OXBOW FARM

Its Past, Present and Future

C. A. PARK

Forestry
copy 1

(only copy with pictures)

I wish to apologize for the mistakes in the typing, and particularly for the surprising manner in which the footnotes have been placed herein. When I commissioned a typist who holds an office position, I imagined I was getting a competent one. You may judge for yourself. I was unable to personally supervise the typing; and since, for reasons beyond my control, the bound copies arrived late, I was not able to take time to attempt to correct all the mistakes.

C. C. P.

O X - B O W F A R M

Its Past, Present, and Future

A THESIS

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INTRODUCTION AND ACKNOWLEDGMENTS

When one has to write a thesis, one must necessarily find a subject which must satisfy not only the writer but the demands of the course of study one has been pursuing. I must confess that this requirement rather embarrassed me for the moment. The call of the wild has up to this time, stirred no feelings of ecstasy in my gentle clod-like soul. I am consumed with no burning passion for searching into the ways of the wild, nor am I warmed by any love of our "little brothers" but rather must I confess, since indulging in some minor reforestation, to a virulent antipathy to all and sundry things lagomorphous and rodent. In short, I am a truly domesticated creature. I go My way and all wild life can go Theirs.

But, I am interested in the conservation of natural resources, mainly along the lines of soil conservation and rural improvement. I think I must be a farmer at heart and strangely enough, it was this innate interest in farms and better land use which led me to the University of Michigan School of Forestry and Conservation. For an Ontario farm should produce three things --- first, crops; second, timber, and third, wild life.

And while it is not wild life itself in which I am particularly interested, I am interested in the place it should occupy in the composite set-up of better land use.

Therefore, I planned to write a thesis covering a broad and general picture of present and future land use, rather than to investigate some particular phase of wild life activity. I wanted to view the whole canvas and later perhaps if time will permit, I may descend to examine the fine detail. The farm, I have chosen for survey, has been selected because it possesses an ideal set-up for my purpose. I had done some reforestation on it; it possesses good hedgerows and in this particular is unlike most Kent County farms. And ox-bow lake for pond development is one of its characteristic features and it had in times past been one of the best farms in the township of Harwich. But alas through culpable mismanagement and neglect it had suffered a wretched decline. Nevertheless it furnished a concrete example and a suitable starting point for my survey. As far as wild life is concerned, I was advised to extend my observations beyond the confines of the farm and to embrace a further square mile of territory. As may be seen from the accompanying map this area is mainly to the west of the farm, there being no woods nor hedgerows to the east.

Once I had settled on this program the thought, inspired no doubt by my earlier courses in philosophy, occurred to me to make a ~~general~~ comparison of this farm with those throughout the County. (i.e. the Particular compared to the General) For instance, I have compared the forest land of the farm with forest land throughout Kent County. I was unable, however to

secure facts or figures concerning the wild life population of the County that would warrant a separate chapter and therefore the omission.

And so I have written a thesis -- a single thesis embracing many topics. A concrete plan of improvement for the farm has been laid down which to some extent has already been followed in practice. My effots have embraced abstract theories on the possibilities and types of conservation schemes to cover broader areas. In this, I seem to have laboured like a mountain -- let us hope, I have not brought forth a mouse.

In this foreword, I must express my thanks and sincere appreciation to Dr. S. A. Graham of the School of Forestry and Conservation under whose direction this study has been carried out; to Dr. J. D. Detwiler of the University of Western Ontario whose early inspiring leadership first suggested this topic of enquiry; to Dr. Wesley Curran at Queen's University; to Mr. Harold Zavitz, zone forester for Chatham District and to A.A. Wood of the Dominion Entomological Bureau in Chatham, for the kindly interest shown in my thesis and for the very material help rendered. To the Ross family also for their generous hospitality and to them and to the farmers of the locality and surrounding district for their kind co-operation and patience and willingness to answer my numerous questions -- go my most sincere thanks.

To you the readers of my thesis also, I pray indulgence and I trust that you may find it not altogether dull and disappointing. I hope my descriptions may enable you to see the picture I have tried to paint -- to follow the historical background leading to present conditions and to visualize possibilities and improvements

the future may have in store.

Sincerely

E. A. Parks

Chatham, Ontario.

January 2, 1944.

THE COUNTY OF KENT

A Brief Description

For the combined natural advantages of a salubrious climate and proximity to the great highways of commerce the geographical position occupied by the County of Kent is superior to that of any other county in Ontario, with the single exception of Essex, which county alone intervenes between Kent and the southwestern tip of our province.

With Essex being the most southerly area of Canada, Kent follows next, lying in the same latitude as Northern California. The fact is not generally realized that one-half of the population of the United States lives farther north than the population of Kent County and one-third the area of the United States is farther north than Kent.

The County of Kent is bounded on the north by the County of Lambton; on the east by the Counties of Middlesex and Elgin; on the west by the delta of the St. Clair river, the lake of the same name, and the County of Essex; and on the south by Lake Erie. Its area totals 574,210 acres.

The surface of the county is a vast level area, unbroken by any elevations of prominence except a ridge a former glacial terminal moraine of an average height of about forty feet above the level which skirts the shores of Lake Erie at a distance varying from a few rods to five miles; and for a considerable distance in the southwestern part of the county, this moraine forms a cliff along Lake Erie. This height of land, varying in width on its top

from a few rods to half a mile is called the "Ridge". The lowest level of the county is 572 feet, the altitude of Lake Erie. Most of the county lies at 600 feet elevation. Several thousand acres of land surrounding Rondeau Bay on Lake Erie are marsh lands, much of which has since been diked. Bordering Lake St. Clair and extending up the Thames River, six miles, and then for a further distance of eight miles north and south of the river, wedge-like in shape, almost to Chatham, cut off from the river by its natural levees are the "plains", vast, flat expanses lying a little above or below the level of Lake St. Clair. Originally the "plains" were marsh and meadow, with scattered clumps of trees. With high water in the lake or the river in spate these areas were all inundated. But dikes, levees, and pump houses have since served to keep out Lake St. Clair, quite successfully, but the Thames with considerably less success.

Two main streams flow through the county in parallel, northeast-southwest directions. To the north is the Sydenham River emptying into the Chenal Ecarte, one of the mouths of the St. Clair Delta; and through the middle of the county the turbid, sluggish Thames meanders to its debouchement in Lake St. Clair. The Thames is always possessed of the utmost dignity, fitting for its old age, being geologically one of the oldest rivers on the continent. From nine miles above Chatham to its mouth sixteen miles below it has the same level as Lake St. Clair, so that during dry periods there is no perceptible current in its lazy coursing. The monotonous flatness of the county surface is broken only by the little subsidiary valleys the tributary streams have cut to reach the water level of the Thames and Sydenham.

The Indians with their innate poetry called the river Escunisseppe, the "Antlered" from the manner of the confluence of its two main branches at London, Ontario. The French with prosaic realism termed the river La Tranche from its high banks upstream. But it remained for the nostalgia of the British to give the present name, the Thames.

The prominent feature of the geology of Kent County is the presence of the Devonian series of strata, and especially the "Hamilton or Lambton" and "Portage and Chenning" formations of that series. The later deposits forming the surface and subsoil of this county, are principally of the Drift or Glacial and Post Glacial Periods, the latter overlying the former. The Post Glacial deposits are comprised chiefly of stratified clays, sands, and gravels which appear to have been derived in great part from the waste of the older Drift accumulations. These upper Drift deposits consist principally of dark blue or gray calcareous clays, arranged in distinct layers, called the "Erie clays", from their prevalence along that lake. At a distance from the shore, however, the clay partakes of a grayer shade, though no more pliable consistency, being exceedingly hard along the banks of the Thames, and smaller streams, but relaxing somewhat in stiffness at points remote from those water courses, and originally in the lower forest and "plains" land generally overlaid by a deep, black, vegetable mould which in some cases has worn out through cultivation, leaving the heavy clay subsoil almost denuded but still fertile.

In addition to the various accumulations mentioned, there occurs in portions of Kent superficial deposits of still more recent origin forming a sandy loam. There is an entire absence of gravel or stones of any description, except along the Ridge bordering Lake Erie, where the soil is more porous, relaxing in many localities into a decided gravelly loam (Fox gravelly loam) and bearing in others small cobble stones in considerable numbers. The soils of Kent have been noted from the earliest times first for their exceptional fertility and secondly for the abominable tenacity of the clays in wet weather.

It may be said here that the soils of the county are made up of three main series, the Dunkirk, the Haldemand, and the Clyde, which are derived from reworked glacial drift material deposited as sediments in the glacial forerunners of the Great Lakes.

Having briefly covered the geographical, geological, and topographical aspects of Kent we can now proceed with the meteorological aspects. Kent and Essex, due to their low altitude, and to the presence of the Great Lakes, make up the third warmest area in the Dominion, the West Coast, and the southwestern tip of Nova Scotia alone having milder winters. The following are the figures for Kent as a whole.

Frost free period	154 to 167 days
July Mean temperature	69° to 71° F
January mean temperature	22.5° to 24.5° F.
Lowest temperature on record	- 20° to - 25° F.
Highest temperature on record	106° F. (highest recorded temperature in S. Ontario, July, 1936)
Mean annual precipitation	28" to 34"
Mean annual snowfall	30" to 40"

Average monthly mean temperature for Chatham 1882 - 1941

Jan.	22.9°	Feb.	22.4°	Mar.	31.4°	April	44.4°,
May	56.0°	June	65.7°	July	70.6°	Aug.	68.5°,
Sept.	62.4°	Oct.	50.6°	Nov.	38.3°	Dec.	27.6°.

Ox-bow Farm

A Brief Description

If you jump into your car and drive out Colbourne Street in Chatham you hit the river road in Harwich Township and after eight miles of devious windings you pull up in front of an old brick house set on a little knoll, its front shaded by a tipsy group of old white pines and one great boxelder. Off to the east of the house stands a single, gaunt, grey barn, an attached corn crib at one end, and implement shed and henhouse at the other. A garage which barely defies the law of gravity, a pump house, and that ever present little haven of quiet solitude with morning glories trailing over it, completes the picture. This is Ox-bow Farm. For such a farm, in its present ordinary, even somewhat dilapidated state, to have a name is sheer affectation. But it is an augury of the hoped-for state-to-come. And perhaps before the farm is built up to what we hope it may become, we may be forced to change the name to Wit's End for a more appropriate description. But officially it is known as Lot 19, Concession 1, Harwich Township, Kent County.

If you look at the accompanying map of the farm you will notice particularly its extreme length in relation to its width. This is a result of the early survey systems when the lots were laid out with narrow river frontages to give as many farmers as possible direct access to the river. Since then many of the original farm grants have lost their long, narrow, rectangular shape through subdivision or addition.

Fields 1, 2, 3, 4, 5 and 6 are cropped, while 7 and 8 are

in permanent pasture. Field 8 is a grazed woodlot and open pasture area. The cover symbols denote the type of growth along the fences and the legend on the accompanying map describes the various landmarks.

Ox-bow Farm in itself comprises 100 acres, but while the northeast half of field 9 is owned by the neighbouring farmer the entire field is used by both farmers equally as pasture. This then brings the area shown on the map up to about 110 acres.

F (the blowout) and 1 (the cemetery) are both on the sandy ridge, 15 feet high which cuts a narrow diagonal path across the flat plain of the farm. Fields 2, 8 and the north half of 7 are rolling, rising up to form the knolls of the low ridge. Fields 1, 3, 4, 5 and 6 are flat with poorly developed drainageways. Some form of contour strip cropping could be carried out on the 4 southeastern fields. The topography of field 9 is a plateau with a curving valley cut through it. The valley is an hanging valley lying eight or ten feet above the present course of the Thames, the valley is an ancient bed an old cut-off meander of the Thames and still contains within it a little ox-bow lake. (B). A, which for want of a better term is called the ox-bow "island", is a raised up little butte-like plateau, once upon a time part of the opposite bank of the river.

The present house on the farm one of the earliest brick houses in the county, was built in 1838 of handmade brick from a nearby clay pit. The sills and frames of the doors and windows are of black walnut, which also forms much of the structural timbers of the house. The architecture is a modification of "Old Ontario", with small, 12 paned windows symmetrically placed; and in this house the

TYPES BASED ON ECOLOGICAL CLASSIFICATION - SOUTHERN MICHIGAN

ORIGIN FROM LAND

UPLAND TYPES

	P	A	R
	Porous Soils	Non-porous	Rock Outcrops
1	Bare Soil	Bare Soil	Bare Rock
2	Lichens		Crustose Lichen
3	Foliose Lichen & Moss		Foliose Lichen
4	Moss & Annuals	Moss & Annuals	Moss
5	Grasses & Perennial forbs Xerotic Species	Grasses & Perennial forbs Mesophytic Species	Same as P 5
6	Mixed Herbaceous Xerotic Species	Mixed Herbaceous Mesophytic Species	Mixed Herbaceous Xerotic Species
7	Shrubs-Sweet fern, cherry, cinquefoil etc.	Shrubs-Dogwoods, Haws, Rubus, Shadbush, Sumac etc.	Shrubs Same as P 7
8	Intolerant Trees Aspen, Juniper, Black Oaks.	Same P 8	Same P 8
9	Intermediate Trees Hickories, White oaks.	Intermediate Trees Shagbark, Pignut, Ironwood, H. Maple, W. Oak, Black Oak, etc.	Same as A9 but black oaks predominate.
10		Tolerant Trees H. Maple-Bass wood-Beech.	Same as A 10
X	Cherry-Aspen Oake-Sassafras		

ECOLOGICAL TYPES (continued)

ORIGIN FROM OPEN WATER AND SEEPAGE AREAS

LOWLAND TYPES

	B^s	B	M^s	M
	Bog Seepage	Bogs	Marsh Seepage	Marsh
1		Open Water		Open Water
2		Submerged Veg.		Submerged Veg.
3	Sphagnum-Heath Sedge	Floating Veg.		Floating Veg.
4	Heath-Sedge	Emergent Veg.	Reeds & Rushes Fragmities, cat-tail, bull rushes etc.	Emergent Veg.
5	Grass & Sedge Hydrophytic Species	Same as $B5^s$	Same as $B5^s$	Same as $B5^s$
6	Mixed Herbaceous Hydrophytic Species	Same as $B6^s$	Same as $B6^s$	Same as $B6^s$
7	Shrubs-same as A7 also Holly, Choke berry, Huck leberry etc.	Same as B7	Same as B7	Same as B7
8	Intolerant Trees Tamarack	Intolerant Trees Tamarack (Black Sp.- a temp. tolerant.	Intolerant Trees Willow-Cottonwood Tamarack	Same as $M8^s$
9	Intermediate Trees Y. Birch, R.Maple, Elm,Ash,Willow, cottonwood, etc.	Same as $B9^s$	Same as $B9^s$	Same as $B9^s$
10	Same as A10	Same as A10	Same as A10	Same as A10
X	Aspen-Y.Birch	Aspen-Y. Birch	Aspen-Y. Birch	

ECOLOGICAL TYPES (continued)

INTERMEDIATE TYPES

	F	E
	Flood Plain	Ecotone & Fence Rows
1	Bare Soil	Bare Soil or Water
2		If under water submerged vegetation
3		If under water floating vegetation
4	Annuals	Annuals or emergent if water present
5	Same as A5	Grass-Sedge & various forbs.
6	Mixed Herbaceous Same as A6	Mixed Herbaceous Variable with moisture.
7	Shrubs Same as B7	Shrubs-variable depending on moisture
8	Same as M^{s}_{g} without Tamarack	Same as M^{s}_{g} usually without Tamarack
9	Same as B^{s}_{9}	Same as A_{9} or B^{s}_{9}
10	Same as A10	Same as A10

Exponential letters

o - outwash
d - dunes
k - kettle
l - calcareous rock
g - igneous rock
s - shale

Sub letters

d - drained
p - pastured
e - erosion
c - cropping
f - flooding
y - cutting
x - fire
a - animal activity

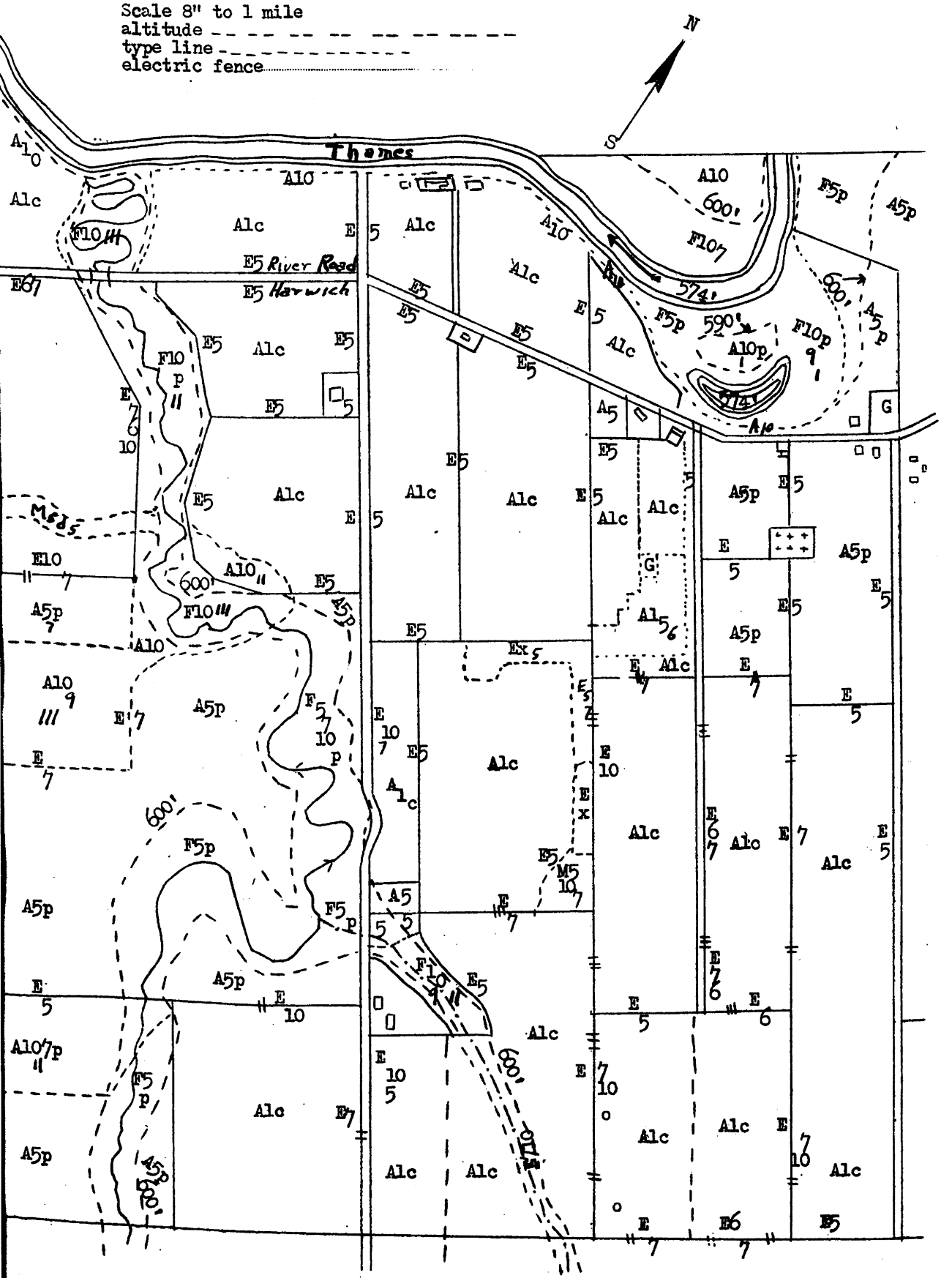
Timber Size

4" to 6" DBH etc.

