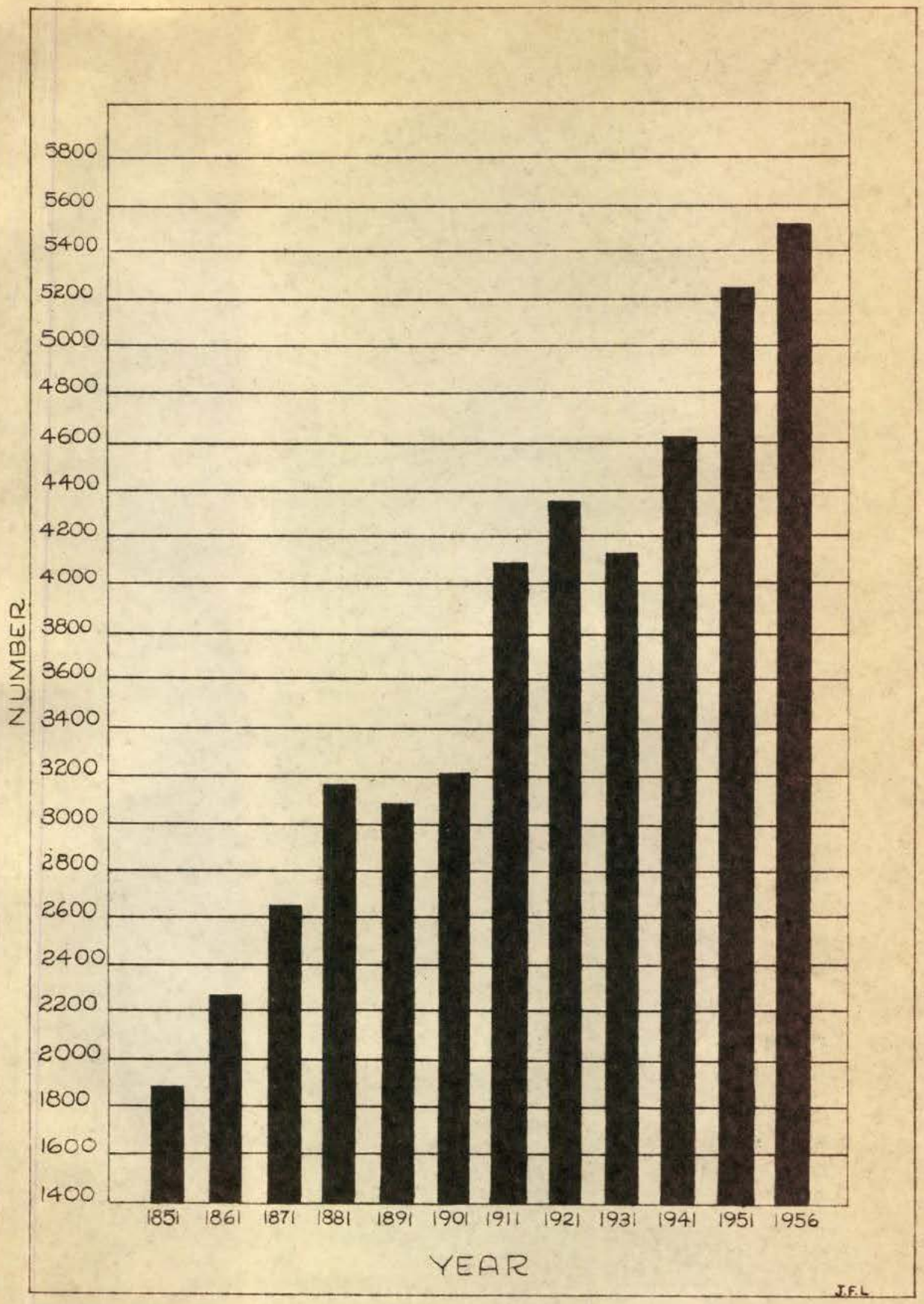


FIGURE XIII

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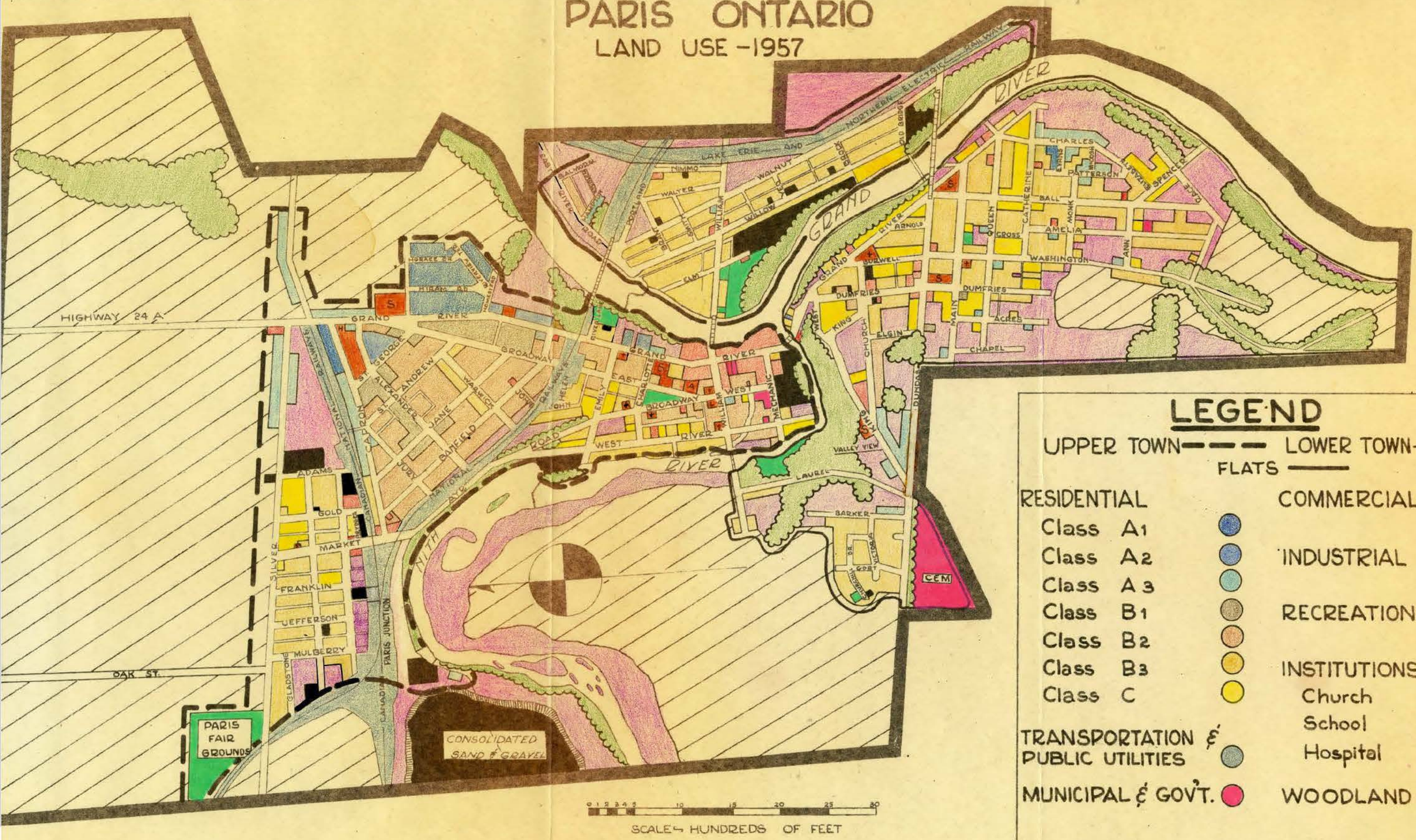
PARIS ONTARIO
LAND USE - 1957



LEGEND

UPPER TOWN - - - LOWER TOWN ——
FLATS ——

RESIDENTIAL		COMMERCIAL	
Class A1			
Class A2		INDUSTRIAL	
Class A3			
Class B1		RECREATIONAL	
Class B2			
Class B3		INSTITUTIONS	
Class C		Church	+
TRANSPORTATION & PUBLIC UTILITIES		School	S
		Hospital	H
MUNICIPAL & GOV'T.		WOODLAND	
AGRICULTURAL LAND		IDLE LAND	

J.F.L.

MAP NO XII

NON-AGRICULTURAL LAND USE IN SOUTH DUMFRIES TOWNSHIP

(4)

Present Land Use in The Town of Paris

Introduction

Since 1915, the nature of land use in Paris has changed very little. The town has, however, experienced growth largely northward. Expansion in this direction has resulted from the replacement of water power by rail transportation as a factor affecting industrial location. The most recently located large industries in Paris are situated along the Canadian National Railway line in the northern portion of the Lower Town. The present land use of Paris is represented cartographically on Map XIII.

Land Use in the Upper Town

The Upper Town, occupying approximately 118 acres, lies to the south of the Nith River (Illus. 33). It is second in size to the Lower Town. The topography of the site is a product of stream erosion and deposition which have flattened and terraced the landscape. These terraces form a series of steps which decrease in elevation toward the river. Lying to the west of the Lower Town proper is a belt of moraine which is a southern extension of the Paris moraine. This has been included in the Upper Town section.

The Upper Town displays a simple pattern of land use, since it is largely residential. This predominance of residential land use is

Illus. 32 Water power was the main force attracting industry before 1915. This dam was built to power Penman's No. 1 plant on the Nith River.

Illus. 33 The Upper Town as seen from the morainic ridge to the west. This section of the town was once the business center. With the growth of industry in the Lower Town, the Upper Town declined in importance.

related to several factors. Prior to 1854, the Lower Town had been the focal point of trade in Paris. This was due to its proximity to the Governor's Road, along which, manufactured goods flowed into and out of Paris. As a result of this traffic, a number of shops were established along Dundas and Dumfries Streets.