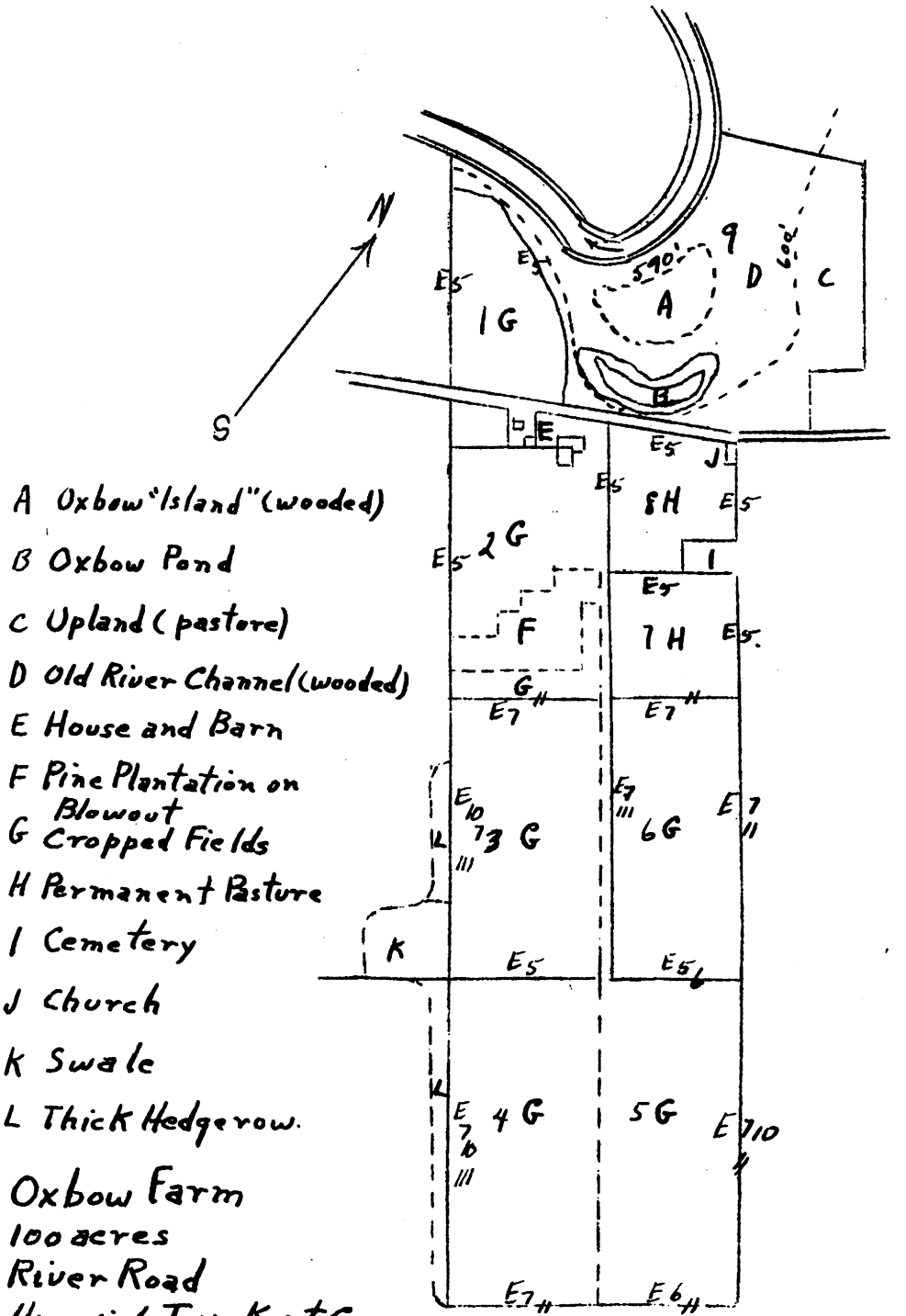
Timber stocking
1 Scattered
11 Medium
111 Dense- Heavy

Shrub density

- Scattered
= Medium
≡ Heavy



Cover Map of the Section



A Oxbow "Island" (wooded)
B Oxbow Pond
C Upland (pasture)
D Old River Channel (wooded)
E House and Barn
F Pine Plantation on Blowout
G Cropped Fields
H Permanent Pasture
I Cemetery
J Church
K Swale
L Thick Hedgerow.

Oxbow Farm
100 acres
River Road
Harwich Twp. Kent Co.
Ontario

The House
Oxbow Farm
A.D. 1838

The Hedge Row
west side of farm

The Back Half of Oxbow
Farm, from the cemetery hill,
showing fields 7, 6, 5, 4, and 3,
and the hedgerows

Views of the Oxbow Lake

Oxbow Farm

Views of the Oxbow Lake
Oxbow Farm

overlooking the oxbow lake
June 26, 1943

The Oxbow "Island"

March 20, 1943

looking north into swale

The Swale
on west side of the
Oxbow Farm

interior view

bank door, rather than the front is the wide colonial door with sidelights. Two great fireplaces, in colonial style , one in the guest parlour, and one in the common-room heated the house. The basement was the kitchen and the large brick fireplace with hook and crane, andirons and built-in oven still is used on occasion. The traditional narrow, enclosed stairway running up from the common room, and the little guest bedrooms leading one after another off the guest parlour complete the picture.

THE HISTORY OF KENT COUNTY

In such a comprehensive study as this it seemed fitting to include a brief history of the county, touching lightly only on the main points of interest.

In the beginning of recorded history the county was inhabited by the Neutral Indians or Ottawandarons (the people with the best country). The first white man who records a visit to the Neutrals was Father Joseph de la Roche Daillon, a Fransican priest, who mingled with them in the summer of 1615. But it is doubtful if he ever came as far west as modern Kent. The year 1640 saw in all probability the first whitemen in Kent, when the Jesuit missionaries, John de Brebeuf and Joseph Chaumonet visited Khioeta or St. Michael, and St. Joseph de Kent, two of the Neutral villages in this area. In 1650 after the Hurons were broken up and dispersed the Iroquois turned their fury on the Neutrals and destroyed them as a nation.

In 1670 the Sulpician Fathers, Dollier de Casson, and Rene de Brehart de Galinee, and their voyagers discovered Rondeau, the large natural harbour on Lake Erie, enclosed by two great sandspits (now Erieau Bar, and Rondeau Provincial Park) and named the extremity of the larger spit La Pointe aux Pins from the remnant stand of white pine there.

Somewhere between 1775 and 1780 there occured the first settlement on the lower Thames or so it was then known, La Tranche, but it was not until 1790 and 91 that the first surveys were made along the river La Tranche, by Peter McNiff, who surveyed the river, laying out lots as far up as the present site of Thamesville, because of numerous requests for land.

In 1792 the County of Kent was formed, and with the County of Essex it formed part of the Western District, hitherto known as Hesse,(from 1788) one of the four divisions into which Lord Dorchester divided the Upper Canada (in 1792), and which at first included a great portion of what is now Western Ontario and Michigan.

In 1794 the first influx of settlers, mostly United Empire Loyalists and discharged British Soldiers, commenced, and 1796 with the transfer of Fort Detroit to the Americans, many of the loyalists living in that area moved to Kent.

In 1794 the Government of Upper Canada established a shipyard on the present site of Chatham, on the Thames, and in 1795, 600 acres were set aside as a town plot by Surveyor Abram Iredell, Chatham was named after William Pitt, the Earl of Chatham, and was originally intended to be the capital of Upper Canada, but the plan fell through, due in part to its nearness to American territory after 1796.

With the advent of the War of 1812 - 1814 comes the most exciting period in Kent's History. At the first call to arms companies were enrolled from the men of the district, General Brock and his men marched from York (Toronto) to Fort Detroit, where they were joined by the militia from Kent, and Tecumseh and his Indians. It is interesting to note that on their march to Detroit, Brock's men pitched camp one night on the shore of Lake Erie between Erieau and Erie Beach. Fort Detroit, under Hull's command surrendered after a one day seige. Brock returned to Niagara, leaving General Proctor in command at Detroit.

With the defeat of the British fleet on Lake Erie by Commodore Perry in 1713, Forts Malden and Detroit had to be abandoned. With Malden in ashes and Fort Detroit a pillar of smoke behind him, Proctor left Sandwich on September 27, 1813, and with four gun-boats and a small schooner set off, part by land and part by water, for the Thames. His men, ill, half-starved, unpaid were utterly demoralized. In five days the retreat covered fifty-four miles of rain-soaked trail.

Hearing of Proctor's flight General Harrison, with General Cass and Commodore Perry and a force of three thousand Kentucky backwoodsmen instantly pursued, the retreating force of six hundred whites and eight hundred Indians. The British spent the night of October 3rd on the north side of the river at Chatham, the Indians on the military reserve, now known as Tecumseh Park, where Mc Gregor's Creek joins the Thames. On October 3rd Harrison's scouts engaged the British rearguard. General Proctor taken utterly by surprise, was twenty-miles ahead considering the fortification of Moraviantown, founded in 1792 by Moravian missionaries from Pennsylvania.

Tecumseh wanted to fight at the forks at Chatham, but Colonel Warburton, the second in command, had no instructions, the men were disheartened and weary; the little fleet could hardly proceed against the roily Thames, swollen by five days rain, and their heavy field pieces were stuck in the impassable trails. So on October 4th the British recommenced their retreat up the Thames. It was impossible for the little fleet to keep up with the army. At the first farm outside of Chatham the schooner was abandoned and fired, two miles farther up two of the gunboats were similarly

destroyed. Meanwhile Tecumseh held the bridge over McGregor's Creek, and a sharp engagement between the Indians and Americans took place at what is now the intersection of King and Fifth Streets. But with Harrison bringing up cannon the Indians retreated, after firing the bridge over McGregor's Creek, and the blockhouse on the military reserve.

So closely did the Americans pursue that the two remaining British gunboats with all their British ammunition were captured about eight miles above Chatham, on October 4th. This was the final blow to the retreating armies who, on hearing the news deserted their half-cooked breakfast, and halted only two miles below Moraviantown, twenty miles from Chatham. At Arnold's Mills the Americans forded to the north side of the river, and on the morning of October 5, 1813 met the British and Indians in the Battle of Moraviantown. The British were defeated, Proctor ignominiously fled, and Tecumseh was killed, and his body spirited away to a secret burial place by his braves, lest the Americans desecrate his body. The village of Fairfield (as Moraviantown was then known) was looted and burned by the victorious Americans on October 6th, in spite of the Moravian missionaries' protests to Harrison who expelled them from the ruined settlement.

Kent therefore remained under American rule till the present international boundaries were arranged. Chatham was practically abandoned until 1820 when the first permanent residence was built.

The war had interrupted the development of Kent. As early as 1804 the famous Talbot Road, the pioneer forerunner of No. 3 Highway had been cut through the county, giving rise to settlement along its course. After the war development went on apace. The Thames

was a well-travelled highway, used by Indians, the Muncey's, the Delawares, and the Chippewas, and whites alike. Schooners loaded with lumber sailed down from Thamesville.

The prolific French Canadians were spreading into Kent along the shore of Lake St. Clair and up the Thames, taking over much of the "plains" and forming French blocs where to this day only French is spoken by many of the inhabitants. At the same time English, Irish and Scottish settlers were pouring in, accompanied by lesser number of Germans.

But perhaps the most interesting of Kent's settlements were the Negro colonies and their later influence on the Civil War in the States. Many ambitious schemes for educating the escaped slaves and placing them on grants of land were formed, and flourished for awhile only to gradually collapse as many of the Negroes returned to the States with Lincoln's emanicipation of the slaves when that country began to boom. Two factors which led indirectly to the Civil War may be traced directly to Kent. The Reverend Josiah Henson, one of the most outstanding Negro leaders first came to Kent in 1830, and soon after became the leader of the Fairport Negro colony, founding what was the first technical school in Canada, the British and American Institution for the training of escaped slaves. But to-day Henson is most famous for being the original of Uncle Tom, Harriet Beecher Stowe's celebrated fiction character. The novelist is reputed to have secured much of her material for "Uncle Tom's Cabin" from Henson whom she visited at Fairport. It has often been stated that the Harper's Ferry Raid precipitated the Civil War. Well, John Brown planned his famous raid in a house which is still standing on King Street East, in Chatham, although the enthusiam of his Chatham supporters cooled considerably at his rashness. And to their eternal

shame, many of the more ambitious negroes of Chatham became officials of the "carpet bagger" governments which for many years after the Civil War dominated the southern states. To-day only a few Negro farming communities, and the dwindling Negro Section of Chatham remain to remind us of the days when Chatham was the head of the underground railway for escaped slaves.

After 1814 the tide of war turned away from Western Canada for years, and nothing of a martial nature happened till the close of 1837. Then the Rebellion aroused the Loyalists of Kent. A voluntary Kent militia was raised, and in January 1838 it took part in a skirmish on Bois Blanc Island and the capture of the schooner Anne from Detroit laden with arms and supplies for the rebels. A month later they also participated in the dislodgement of a rebel Canadian named McLeod and his forces from Fighting Island.

The Municipal Act of 1849 abolished the Districts, including the Western District, which since 1798 included only Essex and Kent and gave municipal powers and autonomy not only to Counties, but to the Townships forming them. Until 1850 Kent included all the territory of the present County of Lambton which was then established as a separate municipality, attached to Kent for judicial purposes, and afterwards to Essex, until in 1854 it assumed all the dignity of an independent County.

In 1850 Chatham, the county seat, was incorporated as a village; in 1855 it became a town, and in 1895 a city.

The 1860's brought the threat of war close to the county again. The Mason and Slidell affair nearly caused war between the United States and Britain, and volunteers were raised.

Then from 1862 to 1864 the threat of raids by renegades and and disbanded soldiers from the States at the close of the Civil War became so serious that the volunteer militia of the county was kept almost in constant readiness. The abortive Fenian Raids on the Colonies from the States resulted in the Kent militia twice being called up in 1866 to guard the boundary. The constant threat of war in that troubled decade resulted in the formation by a General Militia Order of the 14th of September 1866, of the 24th Battalion of Infantry, Kent. In 1901 this became the 24th Kent Regiment.

With 1867 the fear of the "imperialist tendencies" of the United States towards the Canadas as much as anything else caused them to confederate into the Dominion of Canada, which received its independent Dominion status by the British North America Act, passed by the British Parliament. Kent therefore was now a county of the new independent nation, rather than a county in the united colonies of Upper and Lower Canada, which in 1867 became the province of Ontario, and Quebec.

Thereafter the population of the County increased. By 1881 the census returns gave it as 54,310, of which 17,559 were English 11,912 Irish, 9,465 Scotch, 4986 French, 3,458 Germans, 795 Dutch, and all others 2170, Indians 348, and Negroes 3,707, a very large decrease since the previous census. The municipalities were growing rapidly and with them increased the number of schools and collegiate institutes. In the 1880's lumbering and agriculture were the two main industries. Drainage had reclaimed most of the "plains" from River St. Clair.

And finally the industrial era of the county was beginning.

This then brings us up to our present time. Since the early French and Anglo-Saxon settlements which moulded the character of the county, large numbers of Europeans have come in, Czechoslovakians and Belgians apparently the most numerous. These have taken up farms, and in some local areas have displaced almost entirely the original Anglo-Saxon stock. Most of these new settlers have shown an amazing affinity for hard work and an ability to make their own way. It is to be hoped that their children will become fully Canadianized. The war has brought a new class of immigrant, the wealthy refugee, rather than the peasant. Several prominent Czech families have bought up large farms in the county and have made a success of them using the methods employed on their former European estates.

downstream

The Thames, from the bend
at Oxbow Farm

upstream

THE HISTORY OF THE FARM

In his survey of the Thames in 1790 and 1791 Peter McNiff surveyed out the lot now known as Lot 19, River Road, Harwich.

But the real history of the farm begins in 1794 with the first influx into the new county of Kent of United Empire Loyalists, who, being driven from their homes in the name of liberty, sought a new liberty in the empty solitudes of Kent. Where the Loyalists in those tumultuous years in the revolting Thirteen Colonies had faced beatings and even murder, had seen their homes looted and burned, and had been robbed of almost all their possessions except those few they could carry, they now faced empty-handed the lonely and bitter struggle of building anew their lives in the dense forests of Kent.

For the most part these Loyalists were farmers, and tradesmen. The professional men, the wealthy merchants, the land owners had fled mainly to Nova Scotia, New Brunswick, Quebec, Bermuda, the British West Indies or Britain and Europe. And it is true that a very small percent of these farmer "Loyalists" were men who a few short years before were either among the fence-sitters who waited till the struggle was over before becoming devotees of sweet liberty, or were among those who rabidly shouted for the blood of the "Tories". But in either case, at the lure of free land, their undying devotion to the cause of Independence died, and regarding the tyranny of the Crown with less passionate antipathy, took their places with those thousands of real Loyalists who fled for political reasons in search of order and freedom from persecution.

Such then was the political situation in the 1790's. In 1790 Patrick O'Flagherty, a Loyalist, first applied for land along the

River La Tranche. But it was not until 1798 that O'Flagherty was granted the two hundred acres comprising Lot 19.

On May 14, 1810 the farm passed into the hands of George Field, another Loyalist. In all probability Field was a member of the same family as the noted Chicago philanthropist Marshall Field. The Field family originally came from Pennsylvania, and a branch of it settled along the Thames on lots adjacent to 19.

George Field had barely come into possession of the farm when the War of 1812 broke, and Field no doubt volunteered for service in the Kent Militia. There is no record of George Field's family and whether they remained on the farm during the War. Then came the fateful fall of 1813, and Procter's retreat up the Thames. Little is known of the disposition of the Loyalists along the Thames during those three tumultuous days from October 3 to October 5. But one can picture the scene. A slow fall rain, the forests dripping, the river trail a mire entangling, the Thames rising and hissing among its bordering trees. Procter with an advance guard has ridden on up to Fairfield with the intention of fortifying it, and has taken with him seventy sick and wounded British soldiers. The excitement among the river families mounts. Most of their men are in the militia. They remember too well their treatment in Revolutionary Days. Word spreads among them that the British are retreating up the north side of the river. Some of the more timid load their wagons and flee up the muddy river trails. Some take to the woods. Some remain. Behind them then breaks on the air the rattle of gun-fire and the intermittent boom of cannon as Harrison drives out the Indians from the townsite of Chatham. A pall of smoke rises over the townsite and hangs low in the rain. The blockhouse and bridge are burning. Then nearer rises another

cloud of smoke, then another, and another. The schooner, and two gunboats have been fired and abandoned. Two gunboats remain, trying to breast the swiftening current. The vanguard of Tecumseh's Indians pass along the trail through the farm, then the main body. The Americans are close behind. The two lagging gunboats can not keep up; they are near the farm. The Indians, going on ahead, cross the river at Arnold's Mills and spend the night there. The Americans are at the farm! The gloom is deepening as evening comes on. They over-take the gunboats. The gunboats are helpless in the river. They attempt futilely to round the bend but the current of the rising river forces them over to the shore where the Americans wait for them. A few shots, a few shouted commands, the gunboats are captured! The British do not learn of this disaster till the next morning. All their reserve ammunition is gone. White and Indian alike desert their half-cooked breakfasts. The final phase of the retreat begins. The Americans ford the river at Arnold's Mills and in swift climax the Battle of the Thames is fought and lost. Tecumseh is killed. Fairfield is burned. An uneasy peace rests heavily on the land.

For some time the farm remained in American controlled territory till the present international boundaries were arranged.

In 1824 George Field sold his two hundred acres to Clark Warden and William Hatch for four hundred dollars. These two had half interests in the farm, and Hatch controlled the east half of lot 19, one hundred acres, which is the present farm area. In 1826 Hatch sold his one hundred acres to Daniel Corby for £44"0"0 Corby sold to Laughton Case in 1831 for £62"10"0, and in 1832 Elijah Mudge bought the one hundred acres from Case for £85"0"0,

In 1834 Mudge trasferred title to Henry VanAllen for £100"0"0, who in 1838 sold the farm to Lot Patterson for £150"0"0. These rapid transfers of the farm would make it seem that a bit of land speculation was going on.

The original house and buildings were on the north side of the river road, overlooking the ex-bow lake. But in 1838 Lot Patterson built the present brick house on the south side of the river road.

Life along the river in those early days lacked little in variety. The Thames was a well travelled highway for the county roads were but trails. Originally the river roads were tortuous Indian trails skirting the river, and it was to give as many settlers as possible direct access to the river, that the original farms were laid out long and narrow. The Chippewas, the Muncey's, the Delawares, and Mohawks plied their canoes on the river, making themselves completely at home in the pioneer homes with nightfall. Mrs. Patterson was never surprised on coming down of a morning to find several Indians stretched out asleep before the great fireplace. They had just walked in in the night to get warmth and shelter. Then too schooners went as far up as Thamesville to bring down lumber But as the roads of the county were improved the traffic on the Thames fell off, particularly above Chatham, although Chatham remained a busy lake port for many years. In the year 1862 alone, 100 British steamers, 114 British sailing vessels, 155 American steamers, and 100 American sailing vessels called at Chatham.

And with the slackening of river traffic the farmers along the river settled into a quiet, pastoral existence. The rural communities lived very much to themselves, and considering the river road in Harwich it was no small wonder. The so-called road has

suffered little change with the passing of the years. Where once the horses could barely pull through the deep ruts of winter, the automobiles now get mired. The language used on such occasions has never changed.

Three generations of Pattersons lived on the farm. Two generations prospered and became prominent farmers, but the third generation fulfilled an old proverb. Little care was taken with the farm and it sank into a horrible decline, the woodlot was ravaged, and the sandblowout began, where once it had been one of the best farms in the area. In 1933 if finally passed into the hands of Archibald Park, who rented it to Clifford Ross. The neighbours thought Mr. Ross was crazy to rent that farm, that run-down old skeleton, with the centre blowing out of it in every wind, with its pitiful yields, with its dilapidated buildings.

But a farm is no better than the farmer on it. Ten years of hardwork, of crop rotation, of manuring have brought the farm back to average production for that area, and that part of Kent County is very far from being submarginal. It is good farmland. Since their arrival the Ross family has had a hard upward climb, and it is only now that they are beginning to reap the fruits of ten years of soil improvement. In 1940 the author had the sandblowout area fenced off and the first pine plantings were made, to be followed by successive plantings and refills in 1941 and 1942. In the five years since stock last grazed on the blowout "desert", wind erosion has been completely controlled on the blowout, not from the reforestation, but from volunteer invasion of herbaceous annuals and perennials and carolina poplars. In those ten years Mr. Ross's energy, being directed toward the soil building, luckily missed almost entirely the hedgerows. Thus fortunately

some of these have developed into excellent cover and food areas for wild life.

Therefore to-day we have a farm which provides a specially fine demonstration area for soil upbuilding, woodlot improvement, and reforestation, and wildlife management. The farm has passed through the various phases of settlement since pioneer times. It had its period of productivity for many years, then its decline in one generation of neglect; and now it is at the beginning of its third phase --- the restoration of its former productivity, and its rehabilitation through wise conservation farming practices --- farming for crops, for timber, for wildlife.

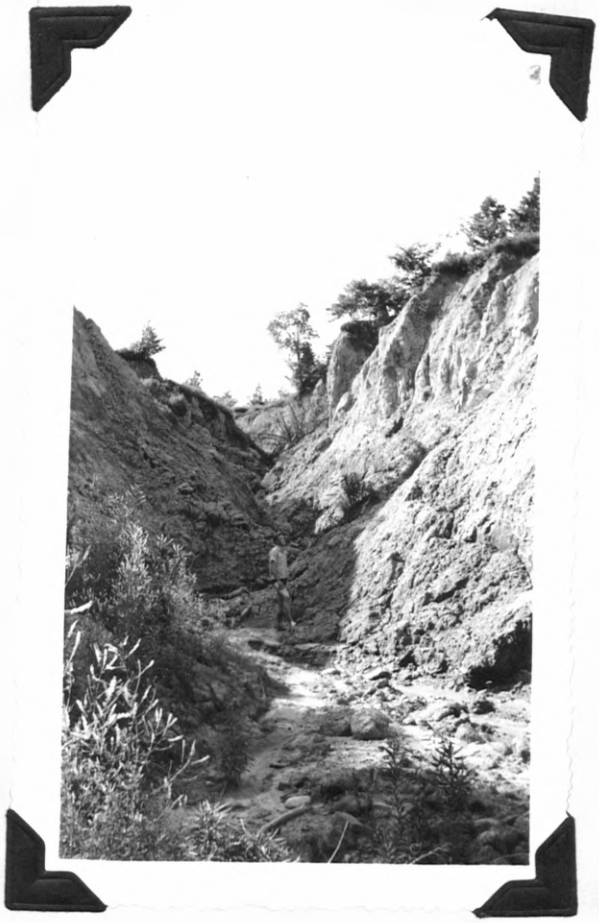
This then is the history of the farm.

SOIL EROSION IN KENT COUNTY

It is possible in this chapter to give only a broad outline of the present situation. No erosion studies have been carried out in the county, and it is this same lack of definite information which bedevils one trying to give explicit facts on the forest and wildlife resources of the county. However, the latest soil map of the county, published in 1930, designates a total of four hundred acres as eroded.

At first glance it may seem then as if erosion were negligible. This is definitely not the case. Those four hundred acres represent the most serious stages of erosion. Each area which has been so classified as eroded is an extremely localized area. Most of them occur in the south eastern corner of Kent where a number of short streams make their rapid way from the top of the Ridge down to Lake Erie, dropping 70 to 100 feet in one to five or six miles; the rest occur in the eastern part of Kent, where the banks of the Thames are high enough that its little tributaries have had to cut substantial canyons to reach the river. This 400 acres therefore represents the denuded, overgrazed and eroding sides of these deep canyons, or the actual gullies themselves.

The Lake Erie shoreline is almost entirely high, for the glacial moraine, the "Ridge", follows an almost parallel course with Kent's Erie shore. At its southwest end, the crest of the Ridge and the lake shore are almost identical, with natural drainage following the long gentle slope from the lake to the Thames. But shortly the Ridge swings inland to an ultimate distance of five to six miles at its northeastern end. Thus here are provided, between the crest of the Ridge and lake level, the only precipitous

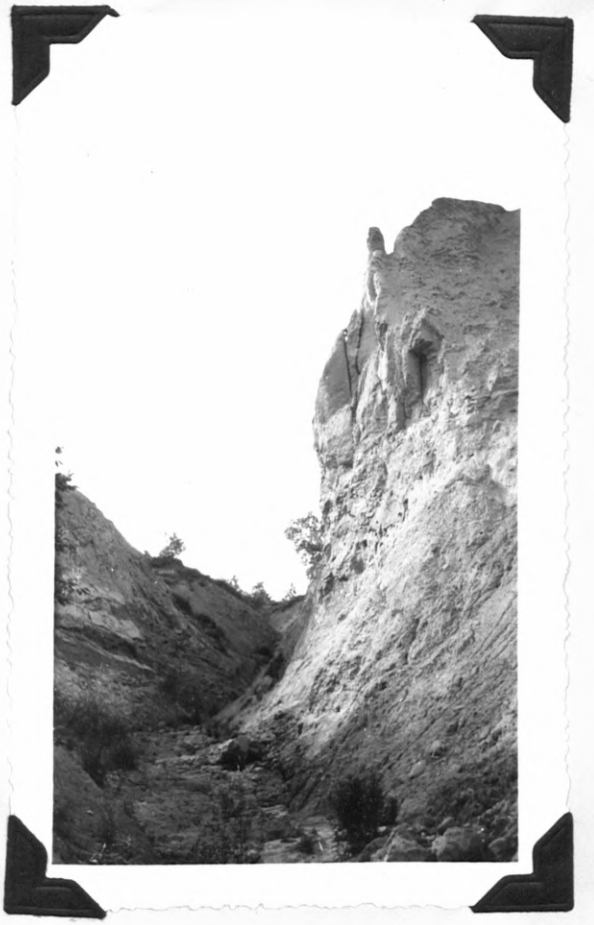


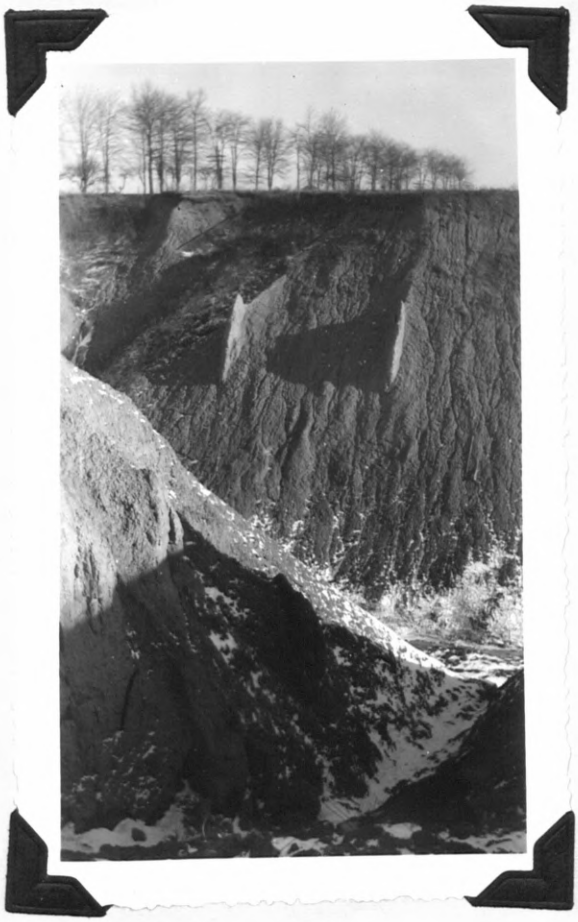
Gully Erosion,
Kent County, Ont.
caused by cutting
over watershed

A Lateral Gully leading into a main gully. Kent County, Ont.

Gully Erosion gully is about 50 feet deep here.

Kent County Ontario





Gully Erosion,
Lake Shore, Kent Co.,
caused by ditching.

Severe Sheet Erosion.
Kent County Ont.,
caused by deforestation
and over-grazing
of "cañon" sides.

elevation drops in Kent. And it is only natural that this region should have suffered the most spectacular erosion since the inception of agriculture.

Where the crest of the Ridge coincides with the shoreline, the land on top of the high clay cliffs is quite flat for a considerable distance inland, and then slopes back to the Thames. In several cases the farmers, being anxious to get the water off this flat plateau, dug ditches to lead the water to the lake, letting it drop over the edge of the high cliffs. In the space of a very few years these ditches cut right down to lake level, forming raw V shaped cuts 70 feet deep at their mouth, 200 to 300 feet wide at their top and up to a mile long.

Following east along the shore where the Ridge is swinging inland forming a natural watershed area, one finds gully after gully cutting through the plateau between the cliffs and the slopes of the Ridge several miles away. These gullies are of comparatively recent origin. None of them are over a mile long from the overfalls at their heads, two or three feet deep maybe, to the great gaps in the cliffs where they disgorge into the lake. Their greatest depth is generally 70 feet -----→ great pinnacled chasms, cutting back each year, sides sliding in, toppling trees and crashing them to their bottoms, sending out slit-like lateral gullys in their insatiable greed. If their artificially conceived brothers to the southwest show the awful effect of unwise ditching, these cancerous growths show even more strikingly the terrible final result of uncontrolled surface runoff. Deforestation, grazing, and cultivation started these gullies, but from their own size they continue to grow whatever the cover on their watershed now. The most awesome of these gullies, the author has ever seen has its entire

watershed is in second growth woods; yet each year finds new cutting back of the main overfall, and the lateral gullies, and new cave-ins along the steep slopes of the main channel.

The third type of spectacular erosion is sheet and gully erosion along the denuded or overgrazed slopes of the canyons of the natural streams which flow down to the lake from the Ridge. Almost all of these streams have become seasonal torrents since the cultivation of their watersheds, and on the actual sides of their canyons erosion has in many cases become exceptionally severe. And where the grass, shrubs and trees on these slopes haven't entirely disappeared, severe grazing and further cutting are fast destroying vegetative cover. Much of the crop land in this dissected plateau area has particularly suffered from sheet erosion due to the sloping terrain, so unusual in Kent.

One could safely say that wherever there is a sizable canyon in Kent, once the trees are cut out of it, it is grazed, until finally the slopes become so bare and eroded that stock can find nothing to eat. Nothing is done with these critical areas. It is evidently accepted by the farmers as the will of God wherever baneful erosion rears its ugly head.

But now we must deal with the less obvious aspects of water erosion in Kent. The erosion problem in Kent could be much more serious but for three factors --- (a) the gentle slopes and vast level areas, (b) the soils, and (c) the comparative youth of agriculture in the county. Certainly sheet erosion, in some degree of severity, is widespread, but except for the aforementioned local regions gullying is negligible. Stream bank erosion would seem to range from moderately severe to quite severe. Many stretches of the banks of the Thames are quite unstable, and fall in with each

flood. In the April, 1937, flood, at a point about one mile below Ox-bow Farm, the river gouged out five acres, twenty feet deep, from a cultivated field along its bank. Controlling bank erosion on the county streams would be one of the greatest tasks, if not the greatest, in any erosion control programme.

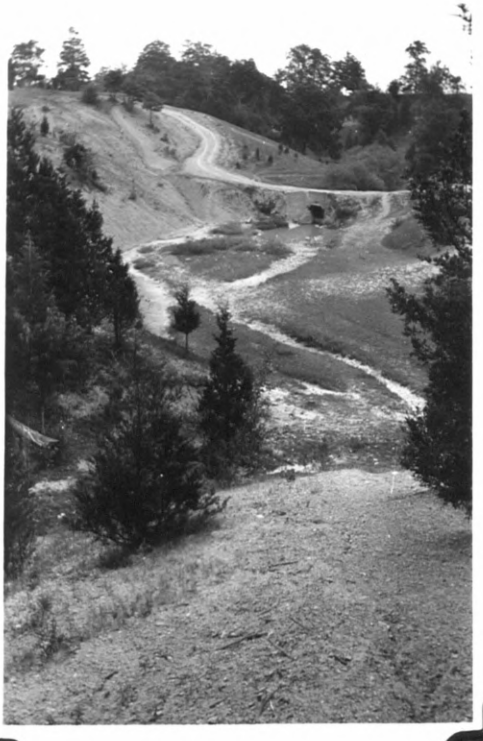
Such a programme would be comparatively simple on the cropland. Contour strip cropping would suffice, while on the Ridge some terracing would be necessary, also. Paradoxically enough, one of the main obstacles to an erosion control programme in Kent, is that erosion has not yet reached the stage where even the farmers themselves notice it, and realize the seriousness of the situation. The map accompanying the chapter an "Soil Erosion on the Farm and Surrounding Area", will clearly show the average incipient stage water erosion has reached throughout the county.

The case for wind erosion parallels the case for water erosion. One hardly thinks of rainfall in a county like Kent, territory having 30 inches of precipitation. And yet throughout the entire county on a winter's day one can see the heavy deposition of fine soil on the snow drifts in the fence rows and ditches. This soil can only have blown off the bare fields. The soils most affected by wind erosion are Plainfield Sand, Berrien Sand, Berrien Sandy Loam, and Brookston Sandy Loam. These cover an area totaling 150,300 acres. These acres lie concentrated in the northeast quarter of the county. The areas of Berrien Sand, enclosing as they do the more localized areas of water soaked Granby Sand, make up the poorest farm land in the county. And it is this bloc of 53,000 acres, exclusive of Granby Sand, which is most subject to wind erosion. This land should be kept in forest or well-managed pasture. Overgrazed

pasture results in blowing. But by far the most easily erodible soil is the Plainfield Sand. However its total area of 300 acres is relatively unimportant as a conservation problem, other than in those extremely localized knolls where it occurs, scattered across the country side. Wherever you find a knoll of Plainfield Sand you find serious wind erosion. The Berrien Sandy Loam, and the Brookston Sandy Loam have sandy knolls scattered through them, and it is these knolls of light soil which cause the most trouble.

The author knows of a belt of Plainfield Sand, several miles long which gives the appearance that a stick of bombs had been loosed down its whole length. All along this snake-like hump, great crater-like blowouts have formed, and are spreading. On another knoll an early cemetery has been almost entirely blown away. Only one small corner is left. In the summer of 1943 the author found a disintegrating skeleton uncovered by the shifting sand, just as it had been buried, 6 feet under, and for an half hour or so fancied himself as something of an archeologist. In one locality in the Berrien Sand of Howard Township enough soil has blown off one small field to cover two roadside fences. There are three fences there, each on top of the other, the first completely buried, the second barely showing at the bottom of the third. And in Chatham and Howard townships there are localized areas where the farm lanes will be blocked by drifted sand after a windy period.