With the building of the Willow Street race, industry developed on the Flats. To capture the trade of industrial employees, businesses began to locate in the Lower Town. With the arrival of the railways, population moved toward the Junction, thus further shifting the economic center of gravity to the north, away from the Upper Town.

At present, no commercial zone can be said to exist in the Upper Town. There are fewer than five shops along Dundas and Dumfries Streets. These streets are now unsuitable for commerce, since they form the urban segment of Highway Number 2, a route which is heavily travelled by through traffic going to Woodstock and London. The road that once funnelled traffic into the Upper Town now serves to channel it through. Commercial establishments throughout the section are limited to several small grocery stores and most of the shopping is done in the Lower Town.

Industry never gained a strong foothold in the Upper Town since it did not have access to the water of the Nith River. This river was smaller and more easily controlled than the Grand and provided the source of power for the earliest industries. When the Lower Town later succeeded in harnessing the Grand River, the former took a lead in industry which was never relinquished.

All industries found in the Upper Town are of the light

variety, specializing in small goods. Most are located along Dumfries Street and are relatively insignificant to the town's economy.

The quality of residential land use in the Upper Town is reflected in the type of housing.* Although there are some first class houses, the majority fall into the B 3 and C categories. Frame, stucco, and insul-brick construction predominate in these types. The houses and lots are small and landscaping is uncommon. Class A 1 homes occur in the Upper Town but are in a minority. They are located along Charles and Evans Streets.

Many vacant lots still exist in this section of the town; the most southerly section, indeed, has not been retired from agricultural use (Illus. 34). Along the edge of the morainic ridge to the west, the land is steeply sloping and unsuited to building or to agriculture.

On the morainic ridge, residential buildings are of more recent construction. Most of the homes, however, are of the wartime type and because of their size, have been placed in the B 3 category. A number of A 2 homes have developed along King Street. This upper part of the Upper Town has the advantage of being at an elevation which affords an excellent view of the surrounding area.

There are very few other types of land use in the Upper Town although there is a large public cemetery. This is located on the high, well drained morainic ridge.

Land Use on the Flats

Lying to the east of the Grand, the Flats occupies 42.8 acres. The development of this section was associated with the digging

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* Appendix E-i

of the Willow Street race which soon attracted a number of industries. A residential survey followed shortly, producing an unusual residential-industrial combination. Commercial establishments are limited to four small stores, since most shopping is done in the Lower Town. Access to the latter is provided by the William Street bridge over the Grand River.

The major industry in Paris, Penman's Ltd., presently located on the Willow Street race, originated in Paris in 1867. The race still supplies one-third of the power for the plant (Illus. 35). The chief products are yarn and underwear. Raw materials are obtained from the Southern United States and the wool producing countries of the world. Approximately 60% of the finished product is shipped by truck, whereas 40% is transported by the three rail lines. At present, the company employs approximately 800 persons, half being females. Since power and raw materials are no longer critical to the location of textile industries, Paris holds no particular advantage for the company.

Although not within the town boundary, Consolidated Sand and Gravel, located to the east of the Flats, exerts considerable influence on the economy of Paris. The company exploits the spillway gravels on both sides of the town. The west pit is located west of the Paris Junction (Illus. 36). The east plant was formed in 1928, whereas the west plant began operations in 1951. The latter pit is the largest producer of gravel in Ontario. The combined production of both pits has been 1½ million tons per year. The gravel is processed,

Illus. 34 Much of the southern section of the Upper Town is still used agriculturally. The moraine ridge to the west, however, is too rough even for pasture or for use as building sites.

Illus.35 The Willow street race provided the stimulus for growth of industry on the Flats. The race still provides 1/3 of the power for Penman's No. 2 plant.

and then shipped by the C.N.R. and C.P.R. rail lines. It is used chiefly for road construction and the building of houses. The company employs 34 persons from Paris at the east pit, and 26 at the west pit, yet this work is seasonal. Reserves are estimated to last only 20 to 25 years, and the company is now searching for more gravel deposits throughout the township.

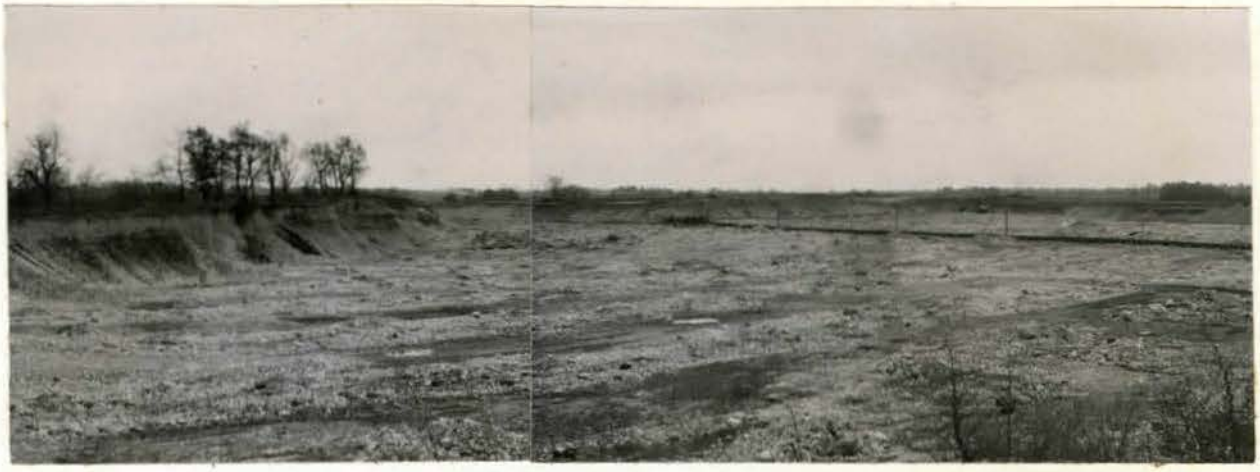
A third industry, the Walker Press, is located on the Flats, at the corner of Yeo and Willow Streets. The industry began operations in 1909, and specializes in photo engraving, designing, price tickets, etc. The company employs approximately 54 persons from Paris. The finished product is shipped by the C.N.R. to Toronto and Brantford.

Residential buildings on the Flats are similar in quality to those found in the Upper Town (Illus. 37). Most of the buildings are of brick construction, are small, and show definite signs of deterioration. Lots are very small and landscaping is rare. Along the East River Road, there are four A 3 homes.

Recreational land use occurs on the Flats. A playing field is located west of the Penman plant, and an arena has been built on William Street. No churches or schools are found on the Flats.

Land Use in the Lower Town

The Lower Town is the largest and most important section of Paris (Illus. 38). Having an areal extent of approximately 392 acres, growth was associated with commerce and industry. Bounded by the Nith and the Grand River, it offered a number of locations to industries requiring water power. In addition, the land around the junction of these two rivers has been flattened to provide an excellent



Illus. 36 Consolidated Sand and Gravel pit. This pit is located on the west side of the town and covers 102 acres. The gravels were deposited by glacial meltwaters flowing through the Grand River spillway.

Illus. 37 Class B 3 homes predominate throughout the Flats and the Upper Town. On the Flats, buildings in this category are small and of brick or cement block construction, whereas, in the Upper Town, they are larger and have a stucco or insul-brick exterior.

site for a commercial district, and to the north, the rising ground was well suited to residential growth.