The period of greatest danger from wind comes from April to May while the ground is still bare of cover. This will continue into late June, depending on the crop planted. The situation becomes acute if the spring is dry. The drought and high winds in the spring of 1941 produced severe wind damage. The author remembers one day in May when soil blowing from certain fields obliterated



Above:
Sheet and rill
erosion

Left:

Overgrazed
denuded slopes;
a former
perrennial spring
stream now a
seasonal torrent.

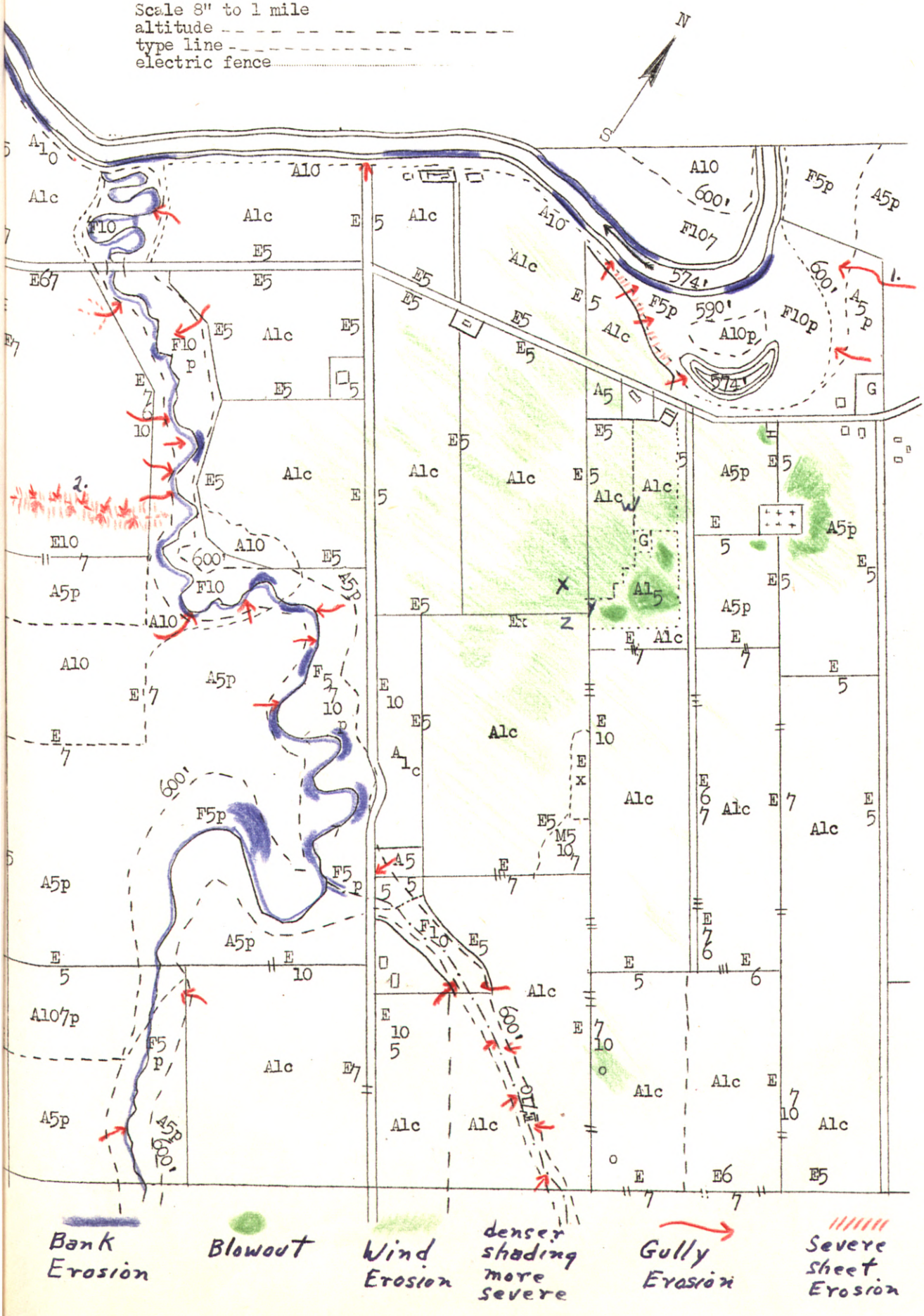
The Effect of a Single Storm, on a field of Beverly Fine Sandy Loam, Kent County, Ont.
2.63" of rain in 1 hour
June 7, 1941.

all vision on the roads. At times you could not see to the side of the road. The onion lands in the Erieau marshes are annually subject to varying degrees of wind damage.

One is almost forced to the conclusion that initiating a programme of wind erosion control would be easier than for one of water erosion control. Certainly over almost a fifth of the county it is quite obvious. Nothing can be plainer to the farmers than to see the driving veils of soil eddying upwards and swirling off the fields.

There are therefore these two erosion problems to be overcome, and yet Kent so far has suffered little from them in comparison with some of the other Southern Ontario counties.

Wind Erosion,
"Deserts on the March,"
Prince Edward Co.,
Ontario.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Bank Erosion
Blowout
Wind Erosion
denser shading more severe
Gully Erosion
Severe Sheet Erosion

Soil Erosion On The Farm And Surrounding Area

It is unfortunately fortunate that the area selected for research contains within its mile square boundaries the average erosion situation as it is throughout all of Kent. It is unfortunate we have the erosion; it is fortunate we have the examples close together.

Let us look at the erosion map accompanying this chapter. There were no techniques available for measuring sheet erosion, which in any case is not too bad on this particular area due to the absorbtive soils and the flat surfaces. Gully erosion, where a gully is a cut one foot or more deep, and one foot or more wide, is represented by a solid red arrow. Stream bank erosion is shown in blue. Wind erosion is designated by green shading, which is heavier where the erosion grows worse; and actual blowouts, that is craters gouged out of the sandy knoll (outlined in pencil), are shown as solid green.

The wind erosion occurs only on the Berrien Sandy Loam, and it is most serious on the knoll where the sod has been broken. You will note that the largest blowout has formed in about the centre of the knoll on Ox-bow farm. Here the whole top of the knoll has been levelled off and then the wind has excavated much of the soil out of the interior of the knoll. The total area fenced off to enclose the blowouts includes five or six acres, of which four or five were, until 1942, actively eroding. The land rises toward the blowout area, resembling a volcano with most of its top blown off. Inside the surrounding height the surface on the windward side abruptly drops inward to form a large interior crater and several subsidiary blowouts. Approximately a maximum depth of 15 feet of sand has been removed from this knoll.

No definite figures can be given concerning the time wind damage first began. As far as can be determined from local legend, the knoll was first ploughed somewhat less than thirty years ago. For several years excellent potatoes were grown on it. And then evidently with the complete distintegration of organic material in the light soil blowing commenced in earnest. In a few years so much material was removed that any attempt at cultivation was abandoned, but to make matters worse, the cattle were allowed to graze that area. This effectively kept down any volunteer growth that would have otherwise come in.

The author first saw this area in 1936. It was truly a desert. With the surrounding height of land shutting out the view of a small boy it was an easy thing for him to believe he was in the Sahara. The fine whitish yellow sand was quite devoid of vegetation except for rare sparse clumps of grass widely scattered. The final touch was a cow skelton uncovered by the sand. In the heat and glare of that bleak hollow the pleasant world beyond the rim seemed very far away indeed.

In 1939 and 1940 the field surrounding the blowout was cropped, and no cattle were allowed to graze on the grass of the outer rim of the blowout, or in the barren hollow itself. In 1941 approximately five or six acres were fenced off to include all the blowouts, and the first pine plantings were made. The two years of rest for the area had resulted in the invasion of sand burr, which scattered thinly over much of the bare surfaces. Several poplar seedlings had seeded in from cottonwoods along the river. The grass around the outer rim had commenced to spread inward. One of the accompanying snapshots shows a view of the area as it was in May, 1941. Compare it with the same view taken May, 1943.

1941 was one of the driest years on record. By September rainfall was 12" below the normal for the period from January to September. Yet in spite of this extreme drought invasion went on apace. Sweet clover, ragweed, blueweed, marijuana, and milkweed made their appearance. The poplars increased by seeding and root suckering. 1942 was a so-called "normal" year, and growth was even more rapid. By the summer of 1943 many of the poplars were as much as fifteen feet high, and in places had formed sizeable thickets. In sheltered corners sumac was making an appearance. Sweet clover was competing seriously with the little pines on the high knolls, and in the interior craters a wide variety of weeds and grasses had covered all but a few bare spaces totalling less than half an acre. Indeed in the space of three years revegetation has advanced to a state where it is offering such serious competition to the pines both in depriving them of light and moisture and in providing shelter for those accursed cottontails which chew off the pines in winter, that the author is inclined to feel at times he had better devote the area to the production of cottontails than timber.

When one considers the pioneering part played by those otherwise abominable sandburrs in stabilizing the eroding surfaces, it is surprising that hitherto, as far as is known, no one has deliberately scattered sandburr seeds on areas where wind erosion is occurring, as part of the first control measures.

From the map it can be seen that at the northeast end of the knoll around the cemetery, other blowouts are developing due to overgrazing. And under the circumstances there seems to be little hope that any control measures will be taken on that farm. In the corner marked X on the map the soil has been removed to a depth of 8 inches lower than the sod protected surfaces of Y and Z.

May 9, 1941

The Sandblowout
Oxbow Farm

June 15th, 1943

June 1943

The
Sand Blowout
Oxbow Farm

May
1941

Field X is yet a fertile field because of the wise crop rotation, green manuring, and manuring it receives. The farmer who owns it is an above average farmer, who has built up a fine farm. Had it been otherwise wind erosion would be far more serious than it is now, although fields X and W have lost from 4 to 8 inches or more of their topsoil by blowing. Yet unless this erosion is prevented a serious decline must inevitably set in on those fields.

So much for the wind erosion of the area. Consider the stream bank erosion. Above and below the stretch of the Thames shown on this map occur two very bad cases of bank erosion, which show every indication of rapidly growing worse with each flood. Both are eating into valuable land. Bank erosion in the mapped area proceeds either by actual cutting by water and ice or by slipping or by both processes. The erosion right at the bend of the river at Ox-bow Farm is the result of undercutting by the current. The bank was stable until the April 1937 flood. In the March, 1943 flood six feet of bank fell in for a distance of 150 feet. The rest of the bank erosion is a combination of cutting by water and by ice and bank slipping. When exposed to cutting the light Berrien Sandy Loam is easily removed by the current. Ten to fifteen feet underneath the Berrien Sandy Loam is a layer of clay. Ground water collecting on top of this impervious clay issues at the same level along the river bank as a series of seepage springs. This water acts as a lubricant causing the upper layers of sandy soil to easily slide over the slippery clay strata. And after periods of excessive rain sections of the bank are especially prone to split off at the top of the bank lengthwise to the course of the river and slip down over the clay into the river. They carry with them their

surface vegetation, trees, bushes and grass, and leave behind a bare surface, exposed to the next high water. This tendency to slippage presents a rather particularly difficult control problem.

Bank erosion on the small tributary stream is of the same types, but on a smaller scale. Observations of the stream bed would seem to indicate strongly that the stream is retrenching itself. Recent cutting appears to have taken place in its old floodplain at the bottom of its broad valley. In many places a former bed of the stream can be distinctly seen meandering on the stream bed, and the immediate sides of the present narrow V shaped channel of the tributary are eroded and bare of vegetation. Something has rejuvenated that stream in the last thirty of forty years. The author suggests that since the normal summer level of the Thames is base level, the drop of six feet in the "normal" summer level of the Thames in the past thirty years due to increasingly severe flash floods in winter and spring, would account for this rejuvenation.

Since both the Brookston Silt Loam, and the Berrien Sandy Loam which covers most of the area, are relatively absorbent, and the slopes are very gentle sheet erosion has not been too serious on the area. But a rain of over 3 inches falling in 4 hours on July 4, 1943 caused bad washing on even the lightest Berrien Sandy Loam. And during one short, very localized, and very severe summer thunderstorm the side road was covered a foot deep in one place by soil carried off a field of Brookston Silt Loam with a one percent slope.

As can be seen from the map the tributary streams have cut down broad, steep-sided valleys to reach the Thames. It is on this drop from the 600 foot contour line that incipient gullying has

Lake Shore Erosion
Erieau, Ont.
Jan. 1943.

Bank Erosion
1 mile below Oxbow Farm.
In the April, 1937, flood, the Thames
gouged 5 acres out of a cropfield
at this point.

Above:
Bank erosion on the creek which passes through the section.

Left:
Bank erosion on the Thames at the bend at the farm.

occurred. Gully number 1 in the north corner is the only sizeable gully on the area. It is 6 to 8 feet wide, 4 feet deep at the mouth and nearly 100 feet long from its mouth to its overfall. It has resulted from surface runoff and from an unprotected tile outlet. The tile drained part of the pasture upland and emptied onto the flood plain of the Thames. Gully number 2, on the middle of the west side of the map is a deep, narrow natural drainageway from a swale further over to the left, to the valley of the stream. This drainageway has been,ploughed over and cultivated, and naturally, serious sheet erosion and gullying has occured on its steep sides. But apart from these two particular cases, the gullies in general are little more than advanced rill erosion channels, one to two feet deep, and as wide, sometimes not as large, and none very long, cut into the valley sidewhwever natural topography causes runoff to concentrate. Contour strip cropping would eliminate the runoff and these gullies, but for 1 and 2, would heal over in a year from natural revegetation. It is a pity that these signs of the erosion which is taking place are not spectacular enough to get anybody interested in them. The area has certainly suffered from erosion, and undoubtedly it will suffer much more; for who will notice a little gully 10 or 12 feet long, one or two feet deep; and who will remember for more than a few days, how muddy the water was in the broad, swift torrent which rushed off a field after a summer storm? And what difference will it make when the broom of the wind sweeps the dust from sandy rises, and lifting it in the air throws it like a sheer yellow veil against a blue sky -- what difference will it make so long as "we grow our best beans on that slope"?

Agricultural Production In Kent County

For the purpose of comparison with the farm the following does not include any of the special crops such as Burley tobacco, onions, sugar beets, and tomatoes, which grow abundantly in Kent's fertile soil; nor does it include fruits -- cherries, peaches, apples, in particular -- or market garden crops which are comparable to the best.

These figures for 1942 were obtained from the statistical branch of the Ontario Department of Agriculture.

Out of 20 major field crops grown throughout Ontario during 1942 Kent's soybean and bean harvest was by far the largest of any county in the entire province. In addition Kent's total acreage yield and value of the 20 crops was higher than that of any of the other counties. The record agricultural production of the county which has an assessed acreage of 568,616 marks it as Ontario's leading food producing county.

The aggregate value of the 20 crops was $11,384,628 the produce being raised on 366,642 acres. The value of the soybean crop alone was $535,776, while the bean crop was valued at $778,390. The most valuable crops were corn for husking at $4,214,779, oats at $1,484,523, and fall wheat at $1,600,372.

The 20 crops are comprised of fall and spring wheat, oats, barley, peas, beans, rye, buckwheat, flax, mixed grains, corn for husking, corn for silo, potatoes, turnips, alsike, sweet clover, alfalfa, hay and clover, mangels and soybeans.

The county's fall wheat yield was 1,875,575 bushels and it was the second largest harvest of that commodity in the entire province. The county's spring wheat yield of 20,838 bushels, valued at $17,712 was the second largest in Southern Ontario.

The county's spring wheat yield of 20,838 bushels, valued at $17,712 was the second largest in Southern Ontario.

Kent's oat yield was also second largest in Southern Ontario, and amounted to 3,401,216 bushels, valued at $1,484,523. The barley yield was the highest in the district with 555,713 bushels valued at $304,538. Peas harvested amounted to 1818 bushels, valued at $3,345.

The large bean crop totalled 525,727 bushels and was well in excess of 250,000 bushels of its nearest competitor. Rye production was 23,920 bushels valued at $15,785, buckwheat 29,297 bushels at $17,578; flax, 1,292 bushels at $339,300.

The county's yield of corn for husking was the second largest in the province, being second only to Essex, which produced 5,964,408 bushels. Kent's yield was 5,263,474 bushels shelled, and was valued at $4,214,779.

Corn for silo use totalled 134,618 tons, valued at $572,126. Potato production was third highest in Southern Ontario with 176,635 hundred weight being harvested, worth $328,451. The turnip harvest amounted to 5,328 bushels, worth $959. Four hundred and two tons of alsike were harvested and brought $3,284, while the sweet clover yield of 12,466 tons brought $78,444. The alfalfa yield of 69,508 tons was worth $639, 438; and the hay and clover harvest was 53,137 tons worth $43,163. Mangels were valued at $13,325 for 83,284 bushels.

The fertile soil of Kent is adaptable to the growing of soybeans on a large scale, and farmers sowed 12,222 acres of land, from which they reaped 317,917 bushels, valued at $535,776.

Kent's total number of horses amounting to 17,853 was the second highest in Southern Ontario, the animals being valued at over

$1,500,000. There were 815 breeding bulls, 18,332 cows for milking, 2,944 cows for beef purposes, 4,715 yearlings for milk purposes, 5,961 yearlings for beef purposes, 13,007 calves and 6,009 other cattle.

The total number of cattle on hand on June 1,1942 was 51,783, which was the fourth largest herd in Southern Ontario. The animals were valued at $2,464,871.

There were 3,017 ewes one year and over, 374 rams one year and over, and 2,848 lambs under one year. The total value of sheep and lambs was $59,271.