Commerce and industry share the Lower Town's economy. The present central business district of Paris is found in the Lower Town and stretches along Grand River Street from the junction of the Nith and Grand River to just beyond William Street (Illus. 39). An extension of the district has grown west along Mechanic and William Street. The function of commercial land use is to trade not only with the local population but also, to trade with the population of the hinterland. The distance from which persons are attracted to Paris is an indication of the strength of its commercial influence. To ascertain this zone of influence, i.e., the trade area, a number of businesses in the town were interviewed. The Paris newspaper reported that trade extended northward to Ayr, a distance of 8 miles; westward to Princeton in Blenheim Township, a distance of 10 miles; eastward to St. George, a distance of 7 miles; and southward for 3 miles to the vicinity of Brantford. Two furniture store proprietors stated that the northern and southern limits of their trade area were Galt and Brantford respectively. One, however, placed Troy as the eastern extent, whereas Burford and Drumbo marked the western limit. The trade area for banking was similar to those already mentioned.

A functional breakdown of the central business district is shown in Appendix E v. Paris has a wide range of retail specialty shops, but has limited wholesale facilities. Most of the goods supplied by the latter come from Brantford and Galt. Paris lies within the larger trade area of Brantford and many residents of the town do

Illus.38 Looking north from upper Dundas Street towards the Lower Town. This is the largest and most highly developed section of Paris.

Illus.39 The central business district of Paris as seen looking south along Grand River Street. The trade area of Paris extends farthest to the north, east, and west. The southern limit is less extensive because of proximity to Brantford which has a wider range of wholesale and retail facilities than Paris.

their shopping there, since it offers cheaper prices in many cases and a greater range of shops. Paris holds an advantage over Brantford, however, since it is less congested and offers better parking facilities.

The trade area of Paris is affected by the trade area of the surrounding larger urban centers. Beyond Ayr, the influence of Galt becomes strong, whereas, west of Princeton, the trade area of Paris comes into contact with that of Woodstock. East of St. George, the distance to Paris is greater than to Brantford, and the latter receives the trade. The southern extent of the trade area is only three miles, illustrating the strong influence which Brantford exerts over Paris.

Besides being the commercial hub of Paris, the Lower Town also contains the greatest number of industries. Of prime importance are the Paris Wincey Mills, Penman's Ltd. (No. 1 plant), Sanderson-Harold Co., and the J.D.Adams Co. The Wincey Mills began operations in 1889 and located on the Nith River along Mechanic Street (Illus. 40). Employing 72 persons, all of whom are from Paris, the plant produces flannel fabric. The Penman's plant, bordering the Nith River on the West River Road, specializes in the manufacture of hosiery. This plant still uses the water power supplied by the Nith River. The remaining two plants are of more recent origin and have located away from the source of water power and along the rail lines in the northern portion of the Lower Town. The Sanderson Harold plant was established in 1902. The company produces screen doors, window screens, and fans, which are shipped to all parts of

Canada. Raw materials include wood, which comes from the west coast, and screen, which is obtained from Hamilton. The total number of employees is 68. The J.D. Adams Co. (Illus. 41) located in Paris in 1929. Its only product is road graders. The major raw material is steel, which is shipped by rail from the United States and Canada. At present, the company employs approximately 80 persons.

Residential land use in the Lower Town is more diversified with respect to the quality of building than the other two sections. The quality ranges from class C, which are found along the West River Road (Illus. 42), and north of the C.N.R. tracks, to Class A 1 found in the recent Capron survey (Illus. 43), along Grand River Street. A number of large, old homes also occur along Grand River Street north of Banfield Street. This type is found only in the Lower Town. In the early days of Paris, many of the wealthy industrial owners chose this section of the town to build large, brick homes, which are still in good condition, despite their age. These have been classified as A 2 (Illus. 44). Between Banfield Street and the Canadian National Railway line, houses are fairly uniform in quality. Most are substantial buildings, being of brick or stone construction, yet show some signs of deterioration due to age. These have been placed in the B 2 category. The northern portion of the Lower Town contains many low quality homes, most of which are within the B 3 and C categories. Buildings are either of frame construction or have a stucco or insul-brick exterior. Many are in need of repair. The poorer quality of homes in this area is largely a result of proximity to an industrial area, which has lowered the value of residential land and buildings.

Illus. 40 The Paris Wincey Mills was attracted to Paris by the availability of water power. This is no longer a critical factor in the location of textile industries.

Illus. 41 The J.D.Adams Co. located in Paris after the arrival of electric power. It chose to locate away from the rivers and adjacent to the C.N.R.line.

Illus. 42 A class C home along the West River Road, in the Lower Town. This type occurs more frequently north of the Canadian National Railway line.

Illus. 43 The Lower Town has the largest number of class A homes. The Capron survey shown above consists entirely of A 1 homes.

Illus. 40 The Paris Wincey Mills was attracted to Paris by the availability of water power. This is no longer a critical factor in the location of textile industries.

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Illus. 42 A class C home along the West River Road, in the Lower Town. This type occurs more frequently north of the Canadian National Railway line.

Illus. 43 The Lower Town has the largest number of class A homes. The Capron survey shown above consists entirely of A 1 homes.

Illus. 44 A 2 homes are found only in the Lower Town. Most are found along Grand River Street, south of Homestead Road.

Illus. 45 An A 3 home on the Flats. Although this type is found in all three sections, they are most common in the Lower Town.

Other types of land use have been given greater priority in the Lower Town than elsewhere. Five churches, a public school, a high school, and a hospital are located here.

Since 1915, Paris has experienced a small but steady growth in population but there were few additions to industries after that date. Consequently, many persons living in Paris find it necessary to leave the town to find employment elsewhere. There is also a tendency to spend wages in other centers, and Paris has become more of a dormitory town, as increasing numbers of persons work and shop in Brantford.

SUMMARY AND SYNTHESIS

All man's activities involve the use of land in some manner. This study has attempted to explain man's relationship with his natural environment by examining and accounting for the past and present patterns of land use in South Dumfries Township.

Since the physical environment sets limitations to the intensity of land use, Chapter I discussed the physical setting of the township. The most important limitations to land use were found to be the topography and soils. The nature of these two factors was the major criteria in determining the boundary of land types in the township. The affects of climate were found to be less significant. Although the Thornthwaite* classification of climate revealed a moisture deficiency in the township, this was not large enough to seriously affect the prevailing types of agricultural land use. Rock formations and vegetation were found to have affected land use only indirectly as a result of their role in determining the nature of soils.

Chapter II concerned a study of agricultural land use in the township from the date of settlement to the present. In the early period, a mixed farming economy predominated but as urban centers grew, an emphasis was placed on dairy farming and the raising of beef cattle. Specialized types of agriculture such as fruit and vegetable farming were found to have increased in importance. Acreage

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* C. W. Thornthwaite, op. cit., p. 26

given to this more intensive use of the land might well increase as expanding urban markets create an increase in demand for fresh fruit and vegetables.

The intensity of land use was found to vary within each of the land types, mainly as a result of differences in topography and soils. In many sections of the St. George and Dumfries land types, cultivation was excluded by excessively steep slopes which necessitated a continuous sod cover to prevent erosion. Long-term pasture was the predominant type of agricultural land use. In the Grand River land type, stony soils rather than steeply sloping topography prohibited cultivation. In the remaining land types, there were no physical limitations which could not be avoided by following sound land use practices such as crop rotation and the application of fertilizers. Variations in the nature of land use in these sections were a reflection of different human responses to the economic environment.

Chapter III was concerned with non-agricultural land use in South Dumfries Township and included recreational land use and urban land use both in the small urban centers and the town of Paris.

Recreational land use was chiefly associated with the areas of rough, steeply sloping topography and kettle lakes. Swimming facilities are generally a prerequisite in choosing a recreational site and further development should occur around the small lakes, particularly Spottiswood, Turnbull and Blue Lakes. Locations along the

Grand River would be ideally suited to cottage development if it were not for the polluted condition of the water.

An examination of land use in the three small urban centers revealed a decline in importance of two of these. Glenmorris, once an industrial and commercial village, has now lost both of these functions to the larger urban centers which offer a greater labour supply and market. Harrisburg, once a rail center, declined when the Great Western rail line was re-routed. Only St. George retained its early importance. This was possible because of its location on a major highway which served to attract industry. Competition from Brantford, however, is becoming more keenly felt as new, improved highways bring that city even closer than its distance in miles suggests. Glenmorris and St. George offer suitable locations for light industry since they are easily accessible and close to the large urban markets. Transportation facilities are only fair in Glenmorris, whereas St. George has the advantage of location on Highway Number 5, a major truck route.

The early growth of Paris was found to be closely allied to water power. With the arrival of hydro-electric power, industries were able to divorce themselves from riverine locations. Since that date, very few large industries were attracted to Paris. The town now has little to offer industry other than location on an already crowded rail line.

Industries in Paris are suited to the use of female labour, a factor which accentuates the problem of male employment in a town where industries are scarce and employment may be seasonal. Many persons in Paris must, and do seek work outside the town, usually

in Brantford.

The site of Paris at the forks of the Grand and Nith rivers is no longer an advantageous one, for it presents physical barriers to expansion. A moraine ridge and the Nith River form natural barriers to the south and west respectively, whereas the steep east bank of the Grand presents a barrier to expansion in this direction. Only to the north can the town expand as a unit.

Paris has been described as a town surrounded by gravel pits. At present, two large pits have been dug to the east and west of the town, and a second company is considering commencing operations immediately north of Paris. These extractive industries permanently disfigure the landscape, provide very little employment per acre, and offer only seasonal work. A more intensive form of industrial land use is required by Paris. Since sites are limited, wise planning will be necessary to attract industry and to insure that the various types of land uses function efficiently with a minimum amount of friction between them.

Agriculture is the predominant type of land use in South Dumfries Township. The slow development of Paris and its location on the periphery of the township suggest that the latter will be little affected by urban encroachment. If land use practises are adopted which are compatible with the physical environment, the township should, at least, maintain its present level of agricultural production and remain essentially rural.

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APPENDIX A

PRECIPITATION AND TEMPERATURE RECORDS

BRANTFORD, ONTARIO*

	Precipitation	Temperature
Winter		
December	2.24	25
January	2.61	21
February	2.12	19
Total	6.97	21
Spring		
March	2.16	30
April	2.54	43
May	2.90	55
Total	7.60	43
Summer		
June	2.65	64
July	3.05	69
August	2.93	67
Total	8.63	65
Fall		
September	2.63	60
October	3.47	48
November	2.40	36
Total	8.50	48
Average Annual Total	30.70	45

* Figures are monthly means recorded over a period of 51 years. Precipitation figures are in inches and temperature figures are in degrees Fahrenheit.