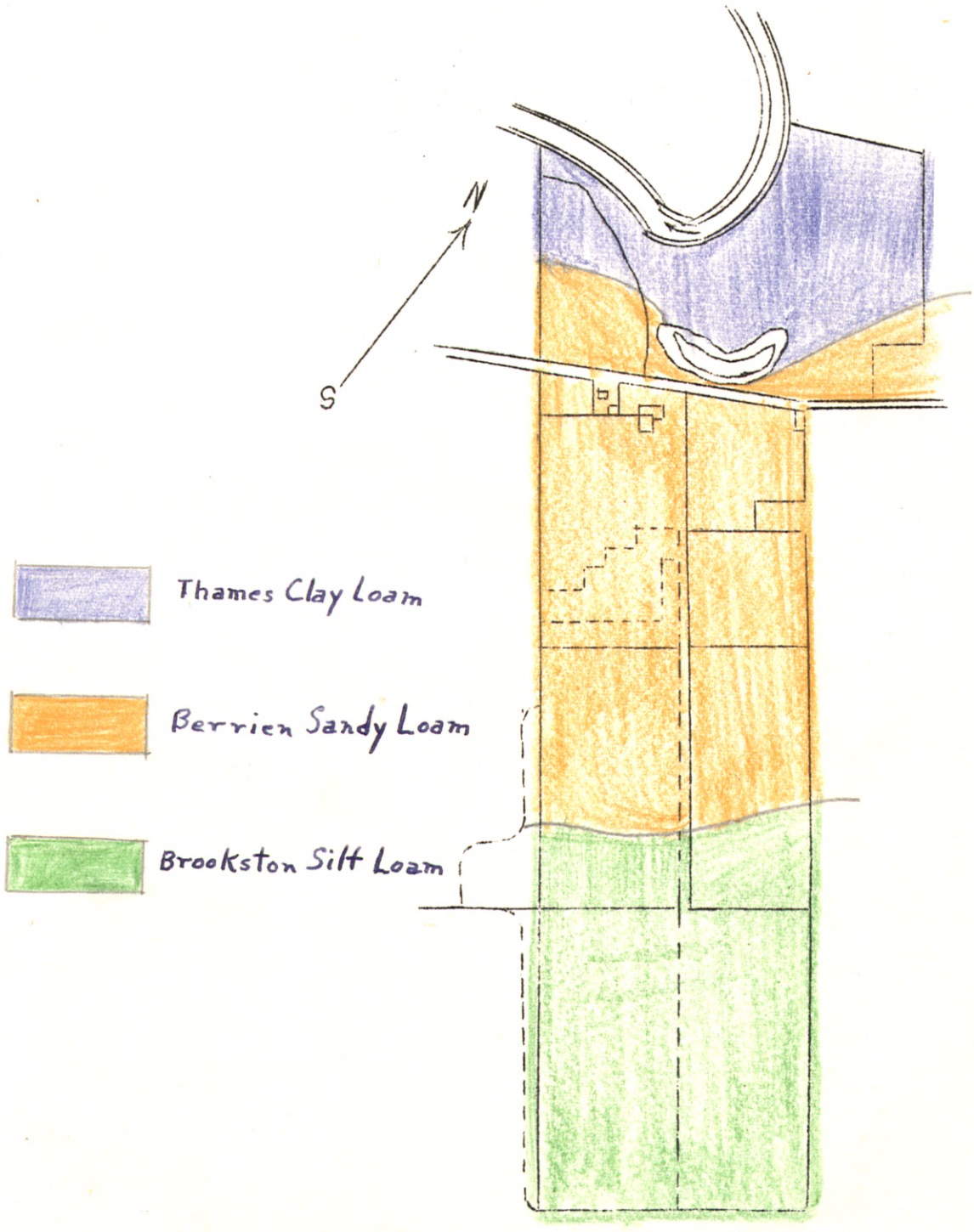
To its record of crop production Kent added the honour of being the leading swine producing county in all of Ontario, totaling on June 1, 1942, 105,910. This figure was composed of 28,352 swine 6 months and under, and 77,558 hogs over 6 months. The hogs were valued at $1,165,010.

Kent is also one of the leading poultry raising counties in the province. It placed third with 1,133,497 valued at $578,083.

In addition to the above 20 crops Kent is a leader among provincial counties in growing the "cash crops", tobacco, sugar beets, tomatoes and onions. The largest sugar beet factory in the Empire is situated in Chatham, while the largest Canadian plant of Libby's is in Chatham too.

SOIL MAP

Oxbow Farm



Agricultural Production On The Farm

Perhaps it would be well at the beginning of this chapter to set down an inventory of the 1942 stock and crop production of this farm. If it seems small remember this is a tenant farm, on a straight rental basis. As can be expected the tenant usually operates on a narrow economic margin. It is needless here to go into the vices of absentee landlordship and tenant holdings. Blame can be placed on both the tenant and the landlord many times for both trying to get as much out of the farm as possible and putting as little into the farm as possible. However in the case of this farm the tenant, Mr. Ross has been quite superior to the general run of tenants. But nevertheless he has been under the definite handicap of coming with little capital to a rundown farm.

In 1942 there were produced

900 bu. corn, 30¢ per bushel	$300.00
300 bu. oats, 40¢ per bushel	$120.00
332 bu. wheat, 82¢ per bushel	$266.00
300 bu. beans $1.50 per bushel	$450.00
15 tons hay $8.00 per ton	$120.00
12 veal calves	$240.00
24 suckling pigs $4.00 each	$ 96.00
520 doz. eggs per year (approximate fig.)	$1686.00

Normal stock carried on the farm are five horses, two sows, and twelve cows. The two sows each produce litters which are soon sold rather than be kept on the farm and fattened. Each of the twelve cows has a calf and these calves are kept with the cows till they are ready for vealing. They are then sold and new calves are brought to the cows, to be fattened on their milk and vealed. There is no dairying carried on at the farm, all the milk from the cows except what is used for the humans on the farm, is utilized for vealing calves. The twelve calves mentioned in the above figures are only the twelve calves born to the 12 cows. Unfortunately no adequate records are kept, so that the exact number of calves vealed is not known.

In addition to the income derived from buying young calves and fattening them for vealing, a brisk speculation is carried on in buying and selling cattle. These are bought at weekly stock auctions and from farmers wanting to sell. Then the cattle are sold either to other buyers or to slaughterhouses when the market prices are favourable. During 1942 over $10,000 worth of cattle passed through the Ross's hands. Sometimes cattle may be kept only one night on the farm, sometimes for several weeks before selling. Usually a profit is made on the buying and selling of these cattle, but in speculation risks must be taken.

The cattle are fed with grain and hay raised on the farm, and the extra grain is sold. Corn and beans represent the cash crops in this section of the county.

Fields 1, 3, 4, 5 and 6 on the farm map are cropped. On each field a five year rotation is followed -- first years, hay; second year, beans; third year, wheat; fourth year, corn; and fifth year, oats. Following oats the rotation commences over again with hay. One of the five fields each year is in hay. If there is a good catch of hay the field is ploughed up and a new field is planted next spring. But if there is a poor catch the field remains in hay for two years and then is ploughed up.

It has been the practice to fertilize only the winter wheat, with 0-12-6 fertilizer at 200 lbs per acre. Economic reasons have so far prevented the use of fertilizer on the other crops.

Since coming to the farm Mr. Ross has assiduously manured his fields. The manure has been put on in the fall at the rate of 20 loads per acre on the field which will be in beans next spring. Therefore each field gets a heavy manuring but once every five years.

REPORT OF SOIL EXAMINATION

Sample No. (by fields)	1 A(tc)	1B(bs)	2(bs)	3(bs)	4(bl)	5(bl)	6(bs)	7(bs)	8(bs)
Tested for									
Reaction	acid	acid	acid	acid	sl. acid	sl. acid	sl. acid	sl. acid	sl.acid
Phosphorous	H	L	L	L	L	L	L	L	L
Potassium	H	VL	L	VL	VL	VL	VL	VL	M
Calcium	L	L	L	L	M	M	M	M	M
Magnesium	H	H	H	H	H	H	H	H	H
Nitrate Nitrogen	M	M	M	M	M	L	M	M	M
Organic Matter	L	L	L	M	M	M	M	M	L

T-trace; VL very low; L-low; M-medium; H-high; VH- very high
TC -Thames Clay Loam BL - Brookston Silt Loam
BS -Berrien Sandy Loam

The manure is piled outside tightly until it is ready to be spread in winter and spring.

Field number 2, which is the poorest crop field, and the one most subject to erosion, is not included in the usual rotation. It is usually planted to rye, or oats,or sudan grass to provide supplementary summer feed. For instance in the summer of 1943 it was seeded one half to corn and one half to oats. In August the cattle were turned in on this field to pasture.

Fields 7, 8, and 9 are used as permanent pasture. All are overgrazed and undermanaged. Field 9 is half grazed woodlot and half open grass land. Sow thistle, scotch thistle, curled dock, ragweed and pigweed have generally ruined the open grassland, and the grazed woodland is also of little value. Field 9 has been thoroughly mismanaged as a pasture area. Fields 7 and 8 are grazed very closely. These fields have never been limed or fertilized. The three fields total about thirty acres. But half of field 9 belongs to the adjacent farm, and so while Mr. Ross pastures his cows there, the other farmer lets his six horses run there also.

The Improvements Suggested For Better Management Of Cropland And Pasture On The Farm

During the summer of 1943 the author took soil samples from all fields but number 9, and sent them to the Ontario Agricultural College at Guelph for testing. With the smaples was sent a report on the present farming and pasturing practices on the farm, with the request for advice in improving the farming set up.

The report from Guelph is set down on a following page. On the whole the level of phosphorous and of potash in the soil is low. Magnesium content is everywhere high, calcium low to moderate, nitrogen low to moderate, and organic matter low to moderate.

Obviously any programme of building up soil fertility must include more frequent applications of chemical fertilizer, and the more frequent growing and ploughing down of alfalfa and red clover.

Guelph suggested the following modifications in the crop rotation. Taking any one field it runs like this: hay one year, manure to be applied on sod during following winter; to be ploughed shallowly for beans in the spring; beans to be disced and sown to wheat; wheat seeded to clover; and clover to be manured in winter, then ploughed in the spring for corn; oats to follow corn, and same to be seeded to mixed grass and clover; grass and clover left down for two years when it will then go back into beans again. This is still a five year rotation.

The heavy manuring of only the bean ground is a wasteful procedure. Therefore hereafter in manuring, only half the quantity formerly used is to be applied to the bean ground, and the other half is applied to the red clover meadow to be ploughed for corn. This will result in a better use of the manure in building up nitrogen.

Fields 1, 2, 3, and 4 need limestone at the rate of one ton pr acre. At such time as this lime is applied it should be put on after the soil is prepared for a crop just previous to sowing. Approximately 40 tons of limestone will be needed for the farm.

As there is usually a large herd of permanent and transient cattle on the farm at all times a great deal of manure is produced. This piles up on the stable floor and is then removed and piled tightly outside until it is spread on the fields. The ideal situation would allow for the spreading of the manure as soon as possible after it is made. Perhaps each day the manure would be taken out and spread on part of the field to be manured, so that

there would be as little loss as possible. Now on a farm like this, where two men do all the work such a situation is highly theoretical. But when a new cattle barn is built, with a manure carrier which carries the manure from the stable daily and dumps it into a specially-built covered storage pit, there will be much less loss of nutrients.

However until this Utopian state exists we can only see that the manure on the stable floor is handled properly, and that particular care is exercised in piling it outside. The manure accumulates on the stable floor where the stock are confined in open pens. Bedding is used as needed to keep the surface of the manure relatively dry. Trampling by stock compacts the manure and keeps it moist throughout. As a result of these respective measures leaching is prevented, oxygen is excluded and aerobic decay of the manure is well controlled, and losses of ammonia are kept at a minimum. In addition this manure should be reinforced. The use of superphosphate spread over the stable floor is recommended. Since manure is low in phosphoric acid in proportion to its content of nitrogen and potash, and since phosphorous deficiency is general in our soils, reinforcement with 20% superphosphate makes a better balanced and more valuable manure. Then too, the use of 20% phosphate aids in preventing the loss of nitrogen in the form of ammonia, improves stable sanitation, and assists in retaining liquid manure. Each day one half pound of superphosphate per animal should be scattered over the manure on the stable floor.

These improved practices should add materially to the fertilizing value of the manure, and be a great aid, along with the improved rotation in building up the soil fertility. By manuring, and by using a moderate application of an 0-14-7 fertilizer (a wartime substitute)

on the beans, wheat, and oats, the levels of phosphorous and potash will gradually be built up, and organic matter content increased. Hitherto only wheat was fertilized. The corn is to be fertilized with 2-12-10 at the rate of 300 lbs. per acre, or more if necessary.

Tile drainage is needed in fields 4 and 5. These fields are of Brookston Silt Loam, and there are several shallow areas in them with no surface drainage. If a wet spring occurs it is very difficult to work these soggy stretches, and in the summer the soil in them becomes exceptionally hard.

Because of the interest in cattle and in beef production held by both the owner and the tenant, intensive pasture management will play a very important part in the new farm programme.

First the other half of field 1 will be bought, and the entire field will be excluded from grazing and devoted to the growing of hardwoods. Field 2 will be converted to permanent pasture, thereby stopping wind erosion, and fields 2, 7 and 8 will be managed as one unit of 22 acres, one large field instead of three separate fields.

The first problem then is to rejuvenate the already existing permanent pasture in 7 and 8, and to seed down the bare soil of 2. The author has fortunately obtained the services of Mr. Karl Abeles, a Czechoslovakian refugee, now living in Brantford, Ontario, in planning the new pastures. Mr. Abeles is an authority on seeding and managing pastures, and since coming to Canada he has continued in this work. Mr. Abeles is to use his own inoculations, seed mixtures, and seeding methods. His first step will be raising the bacteria content of the soil. When this is done then the pasture can be sowed and managed accordingly. Applying fertilizer to the pasture unit now might be more expensive than the results would

warrant due to the present low population of micro-organisms in the sandy soils.

Good pasture is the cheapest of all feeds, producing digestible nutrients at lower cost than any other crop. A good dairy pasture should produce from 3000 to 4000 lbs. of milk per acre, or carry one cow per acre during the season. A good beef pasture should produce 125 to 150 lbs. increase in live weight per acre during the season. Therefore the new unit of 22 improved acres ought to support at least 20 cows anyway, and under intensive management and supplementary feeding during summer dry periods, more cows could be grazed. The author knows of one 20 acre pasture near Agincourt, Ontario which supported 30 head of Holsteins during the pasture season.

Once it is established the new pasture unit of 22 acres will be divided by electric fences into three equal subdivisions. The cattle will be put out quite early in the spring before the grass gets too much head start. When they have pastured for a short time on division No. 1, they will be moved to division No. 2, and the mower run lightly over the original field, as well as over division No. 3, which has not yet been pastured. The cutter bar is raised to 4 or 5 inches and the cut grass is left in the field to dry and be picked up by the cattle. This treatment will keep the pasture growing, green and fresh, and woodiness will be avoided in the grass. Division No. 3, is then grazed and 1 and 2 mowed, and the process commences again on division No. 1.

Each spring 200 lbs. per acre of a 4-12-6 fertilizer will be spread over the unit. This will provide plant food for immediate use, and will help to build up a soil reserve. In the early fall the pasture is to be harrowed to spread the droppings evenly. If enough manure is left over from the normal cropping needs, and no

doubt under this new programme therewill be, every second year the pastures will be topdressed lightly with barnyard manure, which has been reinforced with 20% superphosphate.

In order to obtain early and abundant pasture in the spring close cropping in the fall will have to be avoided. The hay and clover in the rotation will be able to ease pressure on the permanent pastures whenever such is needed.

This new plan to increase the production on the farm may seem over ambitious, a little day dreaming perhaps. But consider this! No reforms have been advocated which cannot be carried out unless a much greater capital investment is made. True it will involve increased expenditure for fertilizer and clover seed but no new buildings, or implements are needed, and the greater expense will result in greater crop return.

Hitherto the vegetable garden has varied from place to place each year, sometimes out near the pine plantation and sometimes in the field across the road from the house. It has been decided that the vegetable garden should be permanently in the small field to the left of the house. This field is large enough to provide a suitable garden unit adjacent to the house, and will include the vegetable garden, a berry patch, and a small orchard of two trees each of peach, pear, cherry and apple, and one apricot. This garden unit will be surrounded on its west and north sides by an evergreen windbreak, which will be a continuation of the windbreak planned along the western boundary of fields 1 and 2.

An expansion in poultry production is also planned. This will require additions to the physical plant of the farm in the way of poultry houses and yards. At present the farm handles 400 chickens. This flock is to be increased, and in addition to this it is planned

to raise 400 ducks each year, and a small flock of geese and of turkeys. The ox-bow lake and the river area will provide an excellent summer range for the ducks, although the ducks will perforce cut down on the available wildlife food supply to some extent. However scattering grain in and around the ox-bow lake will make it even more attractive to the migrating waterfowl. But as far as we can say now any wild duck families raised there in the summer will just have to get along as well as they can in competition with the domestic ducks, unless it is feasible and easy to keep the domestic flocks out of the ox-bow pond entirely.

The Forests of Kent County

Until 1845 the land in Kent was heavily timbered with oak, walnut, tulip poplar, beech, maple, ash, elm and magnolia and a multitude of speies of lesser importance. Due to the mildness of the climate and the richness of the soil a wide variety of hardwoods flourished in such superb growth and abundance that the forests of the county resembled those of the middle and lower valley to a great extent. Vast areas of the county bordering Lake St. Clair and extending up the Thames for 6 miles were meadows and marshes with a few scattered trees. These were called the Plains. From this point 6 miles up the river almost to the present city of Chatham the natural levees of the river were heavily wooded, but the floodplains beyond them to the north and south were meadows and marshes. For the most part the rest of the county was heavily forested, interspersed with black ash swales and the occasional "oak opening" on the drier sandy sites.

In 1845 a demand for walnut, tulip poplar and oak sprang up. The walnut and tulip poplar were exported for building and furniture and the oak was manufactured into staves and shipped to the West Indies for casks and used there for sugar, molasses and rum. A few years later beech and maple were cut into cordwood and exported for fuel, or used on locomotives on the Great Western Railway. The demand for forest products gave an impetus to business among the farming community and greatly accelerated the clearing of the land. A standard saw log of walnut containing 303 feet of board measure sold for fifty cents in 1846.

The Chatham Directory and County Gazetteer issued in 1886 eulogize in the following florid Victorian manner: " Besides fertile

fields the County still possesses considerable areas of timber lands the now carefully preserved remains of the primeval forest, which in former years furnished many a ship with cargoes of staves, oak timber, and finest walnut, cherry, tulip poplar, sycamore, basswood, and other varieties of lumber, the quality being so superior that it was specially quoted in the market reports. Enough yet remains to provide the farmer with material for building and fencing, the implement makers of many countries with superior stocks,the ship builders with plank, soap makers with salts of potash, smelters with charcoal, cities and railways with fuel, and flouring, salt and other manufacturing establishments with staves, hoops and heading. This latter industry has grown to large proportions, numerous mills dotting the country, giving profitable employment to thousands of people and throwing thousands of dollars into the hands of owners of hitherto valueless elm timber, besides materially assisting the farmer in clearing his land. Owing to the general depression of trade now prevailing the shipments of lumber have not been so extensive as they would otherwise have been, but the past few years the exports of staves, hoops and heading have averaged some 2,000 car loads per annum, representing a trade of $400,000 in this branch alone.

The Cordwood Industry is also an extensive one. The fine forests of hard maple and beech, not considered of value in manufactures, and many softer woods, furnish an almost inexhaustible supply of fuel for the settler, the towns, steamboats and railways, as well as for the American cities to which it is shipped in large quantities. The production of charcoal in kilns is carried on quite extensively in certain localities, furnishing a market for the less valuable timber. Nor should the manufacture of salts of potash be overlooked --- an industry which, in the clearing of the country, not only provides a portion of the expense, but returns to the soil in the

Grazed Woodlot
Kent County
Ont.

(in the) process of burning, sufficient material to retain its richness for many years. In fact the many advantages pertaining to hardwood lands are such that no intending settler will lightly pass them by".