APPENDIX A (cont.)

ii. KOPPEN CLIMATIC CLASSIFICATION

Symbols

(a) D- The coldest month is below 26.6° F. and the warmest is above 50° F.
(b) f- feucht or moist. Precipitation is well distributed throughout the year.
(c) b- Average temperature for the warmest month is below 71.6°F., but more than four months are above 50° F.

iii. THORNTHWAITE TABLES FOR BRANTFORD

MOISTURE SURPLUS AND DEFICIENCY UNITS *

	D.	J.	F.	M.	A.	M.	J.	J.	A.	S.	O.	N.
P. E.	0.0	0.0	0.0	0.0	2.6	7.5	11.2	13.2	11.5	7.9	3.8	.7
PREC.	5.6	6.5	5.3	5.4	6.3	7.2	6.6	7.6	7.3	6.5	8.6	6.0
STORAGE	10.0	10.0	10.0	10.0	10.0	9.7	5.1	0.0	0.0	0.0	4.8	10.0
AC.EVAPO.	0.0	0.0	0.0	0.0	2.6	7.5	11.2	12.7	7.3	6.5	3.8	.7
SURPLUS	5.6	6.5	5.3	5.4	3.9	0.0	0.0	0.0	0.0	0.0	0.0	0.1
DEFICIT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	4.2	1.4	0.0	0.0

(a) Annual Potential Evapotranspiration /Thermal Efficiency/Water Need= 58.4 cms. or 22.9"
The annual potential evapotranspiration or PE expresses the amount of moisture which could be lost to the atmosphere during any one year by evaporation, either directly from the soil, or through the process of transpiration by plants. A formula has been computed for calculating the PE of any area if its latitude is known and if temperature and precipitation records are available.

(b) Moisture Index= 39

The moisture index is a comparison of the PE with precipitation in order to determine whether a climate is basically moist or dry. An index of 39 places the township within the B1 Humid climatic category.

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* centimetres

APPENDIX A (cont.)

iii. (cont.)

(c) Thermal Efficiency Index = 58.4 cms

PE is an index of thermal efficiency expressing growth in terms of water needed for growth. Having an index of 59.4 cms., the township has a mesothermal or medium heat climate which is designated by the letters B'1.

(d) The Aridity Index - Type r

This index is the relationship of water deficiency to water need. Calculation of the index places the township within the r category meaning little or no water deficiency.

(e) Summer Concentration of Potential Evapotranspiration = 68%

June/July/August - 35.9 cms. or 14.1"
Type - b'1

APPENDIX B

SOIL TYPES AND ACREAGES

i.

Name	Acreage	Percentage of Total Township Area
Dumfries Loam	13,124	29.9
Brantford Loam	10,675	22.6
Burford Loam	9,907	20.9
London Loam	2,160	4.3
Guelph Loam	6,745	14.2
Fox Sandy Loam	1,491	3.1

SOIL PROFILES

ii.

DUMFRIES LOAM

	Horizon	Depth	Description
(a)	A o		Thin layer of partially decomposed leaves and woody material
	A 1	0-4 inches	Dark brown loam; few large stones
	A 21	4-9 inches	Yellowish brown loam; moderately stony
	A 22	9-11 inches	Pale brown sand loam; occasional stones
	B 2	11-18 inches	Yellowish brown loam; very stony
	C		Light yellow-brown sandy loam, very stony and bouldery

APPENDIX B (Cont.)

ii (cont.)

(b) BRANTFORD LOAM

Horizon	Depth	Description
A o		Thin layer of partially decomposed leaves chiefly deciduous.
A 1	0-6 inches	Brown loam, stone free
B 1	6-18 inches	Yellow to greyish silt; compact
C		Fine sand; single grain structure

(c) BURFORD LOAM

Horizon	Depth	Description
A o		Thin layer of partially decomposed leaf litter.
A 1	0-5 inches	Dark brown, gravelly loam.
A 21	5-14 inches	Yellowish brown gravelly loam
A 22	14-16 inches	Light, yellowish brown loam
B	16-27 inches	Brown clay loam
C		Very pale brown, well sorted gravelly and cobbly material, occasional layer of sand may be present.

(d) GUELPH LOAM

Horizon	Depth	Description
A o		Accumulated layer of partially decomposed litter from deciduous trees.
A 1	0-4 inches	Dark greyish brown loam; slightly stony.
A 21	4-12 inches	Pale brown loam, slightly stony
A 22	12-14 inches	Grey loam; stone free.
B	14-24 inches	Brown clay loam; few to frequent stones.
C		Light grey loam till; boulders vary from few to frequent.

APPENDIX B (cont.)

(e) FOX SANDY LOAM

Horizon	Depth	Description
A^{o}		Thin layer of partially decomposed litter from deciduous trees
A 1	0-5 inches	Very dark grey sandy loam; stone free
A 2	5-8 inches	Yellowish brown sand
B	8-20 inches	Dark brown sand; stone free
C		Light, yellowish brown sand, stone free.

APPENDIX C

LAND TYPES IN SOUTH DUMFRIES TOWNSHIP

i.

Name	Total Acreage	Percentage of Township Acreage
Dumfries	11,603	25
Guelph	5,497	11
Grand River	7,110	15
Paris	6,867	14
Warren	4,499	9
Harrisburg	7,014	15
St. George	5,318	11

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ii.

Name	Total Acreage	Percentage of Land Type Acreage
Dumfries		
Woodland	1,311	11
Long-Term Pasture	2,216	19
Grain	1,411	12
Swamp	100	08
Guelph		
Woodland	300	5
Long-Term Pasture	550	10
Grain	1,521	28
Grand River		
Woodland	1,155	16
Long-Term Pasture	835	13
Grand River (water surface)	230	03
Swamp	155	02

Cont.

APPENDIX C (cont.)

ii (cont.)

Name	Total Acreage	Percentage of Land Type Acreage
Paris Plains		
Woodland	104	7
Long-Term Pasture	667	10
Grain	1,552	22
Corn	750	11
Warren		
Woodland	313	7
Long-Term Pasture	582	12
Grain	1,132	25
Hay	489	10
Harrisburg		
Woodland	352	5
Long-Term Pasture	387	8
Grain	1,428	20
Corn	947	13
St. George		
Woodland	211	3
Long-Term Pasture	1,188	22
Grain	423	7

APPENDIX D

POPULATION STATISTICS

DOMINION CENSUS REPORTS 1851 - 1951

TOWNSHIP OF SOUTH DUMFRIES

i.

YEAR	POPULATION
1851	4,297
1861	3,916
1871	3,468
1881	3,490
1891	3,137
1901	2,922
1911	2,805
1921	2,821
1931	2,639
1941	2,619
1951	3,121
* 1956	3,250

* Township Assessment Figure

APPENDIX D (Cont.)

AGRICULTURAL STATISTICS
FOR
SOUTH DUMFRIES TOWNSHIP

Dominion Census Reports - 1851 to 1951

ii.

Year	Wheat	Barley	Rye	Oats	Pasture	Wood
1851	9,228	318	335	2,218	15,034	12,008
* 1861	9,290	1,248	-	2,056	4,294	8,794
* 1871	6,549	-	-	-	6,315	-
* 1881	8,786	-	-	-	4,535	-
* 1891	6,247	5,498	1,608	3,387	-	7,485
* 1911	6,929	2,488	304	5,781	-	3,520
1921	6,124	1,531	564	5,696	12,160	4,239
1931	3,875	1,158	371	4,961	13,423	4,256
1941	3,401	86	201	4,450	13,103	4,350
1951	3,916	162	152	5,663	13,133	4,849

* figure either unavailable or recorded in bushels

APPENDIX D (cont.)

LIVESTOCK STATISTICS
FOR
SOUTH DUMFRIES TOWNSHIP

Dominion Census Reports - 1851 to 1951

iii.

Year	Cattle	Horses	Sheep	Pigs
1851	3,919	1,697	10,210	3,888
1861	3,672	1,322	8,553	2,857
* 1885	4,395	1,605	3,327	1,758
* 1893	4,274	1,939	1,946	2,583
* 1903	5,684	1,719	1,481	5,719
1931	5,573	1,498	2,282	3,267
1941	6,786	1,411	2,111	5,006
1951	7,410	514	3,330	4,730

* Township Assessment Figures

APPENDIX E

1. HOUSING CLASSIFICATION - PARIS, ONTARIO

Class	Lot Size	Building Material	Age - years	Remarks
A 1	100'	Brick and/or stone and frame	- to 5	These buildings are of excellent quality, and show no signs of deterioration. Most are 1 floor ranch style homes. Lots are attractively landscaped.
A 2	100' +	Brick	50 to 75	These are large, 2 storied buildings. Despite their age, they are in good condition, and in good repair. The large lots are landscaped.
A 3	75'	Brick or frame	- to 10	These buildings are smaller, less expensive, and not as elaborate in their plan as the A 1 homes. There is no sign of deterioration, and lots are generally landscaped.
B 1	100'	Brick	50 to 75	Although similar in construction to A 2 homes, these buildings are somewhat smaller, and not as well kept. The large lots are usually landscaped. Deterioration is slight.
B 2	75'	Brick, or cement block	25 to 50	Lots and buildings are smaller than the B 1 class. Deterioration is more evident, and less emphasis is placed on landscaping.

APPENDIX E

i. HOUSING CLASSIFICATION - PARIS, ONTARIO (cont.)

Class	Lot Size	Building Material	Age - years	Remarks
B 3	50-75'	Brick, frame, stucco or insul-brick	25 to 50	Signs of deterioration are clearly evident in this category, and landscaped lots are rare. Brick buildings are the smallest, and the oldest. Wartime houses of frame construction are included in this category because of their small size, rather than their physical condition, which is generally superior to other types. Most buildings are of frame construction or have an insul-brick or stucco exterior.
C	Under 75'	Frame, insul-brick, stucco	10 to 50	Buildings in this category are in a poor state of repair, and there is an absence of landscaping. Most class C homes are small.

APPENDIX E (cont.)

MAJOR INDUSTRIES IN PARIS

ii.

Name	Product	Location *
J. D. Adams Ltd.	Road Building & Earth Moving Machinery	LT
Cockram & Co.	Boilers, Castings	F
Consolidated Sand & Gravel Ltd.	Washed Sand & Gravel, Paving Materials	F
Kaumagraph Ltd.	Dry Transfers	LT
Medusa Products Co. of Canada Ltd.	White Cement, Paints Waterproofing	LT
Paris Dunbrik Co. Ltd.	Cement Bricks Cement Blocks	F
Paris Playground Equipment Ltd.	Playground Equipment	LT
Paris Wincey Mills Co. Ltd.	Flannels	LT
Penman's Ltd.	Textiles	LT
Sanderson-Harold Co. Ltd.	Kitchen Furniture Refrigerators	LT
Walker Press Ltd.	Printing Lithography	F
White Mop Wringer Co. of Canada	Floor Cleaning Equipment	F
Quikmark	Transfers	UT

* UT - Upper Town
LT - Lower Town
F - Flats

iii

APPENDIX E

POPULATION STATISTICS

DOMINION CENSUS REPORTS 1851 - 1951

TOWN OF PARIS

YEAR	POPULATION
1851	1,890
1861	2,373
1871	2,640
1881	3,173
1891	3,094
1901	3,229
1911	4,098
1921	4,368
1931	4,137
1941	4,637
1951	5,249
* 1954	5,700

* Business Year Book - Financial Post, 1956

APPENDIX E (cont.)