In the natural forest divisions of the Dominion, Kent lies deep within the Southern Hardwood Region wherein swamp whiteoak, chestnut oak, dwarf chestnut oak, burr oak, pin oak, big shellbark hickory, mockernut hickory, chestnut, mulberry, cucumber tree, tulip, pawpaw, sassafrass, red bud, coffee tree, honey locust, hop tree, flowering dogwood, blue ash, hackberry, black gum, and sycamore find their extreme northern range, in addition to the various hardwoods more representative of the Northern Hardwood Region. Along the shore of Lake Erie the mountain laurel and the rhododendron grow naturally. Since the advent of agriculture there have been introduced into Kent many exotic species, of which apricot, persimmon, osage orange, black locust, and catalpa have proved most readily adaptable.

But there has occured in Kent the same deplorable waste of timber resources that has plagued the rest of the Dominion. In the 1880's the timber industry in Kent reached its peak and then commenced to decline. Denudation of the county had occured to such an extent that the law of diminishing returns must necessarily apply. By 1901 only 13.75% of the assessed area of the county remained in woodland. By 1934 this remnant had declined to 3.5%, with 5.5% of the remaining assessed area designated as slash. In giving these figures no differentiation has been made between grazed and ungrazed woodland and slash. From life long observation the author is willing to hazard the guess that at least 50% of the woodland and and 75% of the slash is exposed to various degrees of grazing. And of the remaining woodlands the author knows of only two woodlots which are virgin, besides Rondeau Provincial Park, a 5000 acre area of marsh and forest. It will be a special problem to rebuild the forest reserves

in this county, which is so singularly lacking in submarginal areas of any extent.

The Following Figures May Be Of Interest

Kent: Assessment by Percentages

Township	Assessed Acreage	Cleared	Woodland	Slash	Waste or Swamp, Barren
Camden	40,602	86.1	7.2	5.1	1.4
Chatham	84,805	89.8		9.7	.4
Dover	68,607	82.4	2.6	.1	14.7
Harwich	88,351	95.2	1.8	1.5	1.2
Howard	58,907	91.1	1.6	6.6	.4
Orford	49,704	78.7	4.8	15.8	.5
Raleigh	70,200	97.5	2.2	.2	
Romney	26,093	81.6	11.3	6.6	.4
Tilbury E.	54,174	88.3	1.9	8.3	1.2
Zone	27,176	82.5	11.4	5.9	.008
County 1934	568,619	88.8	3.5	5.5	2.3
County 1901		83.1	13.75		3.2

Kent Assessment 1934

Township	Total Acreage	Cleared	Woodland	Slash	Waste
Camden	40,602	34,995	2,938	2,086	583
Chatham	84,805	76,164		8,280	361
Dover	68,607	56,560	1,785	129	10,133
Harwich	88,351	84,229	1,627	1,356	1,139
Howard	58,907	53,765	946	3,942	254
Orford	49,704	39,152	2,396	7,865	291
Raleigh	70,200	68,500	1,550	150	
Romney	26,093	21,297	2,956	1,728	112
Tilbury E.	54,174	47,864	1,047	4,546	717
Zone	27,176	22,434	3,103	1,615	24
	568,619	504,960	18,348	31,697	13,614
Percentage	100.0	88.8	3.5	5.5	2.3

This 10,133 acres of "waste" in Dover represents mainly unreclaimed marshes bordering Lake St. Clair.

The grazed remnant stand on the Oxbow's island.

The River Road from the house, looking toward the church.

The Forests Of The Farm

The title should really read "The Lack Of Forests On The Farm". One look at the so-called forest and you would know why! In 1791 when Peter McNiff surveyed the lots along the Thames he remarked on the fine growth of black walnut, black cherry, hard maple, sycamore, and hickory which grew on the river banks. Since McNiff's observations it is safe to say that at one time or another almost every stretch of bank on the Thames in Kent has been cut over. To-day for the most part the banks have some tree growth on them, varying from a few scattered trees to a dense growth of woods. But with the cutting there came a change in species composition. Poplars, willows and manitoba maples everywhere predominate along the banks to be followed by sycamore, and second growth and hard maples are little in evidence. Indeed it would seem that there are more of the introduced black locust along the banks than there are of these two original species.

The only woodland remaining on the farm lies along the immediate river bank in a narrow strip and spreads out over the ox-bow "island" and old stream channel. This whole area totals about 10 acres in trees, while the rest is open grassland, seepage marsh, and ox-bow lake. The woods itself is a remnant stand. Excessive cutting and severe overgrazing has brought it to its present low value condition.

In order to give a good cross section of the condition of the stand four plots of one square chain were laid out, and the species of trees in these plots were counted as to their number and diameter range. Since there is no reproduction in the woods because of the excessive grazing, and since there are comparatively few remnant trees in the stand these large plots were quite satisfactory in showing stand composition.

One plot was laid out in the old stream channel, another on the higher upland of the ox-bow "island," another on the river bank itself, and a fourth on the south bank above the ox-bow lake to give adequate sampling.

Here are the compositions of the plots.

Plot No. 1 Old Stream Channel
Size 66' x 66'

Species	Diameter Range					
	3-6"	7-9"	10-15"	16-20"	20"+	Total
Populus deltoides				1	1	2
Salix Spp.	5	1	2	2		10
Acer negundo	2	2	3	3		10
Platinus amer					1	1
						23

Plot No. 2 Ox-bow "Island"
Size 66' x66'

Species	Diameter Range					
	3-6"	7-9"	10-15"	16-20"	20"+	Total
Celtis occidentalis	1	4	2	1	2	10
Juglans nigra		1				1
Ulmus americana	3	2				5
Acer negundo		3	2			5
Ulmus		1	3			4
Populus deltoides				1	1	2
						27

Plot No. 3 River Bank Proper
Size 33' x 99'

Species	Diameter Range					
	3-6"	7-9"	10-15"	16-20"	20"+	Total
Juglans nigra				1		1
Plantanus amer	1	2	1			4
Ulmus americana	1	1	1			3
Acer negundo	1	5	3	1		10
Robinia psuedoacacia	9	3	2	1		15
Celtis occidentalis		1			1	2
Populus deltoides			1	1		2
Ulmus	4					4
						41

Plot No. 4 South Bank above Ox-bow Lake
Size 33' x 99'

Species	Diameter Range					
	3-6"	7-9"	10-15"	16-20"	20" +	Total
Robinia psuedoacacia	7	1	2	1		11
Celtis occidentalis		2	1	1		4
Acer negundo	10	5	3			18
Salix spp.		2	4	1		7
Fraxinus amer	3	2				5
Ulmus americana	2	1	1			4
Populus deltoides		1	2	1		4
Primus virginiana	3					3
						56

The figures give at a glance a good idea of the density and composition of this remnant stand. The last serious cutting occured during the winter of 1930 - 1931 when the last Patterson was still on the farm. Apparently the cutting was done as much to obtain cordwood as to get valuable timber. Everything which was of any value either through species or size at that time was cut. Red elm, manitoba maple, and hackberry numerically dominated after this cut, and the only valuable species not cut were left there because it would have been impossible for horses to draw the logs out because of steep terrain or unfrozen seepage springs.

Far more cordwood was cut than was necessary, and as was typical of the contemporary resident, it was left scattered outside to rot. In this whole operation no more wasteful methods could have possibly been used to complete the ravishing of what had continued until that time to be a moderately good hardwood stand.

The cutting of many of the trees on the river bank was a serious factor in increasing stream bank erosion. The opening of the stand allowed an intensive grazing which has been praticed to this day. Reproduction has been effectively prevented. On the upland of the Oxbow "island" and above the 600' contour the forest floor has been converted into a hard-packed dense grassy sod scattered through

Woodlot A 10 q
middle-west of
Section studied

A view of the creek
valley in the section
studied.

FS 7 10 P

with yellow ironweed, pigweed, curled dock, giant ragweed and scotch thistle. Down in the old stream channel, these weeds and many others, especially annuals have taken over almost entirely. Grass is at a decided disadvantage here for the spring floods deposit sand here each year, and at the same time scour away older depositions. Naturally under such relatively transient and unstable surface conditions which change from year to year hardy annuals have a great advantage.

Proposed Woodlot Improvement And Reforestation On The Farm

In the programme of increased production for the farm, woodlot improvement and reforestation plays a large part. A farm is only half a farm if its woodlot is a dwindling asset, if its submarginal areas are waste space. Now under the circumstances it has been deemed best to retire the river woodlot pasture area to the production of timber and wildlife and devote certain fields entirely to pasture.

At first the half of the river pasture area which belongs to the adjacent farm will be bought in order that the entire area surrounding the ox-bow lake may become one unit. This then gives us three types of planting areas --- the upland including the ox-bow "island", the old stream channel, which is prove to flooding, and the wet areas made up of long, band-like seepage areas on the river bank, and between the ox-bow lake and the 600' contour, and the triangular area at the north end of the ox-bow lake.

This future woodlot must be planned to produce timber and wildlife. Because of this and because of the variety in terrain a rather wide diversity in plantings is called for. For instance the control of erosion on the river bank will require as perhaps

the main control measure the planting of water-loving shrubs such as willow and red osier in a band along and extending above the normal water level. One stretch of bank right on the outside of the bend of the river will have to be sloped and protected by willow matting wired down to willow stakes before cuttings can be planted. Above this belt of water-loving shrubs will be another belt of bushes preferring a drier site, and this belt could extend into and be of much the same composition as the "wildlife border" which will encompass the entire outside boundary of the woodlot, following the present fence lines. This border will be about 20 feet wide. On its outer edge will be grasses, herbs, and low wildlife-food shrubs, ground junipers, vines etc. In its middle will be the intermediate shrubs which provide food for wildlife, and on its inner edge will be the tall bushes and the small trees --- flowering dogwood, flowering crab, shadbush, mulberry, hackberry, persimmon, osage orange mountain ash, nanny berry, cherry, hawthorn, etc. The ox-bow pond will require the same type of development to improve its edges. But here, besides the water-loving shrubs and trees we must take into consideration the herbaceous marsh plants, (rushes, sedges, arrowhead, water hemlock for example,) and the floating vegetation such as duckweed, and the submerged vegetation. Since the pond is to be a sanctuary for waterfowl the plantings along and back from its shores must be developed in such a manner that they will provide the optimum in supplying food and cover to nesting waterfowl and their young during the summer.

The low wet area at the north end of the ox-bow lake, the long, broad seepage area along the river bank, and the smaller seepage areas south of the ox-bow lake lend themselves to the planting of white cedar. The cedar will provide a dense evergreen winter cover

which this area lacks now. In the map of the area after improvement the cedar plantings in the river woodlot are shown in red. The wildlife plantings about the pond, and around the outside of the woodlot including those on the river edge are marked as a solid green line. A large stabd gully leading down from the cropped field north of the road to the southwest end of the ox-bow lake will connect the wildlife border plantings with the pond plantings. The bottom and sides of the broad gully will be planted to shrubs.

The old stream channel will be planted mainly to poplar, white willow, and sycamore and some black ash, but much of its length will be taken up with longitudinal extensions of the permanent wildlife plantings at the north and west ends of the ox-bow lake.

This leaves the upland, made up of the ox-bow "island" and the lands above the 590 foot contour line. This land is best suited to timber production because of its better drainage and its comparative security from flooding and ice damage during the spring break up. Much of this area is devoid of trees, but to facilitate growth of many of the young trees to be planted it will be necessary to remove all of the manitoba maples and as many of the red elms as is aesthetically feasible in order not to destroy the beauty of the area. This means that only twenty-two trees will be cut, and will serve to open up the stand only a little more than it is already. None of the hackberry trees, particularly the two giants, hollow veterans over 3ft. d.b.h. The smaller ones provide wildlife food, the larger ones furnish dens.

Species to be planted will include hard maple, basswood, black walnut, black cherry, white ash, red oak, hickory, tulip poplar, black locust, scattered through with occasional catalpa, cucumber tree, coffee tree, honey locust, american elm, papaw etc., to provide

an interesting variety among the timber producers. The author is aware that a silviculturist would consider this a wasteful practice, but the author is willing to lose some space by growing a few of these other species around the edges of the woodlot merely for the sake of variety.

Over much of the area the sod will be ploughed up, and the trees will be cultivated for two years after planting. But over some of the area planting will have to be by the spot method because the standing trees prevent ploughing. The trees will be spaced at a 6' x 6' spacing or as nearly that as possible and they will be planted in groups by species. This would mean that every square of 25, or 36 trees will be of the same species to prevent over topping by faster growing species as would occur were the species mixed up indiscriminately. Only hard maple and basswood will be planted under trees already standing. The intolerant species will be planted in the open areas where no standing trees will shade or interfere with them. In such a small woodlot as this the overtopping trees of the present remnant stand can be carefully trimmed as the under planted trees grow up, and finally be carefully removed when trimming no longer can prevent interference in the growth of the young trees.

This planting programme will extend over a period of years. The trees are supplied free by the Ontario Forestry Nurseries. But the wildlife plantings will have to be delayed until such a time as cheap and abundant nursery stock of these shrub species is available in Canada.

To date approximately five acres of the sandblowout have been reforested and this programme is almost finished. Two more acres remain outside the blowout to be planted, besides what ever replacing of failures is required.

In the spring of 1941 the author visited the forestry nurseries at St. Williams, Ontario, and was so overwhelmed by what he saw there he plunged with amateur enthusiasm into reforestation. Thirty-five hundred pines were ordered---2000 white pine, 1000 red pine, and 500 scotch pine. The five acres of the blowout and its outer rim were fenced off and about three of them were planted with the 3500 pines. When it was done everybody was all blistered and aching, sustained by only the glowing accounts in the forestry pamphlets of how fast the pines would grow, untouched by any harm, into tall groves. How soon were we disillusioned!

During the exceptionally dry summer of 1941 a good many of the pines died of drought and a half acre of white pines blew right out. In the spring of 1942 the half acre of missing white pines were replaced by 500 larger scotch pines. No other planting was done due to the labour shortage. During the snowy winter of 1942 - 1943 fully 80% of the pines were damaged in some degree by cottontails who came to feed. In the spring of 1942, 3200 pines were planted---1700 red pine, 1000 white pine, 500 jack pine. The jack pine were to be planted on a particularly dry sterile knoll with a bare eroding slope. Clear written instructions to that effect and a map were sent to the planters since the author was unable to be present at the planting. As a result the jack pines were planted on the low, moist, richer areas, skirting the outer edge of the blowout rim, while the white pines were planted on the dry sterile crest of the rim. The jack pine grew very well during the summer of 1943.

With the exclusion of stock from this area weeds and poplars invaded the bare areas so quickly that they are now a serious competition to many of the pines. You can cut out the poplars where they interfere with the pines, but you can't cut the weeds for fear of cutting the pines, and burning or grazing

is also out of the question. However the pines will probably pull through all right.

Around the outer boundary of this pine plantation there will eventually be planted the same kind of wildlife border as was described earlier in this chapter. The windbreak (one row of norway spruce, one row of cedar) runnning down the west side of the farm and shown in red on the map of the improved area is part of the future planting plans. Besides its function as a windbreak for the house and pastures, it will act as a travel lane and winter shelter for wildlife.

The Wildlife On The Farm And Surrounding Area

If this were a wildlife thesis then all else but the wildlife on the area and their habits would be irrelevant. But this is not a thesis on wildlife per se. However in such a study as this where we are attempting to gain the broad picture of multiple use we must make an attempt to find out how many animals and of what species are present on the section. Accordingly it was done.

A cover map of the section was made in the spring of 1943 using as a base map to give streams, rivers, roads and contours the Chatham sheet of the provincial topographical maps. This was enlarged from a scale of 1 mile to 1 inch to a scale of 1 mile to 8 inches. The fences and farm boundaries were marked in on the enlarged map by pacing. The cover types were marked in by symbols, following the ecological classification of Southern Michigan types, developed by Wight at the University of Michigan School of Forestry and Conservation. A copy of this classification is included in the thesis. As a result we have a topographical map of the section which shows also at a glance the ecological types on the section.

The most feasible method of censusing under the particular circumstances surrounding this study was by direct observation. Direct observation requires both keen observation and one of the attributes of God, and no matter how keen his powers of observation were, the author found it exceedingly difficult to be omnipresent on 640 acres. Then too, you can not expect to observe animals when they are quiescent, as they are likely to be during the midday heat, and conversely you can not expect to observe animals if you are quiescent, as you are likely to be "by the dawn's early light".

Therefore the author lived on the farm from June 12, 1943 to October 5, 1943, five days of each week from early Monday morning to late Friday night.

Each morning with dawn and each late afternoon and early evening the author set off to tramp over the area, paying particular attention to the hedge rows and wood's edges, to see if he could see any wildlife at the times it was most likely to be active. The route of each trip varied in order all of the section could be covered and observations made at different times. This was done to avoid a beaten path habit whereby the observer would be at a certain point at about the same time each day. With him he took copies of the cover map and coloured pencils. Whenever he saw an animal he marked down the symbol for that animal on the map at the location where he saw it. For example quail was represented by a "Q" and rabbit by "r" and so on.

Now the summertime is certainly not the best time of year for censusing by direct observation; but it was the only time available for the study and besides the observations extended into early fall and offset somewhat the disadvantages of summer. During summer quail and pheasant are scattered and nesting. While the quail can be censused by noting the whistles of the males and multiplying by two, the pheasant cocks have slackened in their crowing and there is certainly no indication in it of the sex ratio. Cover is abundant and easily hides the wildlife and their young, and in the case of squirrels and chipmunks there is no concerted activity yet to gather nuts for winter. Therefore in the light of the foregoing we must take the census figures only as an approximation for some species, a very close approximation perhaps, but not quite as correct a count as would be obtained from a track census for example.

When the period of observation was finished the bi-daily count maps were carefully looked over, and each day's count of each species was set down. When you have walked over an area twice a day for

several months you soon learn where to expect to see a certain animal, and with some species such as hawks, woodchucks, or the male bobwhite quails as they whistle you can include in your observation all the individuals on the area. However with species like rabbits, for example, it is highly improbable that an observer will see all the individuals on the area. Therefore in determining the animal population of the selected area the author was able to divide his results into those animals actually seen on the area and known to represent the total number of that species, and those animals whose probable number must be taken as the greatest number of that species seen on any one day. The number of racoons on the area was determined by a study of their tracks whenever conditions were right to produce tracks.

Here then are the numbers of the various species on the area.