MARKET DATA FOR PARIS, ONTARIO

iv

Population - 1956 - 5,404

On C.N.R., C.P.R. Lines

Banking - 1955 - 3 Branches

Homes Built - 1954 - 20
1955 - 18

Manufacturing - Number plants 24
1949 employed 1256
1953 " 1369

Newspaper - Weekly Star - 1955 Circulation 1,763

Religions - Protestant 83.8%

Racial Origin - British 90.6%

Labour Force - 1,951

Male - 1,592		Female - 685
Proprietary, Managerial	176	14
Professional	70	51
Clerical	129	161
Manufacturing, Mechanical	646	297
Construction	106	
Transportation & Communication	135	17
Commercial & Financial	97	48
Service	81	76

Retail trade - 1941, 92
1951 85

APPENDIX E (cont.)

CENTRAL BUSINESS DISTRICT

PARIS, ONTARIO

v.	Type of Business	Number
	Hardware and/or Electrical Appliances	7
	Furniture	3
	Newspaper	1
	Jeweller	2
	Meat Markets	3
	Locker Service	2
	Optometrist	3
	Variety Store	2
	Liquor Store	1
	Men's Wear	2
	Confectionery	3
	Sporting Goods	2
	Crafts Shop	1
	Drug Store	3
	Bank	3
	Grocery	4
	China Shop	1
	Shoe Store	3
	Cake Shop	1
	Dry Goods	2

Cont.

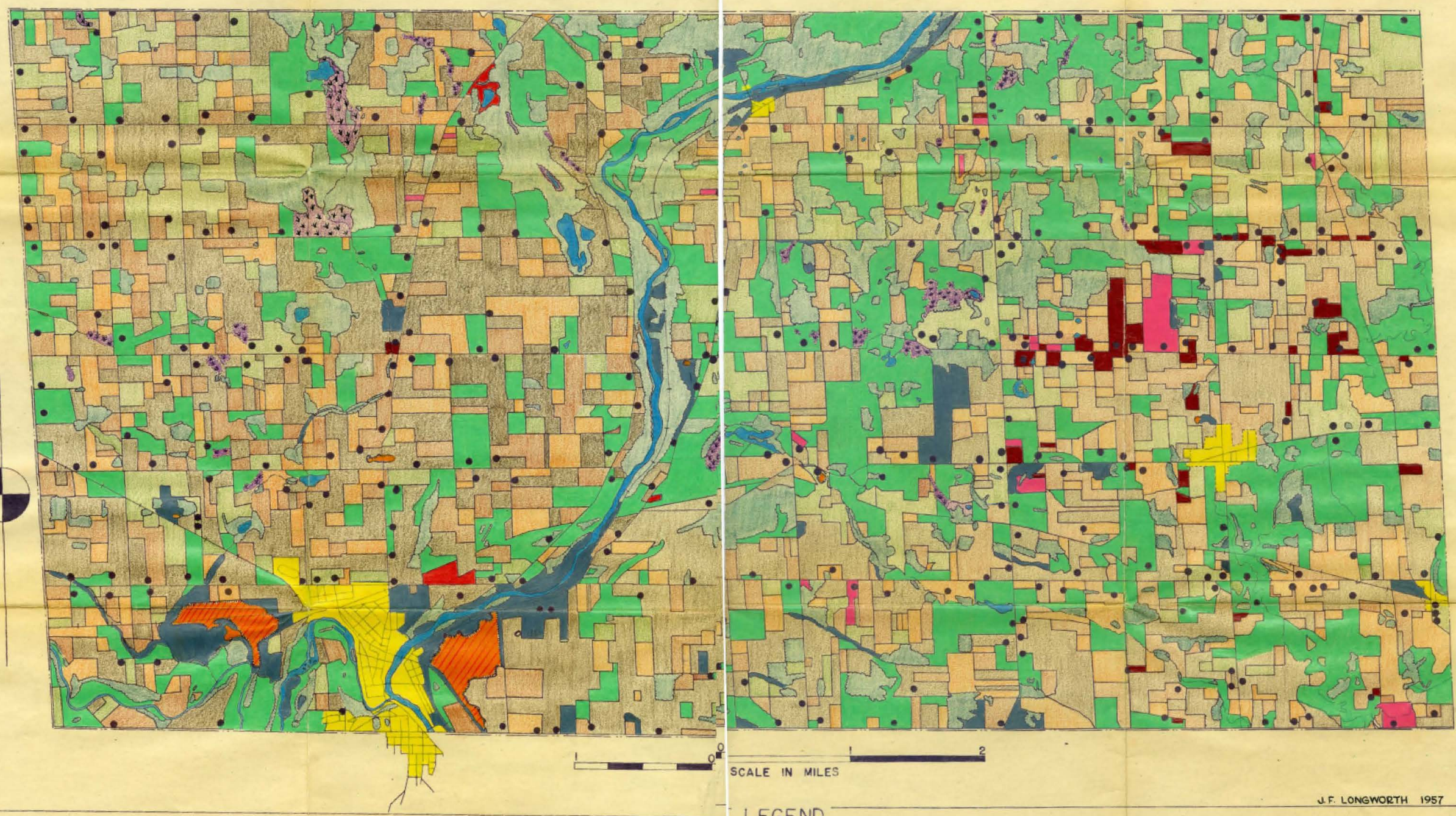
APPENDIX E (Cont.)

v cont.

Type of Business	Number
Luggage Shop	1
Paint Shop	1
Children's Wear	2
Laundry	1
Soda Bar	2
Restaurant	1
Canadian Pacific Telegraph	1
Shoe Repair	2
Bowling Alley	1
Taxi Service	1

SOUTH DUMFRIES TOWNSHIP

LAND USE 1957



SCALE IN MILES

J.F. LONGWORTH 1957

LEGEND

URBAN LAND
IDLE LAND
SWAMP LAND
WOODLAND
RECREATION LAND
STREAM
CROP LAND
Hay
Grain
FARMSTEAD
QUARRY
HYDROGRAPHY
ROAD
RAILWAY
Corn
Orchard
Vegetables
ROTATION PASTURE
LONG-TERM PASTURE