Greatest Number Seen On Any One Day

Black Squirrel	12	
Cottontail Rabbit	14	
Deer (as of spring of 1943)	6	(2 bucks, 2 does, 2 yearling fawns)
European Hare	2	
Skunk	5	(1 female, 4 young)
Pheasant	5	(2 cocks, 2 hens, 1 chick)
Muskrat	2	
Weasel	1	(1 set of tracks)
Racoon	2	(2 distinct and separate sets
King Rail	2	(of adult tracks evidently a
Chipmunk	4	(pair plus the young of summe (of 1943)

Observations Actually Known To Be The Total Number Of Species

Bobwhite Quail	8	Whistling males -- therefore
	16	mated adults plus their young of the summer of 1943.
Marsh Hawk	2	(1 pair)
Black Duck	2	(1 pair, no young were observed)
Wild Mallard	7	(1 mother, 6 young raised on ox-(bow lake)
Red Shouldered Hawk	2	(1 pair)
Turkey Buzzard	2	(1 pair)
Green Heron	2	(1 pair)
Great Blue Heron	4	(1 pair)
Woodchuck	32	
Screech Owl	2	(1 pair)

This area is fortunate in having an herd of deer. The cut over area (A 10,) to the west of the area has been a main factor in attracting them for a dense growth of stump sprouts and bushes has come up since the woods, long famous for the beauty of its many dogwoods, was cut. And it is here that the deer tend to concentrate in winter, scattering and spreading out over the surrounding territory with the advent of spring. In summer tracks are frequently seen along both sides of the river, and crossing the pine plantation on the farm, and leading to and from the swale on the west side of the farm.

One early evening in July the author watched a doe and a 1943 fawn come down the river road and descend into the Ox-bow lake area. Single deer (2 bucks, 1 doe) were seen on three other occasions. Evidently these deer have escaped from the herd in the Rondeau Provincial Park on Lake Erie, 20 miles south. Finding suitable conditions they have stayed on the area and multiplied. Lack of ammunition has prevented their being hunted these last two years, and the deer have little fear of a man or his dwellings. However, when ammunition is once more available this idyllic situation will be terminated, leaving one less species to be considered in a wildlife plan for the section. But if through the most unlikely circumstances this herd is protected either through no hunting, or controlled hunting it will likely be a permanent attraction on the area as long as food and cover is sufficient. Indeed under protection, and if the excess population, the season's "crop" were not removed by shooting, this herd might serve as a nucleus to stock the surrounding land. Population pressure would cause a slow dispersion into the lands around , and because of the slight snowfall the deer would not be forced to return to a certain

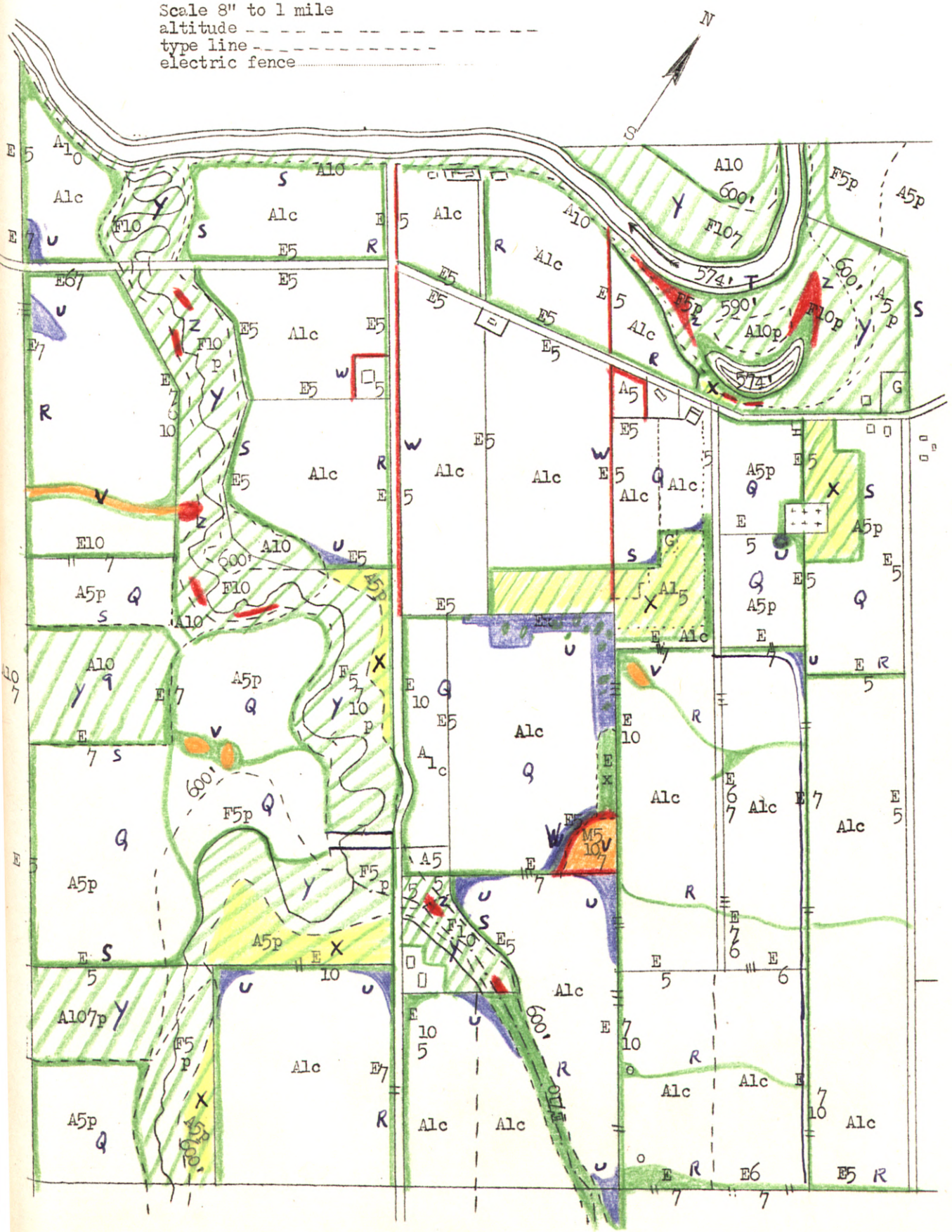
yard but could find shelter anywhere. Or else the excess population could be trapped and removed elsewhere.

The pheasantpopulation has suffered a severe decline in numbers the last few years. It has been the custom of the Kent Rod and Gun Club to release pheasants in some parts of the county each year; an d it is likely that from such stocking came the first pheasants to this section. According to local legend they were quite numerous for awhile but overhunting (according to the farmers) has brought them to their present insignificant numbers. The author is inclined to think that limited winter cover and the fact that the corn is brought in from the fields in the fall have had a considerable part in reducing the pheasant population. The pheasants made considerable winter use of the dense hedgerow along the farm boundary and the heavy brush growth bordering the little tributary stream which runs into the creek. As we shall see later there is a wide variety of food bearing plants in these hedgerows, and the little tributary valley provided shelter excellently. In its presnet state the area could support more pheasants than it does now, but their numbers would be limited by the capacity of the hedgerow and the brush along the little valley to support them. Elsewhere on this section there is little or no cover adequate to protect the birds in winter, nor is there much food available.

In its present state this section appears to be most favourable to the bobwhite quail. In early summer there were eight breeding pairs counted. As would be expected the nests, as revealed by the whistling males were located in the hedgerows or just inside the tree growth in the woods or along the river. The broad hedge row along the western farm boundary and the hedges radiating out from it together with the wide herbaceous border around the swale were particularly used by the quail. There has been no hunting of the

THE IMPROVED AREA

Scale 8" to 1 mile
altitude - - - - - - - - - - - - - - - - - -
type line - - - - - - - - - - - - - - - -
electric fence .....



quail for a long time, and since there is so little competition from pheasants it is likely that the present quail population represents approximately the carrying capacity of the section in its present state.

Woodchucks are an ever present nuisance on the area. The shortage of ammunition has allowed them to increas to a total of 32, and since there is plenty of food for them they will continue to increase.

As far as it can be determined there are at least 14 adult cottontails and 2 European Hares on the section. The rabbits were reputed to be particularly abundant in 1943.

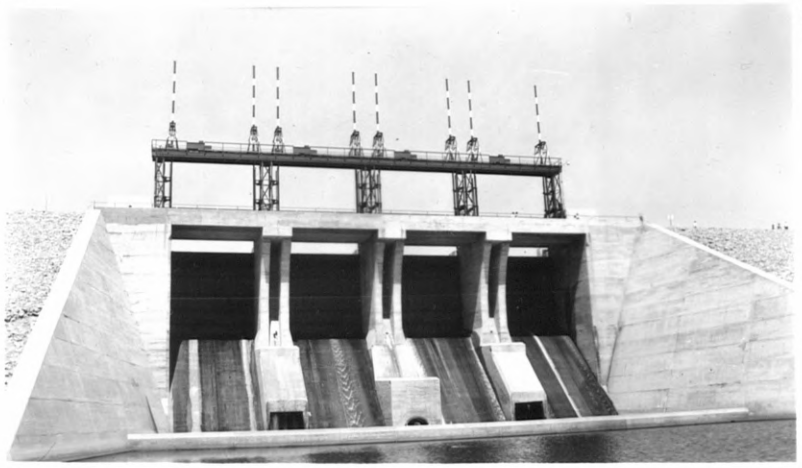
The following birds were seen on the section throughout the summer; black duck, wild mallard, green heron, great blue heron, turkey buzzard, marsh hawk, redshouldered hawk, screech owl, quail, pheasant, song sparrow, eastern chipping sparrow, mourning dove, goldfinch, meadow lark, redwinged blackbird, redheaded woodpecker, downy woodpecker, bank swallow, cardinal, robin, house wren, nighthawk, wood thrush, english sparrow, crow, grackle, starling, cat bird, blue bird, flicker, hermit thrush, oriole.

During the spring and fall migration periods the ox-bow lake serves as a resting place for considerable numbers of water fowl since the Thames River valley is one of the subsidiary flyways. As many as thirty ducks and twelve Canada Geese have rested overnight on the pond. No artificial feeding has been done, yet it would greatly increase the value of the pond as a resting place.

1 mile below Oxbow

The Thames

a cut-off meander
not yet an oxbow lake



The Grand River Dam
Fergus Ontario
flood control

The Bend of the Thames

Oxbow Farm.

"Beside Still Waters."

A List Of The Species Found In The Thick Boundary Hedgerow Along The West Side Of Ox-bow Farm

Plots 30 feet long were marked off at five equal intervals along the hedge, and a list of all the species in each sample plot wat taken.

PLOT NO. 1	PLOT NO. 2	PLOT NO. 3
Wild grape	Sassafrass	Manitoba maple
Thimbleberry	Blackberry	Staghorn sumac
Staghorn sumac	Wild bergomat	Hazelnut
Evening primrose	Blue Vervain	Cretaegus
Slender nettle	Black cherry	Wild plum
White vervain	(Golden rod	White lettuce
Catnip	(Solidego graminafolia	Elderberry
Sedge	Virginia creeper	Mulberry
Common milkweed	Common bittersweet	Wild grape
3 seeded mercury	Wild lettuce	Wild aster
Pleurisy root	Wild grape	Hedge bindwood
Cretaegus	Indian hemp	Marijuana
	White oak	Spearmint
	Trembling aspen	(Culver's root
	Black snakeroot	(Veronica virginica
	Elderberry	Black cherry
	Mulberry	Bitternut hickory
	Carrion flower	Indian tobacco
	Panicle dogwood	American elm
	Hazelnut	Cottonwood
	Agrimony	
	Raspberry	

PLOT NO. 4

Black cherry
White ash
Hard maple
Bugleweed
Giant Ragweed
St. John's wort
Blackberry
Daisy fleabane
Bittersweet
Carrion flower
Sand cherry
False solomon's seal
Beggar tick
American elm
Bur oak
Poison Ivy
Red Ash
Black walnut
Mother wort
Gerganot
Hackberry

PLOT NO. 5

Tulip poplar
Black cherry
Honey locust
Staghorn sumac
Bittersweet
Green brier
Wild grape
White ash
Hazelnut
Red osier
Panicle dogwood
Nanny berry
Snow berry
Hackberry

Species List of Marsh Plants Surrounding Ox-Bow Lake

To ascertain the number and prominence of plant species surrounding the Ox-Bow Lake 4 sample plots 6 feet square were laid out, one at each point of the compass. The plots bordered on the waters edge.

Plot Number 1. Species	Percent of Area Covered					
	1-10	10-20	20-40	40-60	60-80	80-100
Sedge				x		
Curled Dock	x					
Cockleburr	x					
Wild Astor	x					
Wood nettle	x					
(Maddog Skull Cap (Scutellaria lateriflora	x					
Dodder	x					
(Beggars Tick (Bidens frondosa	x					
Joe Pyeweed	x					
Hog peanut	x					
Barnyard grass	x					
(Bugleweed (Lycopus Americanus	x					
Elderberry		x				
(Wild cucumber (Echinocystes lobata	x					
Wild barley	x					
Wood sage	x					

Plots Species Number 2.& 3	Percent Of Area Covered					
	1-10	10-20	20-40	40-60	60-80	80-100
Arrowhead	x					
Boneset		x				
Joe Pyeweed		x				
Cattail			x			
Salix spp.		x				
Bugleweed	x					
Grass	x					
(Beggar tick						
(Bideous conata	x					
Sedge	x					
Sedge	x					
Speedwell	x					
(Smartweed						
(Polygonum hydropipus	x					
Water plantain	x					
Plot Number 3						
White vervain			x			
Yellow ironweed			x			
Swamp beggar tick	x					
Bugleweed	x					
Grass	x					
Curled dock	x					
(Golden rod.						
(Solidago spp.	x					
Wood sage	x					
Roundleaf Mallow	x					

Plot Number 4 — Species	Percent Of Area Covered					
	1-10	10-20	20-30	40-60	60-80	80-100
Touch-me-not		x				
(Smartweed						
(Polygonum virginianum	x					
Hog peanut	x					
Yellow ironweed		x				
Giant ragweed	x					
Bugleweed	x					
Wood nettle	x					
(Beggar tick						
(Bidens cernua	x					
Wood sage	x					
Coarse gentian	x					
Golden rod	x					
White vervain	x					
Grass	x					
Sedge	x					
Water hemlock	x					
Joe Pyeweed	x					
Wild cucumber	x					
Maddog Skullcap	x					
(Brown-eyed susan						
(Rudbeckia laciniata	x					
(Wild pepermint						
(Mentha canadensis	x					

The Management Of The Farm And Surrounding Area For Wildlife

The title of this section is somewhat misleading. The plan the author has drawn up is not a plan to "manage" wildlife but a plan to improve the environment for wildlife. And in this the true wildlife manager may be disappointed. But this thesis is not a wildlife thesis, although wildlife and its "management" necessarily enters into the picture presented by this study. Therefore it was felt that any "management" plan for the area must be one for which there was some possibility of its being set up. And with this limitation on the proposed plan the author was forced to the realization that even in just improving the environment for wildlife there were things which could not be done, however fine they might appear in an idealized situation. Now any programme which has to do with farmers must take into account the farmers themselves, their attitudes toward and their interest in the proposed programme.

Above all the farmer is first a farmer who sees in his farm a means of producing food. After that he may be interested in wildlife or he may not; he may be interested in conserving natural resources, or he may not; he may be interested in improving his relations with hunters, or he may not. All these other things and any attempt to institute any new programmes which they include, collide with the collections of attitudes the farmer has built up concerning his conception of farming.

In Kent County, and for that matter all over Southern Ontario the field of manipulating the environment for the benefit of wildlife has scarcely been touched. True we have certain game laws and sanctuaries, some of them very excellent. But wildlife management as it is known in the United States has not yet arrived. On the

other hand, we have in mind the high degree of pheasant management which was reached at Williamston by the late Professor Wight of the School of Forestry and Conservation of the University of Michigan. Williamston is a village in Michigan near East Lansing. Nea r the village Wight had developed an area and a system of management very successfully with a view to increasing the pheasant population. Farmer-hunter relations had been developed to a high and amiable degree. Permanent plantings to provide food and cover for wildlife were set out. Annual food patches were planted, and all the various cultural practices to protect nests and provide shelter and food were carried out. The whole arrangement was very successful. The pheasant population increased enormously. Thus we had these two extremes --- the one undeveloped, the other highly developed.

It might be expected that the smooth-working organization at Williamston would have continued when Wight withdrew his active support. Theoretically there was no reason why it should not have. Everything pointed to a rosy future. But with Wight's withdrawal the whole plan quickly collapsed. There is now no more wildlife management on the Williamston area than there is on the study area selected for this thesis. But the permanent plantings for food and cover are still carrying on their function, and thereby are supporting on the area more pheasants than the area could support without them, but far less than the area under a highly developed management formerly supported.

Therefore to be quite blunt, what is the use of bothering with developing a management plan for the area, if you are going to end up with approximately the same net effect as soon as the guiding energy is cut off as if the area had received no management at all?

With this in mind, and considering the topography of the countryside, the following plan for the improvement of the area for wildlife

was worked out. It is essentially a plan for permanent plantings, and rests on two main bases --- hedgerow developments and woodlot developments. The flat topography, lacking in marshes and kettle-holes and the value of the land for agricultural production were limiting factors in planting schemes.

It has been said that wildlife is a phenomenon of the edges. In other words there is little wildlife to be found deep in a forest on the one hand, or in the middle of a bare field on the other hand. Rather the wildlife is likely to concentrate along the edges of a forest and a pasture, or a crop field, or along the edges of waste land and farm land, or around kettle holes, or around marshes. Wildlife requires a diversity in their environment to provide them with food, and cover, and a breeding and rearing site, the three essential requirments of all wildlife; and far far too often agricultural practices of eradicating hedges, burning marshes, grazing woodlots and so on, have resulted in producing a wildlife desert, an area devoid of food a cover plants and barren of game.

The area under consideration in this thesis is fortunate in having at present several good hedgerows on it, but much of it is a desert. Therefore the first problem is one of creating a greater diversity in the environment. The reader is asked to consider the map accompanying this chapter. This map shows the future distribution of cover on the area, should such an improvement plan be carried out. The reader would do well to compare this new cover map with the present cover map of the area, near the beginning of the thesis.

The map is laid out so that the new plantings, and the hedgerows along the field boundarys would conform to any contour strip cropping, and other soil conservation measures which might be carried out on the area. Therefore some fields have been combined by the removal of

fences to facilitate this new strip cropping, while other fields have been subdivided by "travel-lane" plantings on contour lines. The reader ought to remember that this area is quite flat, and indeed some of the fields require no strip cropping or contour ploughing whatsoever

On the various coloured areas of the map have been placed the letters, X, Y, Z, W, V, U, T, S, R, Q. This is to facilitate discussion and intrepretation of the map. The letters found at the beginning of each of the following paragraphs designate the development scheme on the map, which is being explained.

X. All areas marked X (green and yellow cross hatching) on the map represent future conifer plantations. Those around the cemetery, and those extending out from the present pine plantation on the sand blowout on Ox-bow Farm will fulfill the main dual purpose of preventing further wind erosion, and of putting land already submarginal, or fast becoming so, into production of timber. The other recommended comiferous plantations serve the purpose of producing timber and of creating a varied woodland type in the hardwood forests. All the coniferous plantations will provide winter cover for pheasants and quail.

Y. All areas marked Y on the map (green and white cross hatching) represent present and future hardwood forests. All of the existing woodlands on the area are subject to various degrees of grazing. These should be retired from grazing, closed by electric fences perhaps. On this particular section these woodlands may be retired from pasturing with no interfering in the farm economy . The river pasture (grazed woodlot) of Ox-bow Farm is the exception to this. It has been discussed in a previous chapter. But all the other existing woodlands are grazed not through economic necessity, but through carelessness and ignorance of the harm done. While the existing woodlands are building themselves up new hard wood plantations would be set out to

connect up the existing woodlands, thus providing a greater variety of cover, producing more edge areas for wildlife to enjoy, and creating a continuous band of forest leading to all parts of the section besides preventing erosion on steep slopes. All these woodlot areas would be managed as farm woodlots to produce timber, fence posts, fuel, and wildlife. Den trees and some fruit bearing shrubs would be allowed to remain, as an aid to wildlife.

Z. All areas marked Z on the map (solid red) represent white cedar plantings on wet areas, either marshy areas or seepage areas. These cedar plantings would produce fence posts at a future date, and would provide winter cover areas for game in the more open hardwood forest belts.

W. All areas marked W on the map (red line) represent windbreak plantings. These would protect the schoolhouse, and various farm homes and buildings from piercing winter winds; they would prevent wind erosion on the Berrien Sandy Loam; they would reduce evaporation and thereby protect against drought on the light soils; and they would serve as travel lanes for wildlife, as for example the windbreak on Ox-bow Farm would connect the pine forest with the hardwood forest along the river. These windbreaks would consist of two rows of trees, the windward one of Norway spruce, the leeward of white cedar.

V. All areas marked V on the map (solid orange) represent swale developments. These swales are not kettle holes. Only the large one has a shallow depth of water in it in the spring. The three little ones are merely little hollows with damp bottoms. The three small ones would provide excellent little refuge and excape cover areas Plantings in these areas would include willow shrubs, elderberry, arrowwood, spice bush, chokeberry, silky cornel, red osier, winter berry, highbush carnberry. Ground junipers and a few cedars and barberries and wild roses would provide a sheltering ring around the

outside of the wet areas. The large swale is used during the winter frequently by deer, quail, and the few pheasants on the section. Already there is considerable bush growth in it but a greater variety of moisture-loving, food providing shrubs could be introduced, while some open areas may be left inside it. A windbreak of Norway spruce, and white cedar, around the outside as shown would greatly increase its winter-shelter value for deer and game birds. Outside of the windbreak strip would be an ungrazed strip of herbaceous vegetation, tall grass and weeds, which would provide nesting cover, safe from the cattle in the permanent pasture.

U. All areas marked U on the map (solid blue) represent areas of grass or mixed grass and weeds, ungrazed, and otherwise undisturbed. For the most part these would be corners in the contour ploughed fields which are too small or too awkward to plough, as for example the grassy area immediately southeast of the large swale. The broad grassy strips bordering the field the large swale occupies, are at present ungrazed and uncultivated, because of invasion of the shrubs and aspen from the hedgerows, and because of the danger of wind erosion on the knoll at the north end of the field. These grassy areas would provide crowing areas for cock pheasants, and undisturbed nesting areas for both quail and pheasant, as well as roosting and resting cover. All these grassy, herbaceous plots would be kept essentially free from brush invasion.

T. All areas marked T on the map (green line along river) represent plantings of moisture-loving shrubs and trees for the main purpose of controlling stream bank erosion (if it be possible by plantings alone) and for the secondary purpose of providing food and summer cover for wildlife.

S. All areas marked S on the map (green line around outside of woodlands) represent wildlife border plantings along the forest edges to increase the food and cover value of the edge area. These border plantings would be 20 to 30 feet wide, or even more. On their outer edge would be an herbaceous strip, next would come a strip of low shrubs and vines including clumps of ground juniper to provide winter cover. Next would come a belt of intermediate shrubs, next a strip of high shrubs and finally last of all before the forest proper the row of small trees such as flowering crab, mountain ash, flowering dogwood, mulberry, hawthorn, osage orange, pawpaw, and a row of other trees including the cherries, hackberry, honey locust, various nut trees, and some spruces and cedars.

R. All areas marked R on the map (solid green field boundaries) represent the hedgerows. Composed of the proper species these hedgerows may be planned to grow to any desired height, from low travel lanes 3 to 4 feet high, to high boundary hedges containing tall trees. With carefully planned species composition they may be made to serve a multitude of purposes from beautifying the farm and aiding in wind and water erosion control to providing travel lanes to all parts of the section, food, winter cover, refuge cover, escape cover, nesting cover, roosting cover, and resting cover for farm game. The following species may be included in both woodland border plantings and in the various types of hedgerwos for Kent County. Norway spruce, scotch pine, corsican pine, white cedar, black locust, honey locust, various nut trees, siberian pea tree, osage orange, the cherries, mulberry, mountain ash, flowering hop hornbeam, hackberry, shadbush, highbush cranberry, willow bushes, panicle dogwood, red osier, Japanese rose, raspberry, blackberry, huckleberry, coral berry, green briar, carrion flower, snowberry, solomon's seal, false solomon's seal,

red-berried nightshade, tatarian honey suckle, prickly ash, nannyberry, oriental bittersweet, common bittersweet, wildgrape, virginia creeper, matrimony vine, honeysuckle vine, woodbine, Japanese barberry, juneberry, wild plum, persimmon, sumac.

Q. All areas marked Q on the map represent permanent pasture areas. Those fields so marked on Ox-bow Farm, and the field containing the large swale must become permanent pasture to prevent their eventual blowing away by wind. It is expected that these permanent pastures would be well managed and properly fertilized. Strip cropping in creating more edges and greater diversity of cover would also benefit farm game.

Such then is the primary "management " plan for the section. It throws the full weight of increasing the wildlife population, and in particular that of pheasant and quail, on the permanent plantings which would provide food and cover. For instance summer food would include Virginia creeper, Juneberry, cherry, plum, elderberry, blackberry, raspberry, and mulberry. Fall and winter food would come from bittersweet, hawthorn, sumac, winterberry, wild grape, snowberry, persimmon, viburnum, hazelnut, oak, walnut, mountain ash, crab apple, dogwood, Japanese rose. Song and insectivorous birds would also benefit greatly from these plantings.

But with these permanent planting plans and developments there would have to be enough control over hunting so that adequate numbers would be left to restock the area each year. Overshooting ruins the effect of improved environment.

Providing the farmers allowed the hedge and reforestation plantings to take place, and withdrew their existing woodlots from grazing, and then continued year after year to maintain their hedge rows and forests, such an improvement plan would give considerable satisfaction in increasing farm game while not throwing extra labour

on the farmers, especially those who would not have developed any particular interest in wildlife.

So far nothing has been said of emergency winter feeding (which is now considered hardly ever necessary since most species if given adequate cover can fast for long periods), of leaving corn standing or shocked in the fields over winter (a custom not followed in this section), of leaving rows of grain along field borders for food and cover, of leaving uncut strips of hay, or sparing "islands" of hay around the nests, of predator control (a subject best left quite alone until one is entirely sure some little control is necessary) of temporary food patches planted each year, of constructing feeding stations, and artificial escape cover. Of all these things nothing has been said.

In the opinion of the writer they constitute what might be termed the secondary management plan. This is the true "management" plan whereby the wildlife manager and the dwellers on his area use all the means at their disposal to artificially increase the population of the desired game species, and to maintain it from year to year at this high level for some altruistic purpose such as shooting for a farmer-hunter club, or a game club, or for the hunting enjoyment of some wealthy individual whose hobby is game raising on his estate. Such an intensive plan requires first and always a guiding energy, a directive genius, a person that is the wildlife manager whose duty is to know the area and its wildlife thoroughly and to see that such intensive management is maintained, and secondly a farmer group interested in and educated in farm game management plans are not likely to occur other than in certain local areas throughout the country where conditions have been just right to result in the development of such intensive manggement for some certain purpose.

The writer feels that it will have to be the primary management plan upon which we must rely to increase farm game throughout the agricultural counties as a whole. And even that policy of maintaining and managing hedgerows and ungrazed farm woodlots will require a great deal of education and persuasion among the farmers.

A Summing Up

We have set down in this thesis our conception of what can be done in the rejuvenation and rehabilitation of the particular farm, Lot 19, River Road, Harwich. In reality it is only giving the farm a good "face-lifting". We have set forth a plan for increasing the agricultural productivity; we have laid down a sequence of annual planting programmes for eventually building up the forest resouces of the farm; we have shown how the farm and the section surrounding might be improved to provide a better habitat for wildlife and yet not interfere with farming practices nor place a heavier burden of responsibility and labour on the farmers. And, above all, we are indeed fortunate that through the willing co-operation of the farm's present tenants, we have been able to start on this programme. It is no longer a phantasy on paper; its inception is an accomplished fact; and its full development will be realized.

But the reader may well say "This is an exception caused by a rare and happy combination of willingness and interest on the part of the tenant and interest and economic means on the part of the owner." Indeed, it is just that, " a rare and happy combination".

Again the reader may say," But you'll never get the farmers on the whole to do a thing like that, by themselves." And we answer that we do not expect the farmers as a whole to do it by themselves. Here and there an individual, progressive farmer, through his own volition may commence and carry through such a combination programme of multiple land-use on his farm. But to move the great mass of farmers will take a long lever of education. The inertia of conservatism and of necessity born of economic limitation is very great.

The time is very near when the farmers on the whole must become

specialists if they are to survive as independent entrepeneurs playing their rightful part in society. The old ideas, the old slipshod methods and concepts remaining from the relatively simple pioneer life must give way to a new vision of farming in the new Canada. In four years, under the stimulus of war production Canada has undergone a tremendous surge of industrialization almost unbelievable in its scope. Her economy has changed from an agricultural economy to an industrial economy. Never again will we be predominantly an agricultural nation. And it is this fact that the farmer must recognize.

1. The farmer is a producer, and his claim to a place in the new industrial economy must rest on his ability as a producer of food. With the Canadian economy changing from an agrarian economy to an industrial economy there must come a new agrarianism. This would not necessarily mean a physical revolution in the rural life of the nation such as socialization of the land, nor would it mean necessarily the continuing of our price control schemes, nor the developing of new legislation or new marketing methods. Rather the new agrarianism would be a revolution of attitudes, as far reaching in its effect as a physical, political revolution, but far more enduring and certainly devoid of the evils of physical revolution. New attitudes and convictions would replace the old. The new agrarianism would be revolutionary in that it would place food ahead of farmers. It is startling to realize that food is as important to an industrial economy in peace as it is in war. We do not think of that! Therefore the new agrarianism must be an industrial agrarianism which would create a farm policy to assure a continuous supply of nutritious food raised by a relatively few specialists so that the rest of the working force could be in factories. (One of the drawbacks in the industrial development of modern China is the great

1. Moore has expressed and enlarged upon the same idea as in this sentence in his article "The New Farmer", Arthur Moore, Atlantic Monthly, December, 1943.

number of people employed in tilling the soil to wrest a living from it, which results in preventing a division of labour. Too many people are working in one occupation with the result that too few are left over to work at other jobs.)

Food for workers is the first and most important raw material, and if agriculture were allowed to decline the whole industrial economy must ultimately collapse unless enough food could be imported to adequately feed the nation as a whole. Therefore to take his rightful place in the national economy it is up to the farmer to develop the most efficient means of producing food, and use the most effective methods of conserving the nation's soil, and in agricultural communities, the wildlife and woodlot forest resources.

We hear more frequently with the recent swing, to the left in Canada glib phrases from the more rabidly radical Socialists concerning the confiscation of farms and socializing the land for various reasons, such as for example the innocuous one of raising the standard of rural living or the more sinister one of destroying the last bulwark of rural resistance and independence and private initiative which may stand in way of the all-embracing planned economy of the iniquitous doctrine. To deprive person's of their right to private property, to deprive them of their economic freedom is to deprive them of their political liberty. The proper scope of society is to aid the individual in his fullest personal development both economically and spiritually. Society is a means to an end. When it becomes an end in itself it inevitably becomes a society of repression and slavery. There are those in Canada who worship the

god-like State, wherein the State is all in all, controlling all means of production, owning all wealth, possessing all property. They would create a god of a servant, and in their religious zeal they would destroy those who fail to worship the new god. Let them beware, lest they who created this god be in turn destroyed by this same god turned monster.

Thus we have the Canadian farmer faced with the necessity of finding his proper place in the new industrial economy, with the possible threat of confiscation of his land, however remote that may be. We said before that the new agrarianism did not necessarily concern legislation, marketing devices, or price-controls, but these would be of a definite aid to give the farmer an adequate income to pull himself up to his new position. For if the farmer, that is the average, or poorer than average farmer continues in his present path he will ultimately lose his land to his more progressive neighbour who will expand his holdings, or all will face a serfdom on land which is no longer theirs. But if the farmer in spite of all education, all economic and material helps refuses to become a skilful producer of food for the workers then eventually whatever Government is in power will be forced to deprive him of his land. And socialization of the land loses its iniquity only when there is a wholesale refusal on the part of the mass of farmers to become better farmers.

The foundation of a stable national life is a contented, conservative and stable rural population. We would like to see as many farmers as possible owning their own land, not renting, and free from mortgages. However evil has been the present absentee -- landlord system, or the share cropping system, they would solve themselves under the revolution of attitudes in the new agrarianism.

The mainstay of the new attitudes towards farming would be a deep conviction that the soil is a national trust. We have no greater precept than the words of the Psalmist "The earth is the Lord's, and the fulness thereof, the world and they that dwell therein." The religious would conceive man as the steward of God's estate, the irreligious would conceive of man as the steward of the nation's estate. To us in Canada, and particularly in rich, fertile Southern Ontario has been given just so much land. It is limited in area; it is exhausted even in the short period of our agricultural history. Yet this soil, this living thing teeming with organic life and holding in itself the life of our nation is our most precious resource.

With this concept of the earth as our priceless heritage there must go a firm conviction of multiple use of the land. The Ontario farm must be more than a piece of land to produce crops. It should produce timber and wildlife to realize the fullest economic use, especially if it be a farm with areas of poorer soil, or sizeable awkward corners difficult to cultivate. Most of us know of the aesthetic and economic value of a farm woodlot. But fewer are aware of the same values in the wildlfe population in a farming area. Therefore the new farmer must come to see himself as a specialist in food producing, as a conservator and builder of the soil, as a conservator of the forest resources, and as a conservator of the wildlife resources. He shall be no longer the rude country bumpkin, the butt of city jokes; but rather shall he bear the dignity and responsibility of one who guards the very foundation of our national existence --- the land and its multiple resources, and preserves it from generation to generation.

The marginal farmer who struggles along each year, sometimes paying his taxes, sometimes not, who cannot give his family a decent living, is not a man to be a steward of the land. According to our

idea of material comfort required for a so-called happy life he can not be a guardian of the land for his is desperately draining it of its resources in a losing battle in an attempt to get ahead. In Japan, the average farmer with far less material wealth than the below---average Ontario farmer, is forced in desperation to conserve and build up his soil so narrow is the margin which separates him from subsistence or starvation.

To treat the soil, the woodlot, the wildlife as they should be treated the skilled food producer must be granted the good things of an industrial economy on a basis of full equality with other skilled producers. And although a higher standard of living is by no means the sole avenue to the more abundant life, as some people and parties think, it is a certain help, and therefore in our new agrarianism there cannot exist a lower standard of living in the county than exists in the city.

The new agrarianism must rest on a foundation of attitudes rooted deeply and firmly in the individual and collective consciousnesses of the farmers. These new attitudes towards soil, forest and wildlife, must become an integral part of Canadian agricultural tradition. And when the farmer sees himself in the light of these new attitudes his relation to society as a whole will appear in a new aspect, and his mind will be more open to technical improvements in farming methods, new methods of conservation, and new advances in agricultural research. Then upon this base of new attitudes can a future Government with confidence build an enduring superstructure of legislation and price guarantees etc., as they may be needed, to aid, by material means, the farmer in his most important task in his new and rightful place in an industrial society.

Therefore the immediate and most essential task of the Canadian conservationists is to formulate and launch an intensive plan of conservation education for the public as a whole. The overall plan for education ought to consist of sub plans each embodying the principles of conservation laid down in the master plan, but which could be directed especially to certain groups within the public as a whole. For instance the education plan for the farmers would stress soil conservation mainly, but would also include reforestation, farm woodlot management, and certain aspects of wildlife management as it ties in with soil conservation and reforestation.

Plans are being made for conservation and reforestation schemes as rehabititation measures in post-war Canada. But it will be a kind of putting the cart before the horse to carry out these schemes if the public does not realize their need and value. How are the farmers to accept certain soil conservation measures whose carrying out is employing hundreds of discharged men, if the farmers have never even heard of soil erosion?

This programme of education must seek to impress people with the need for conservation and must attempt to instil in each person (and particularly in each farmer) a strong sense of HIS OWN PERSONAL RESPONSIBILITY in guarding and conserving the nations resources. We must plan in terms of generations for the conservation programme will last from generation to generation. The missionary work of the new gospel should be carried out at every opportunity, through the aid of pamphlets, movies, speeches and shool courses. All the varied facilities for educating the masses, all the techniques of propaganda ought to be brought to bear upon the public in an intensive "softening-up" campaign to prepare the way for the inception of the first of the post war conservation works and those that will follow as the Government becomes more interested in conservation.

But where the greatest task will lie will be with the children, especially in the rural schools. In training their minds, their children's and their children's children's, lies the hope of the eventual full development of the new agrarianism. That is why we must plan and educate in terms of generations. The process of education must continue until the new attitudes no longer are strangers struggling against older, established ones, but are simply taken for granted as the traditional and mind-enveloping outlook of the farmers as a whole.

Following somewhat behind the education which will have paved the way for it there should be developed by the Government a system of economic aids which will enable the farmer to raise his standard of living and be one of the means whereby he can institute his conservation programme. But as we have said before, there is little point in subsidizing farmers to plant trees, to set out wildlife plantings, and in laying out soil conservation measures on his lands until he is quite aware of the need for them, and intends to continue in keeping his plantations, terraces, hedges and so on in good condition.

Let us consider the economics of soil conservation. These same economic stresses which play upon our efforts towards conservation of the soil, will also guide our endeavours in conserving farm woodlot and wildlife resources to much the same degree. To conserve our soil, our woodlots, our wildlife is to maintain from them a certain level of productivity for an infinite period of time.

Under our present economic system any such programme of conservation will have to tie in with a practical management plan so that the benefits derived from the programme will equal or be greater than the costs involved. 1. Weitzell distinguishes economic conservation whereby benefits equal or are greater than costs, from physical conservation wherein the cost-benefit relationship is not

considered. He further explains that erosion of farm lands might be retarded or totally eliminated by engineering methods; but, unless all the costs of such control are economically justifiable in terms of future incomes, the result will be physical rather than economical conservation. While we recognize that a Canadian conservation programme has to be one of economic conservation in its early stages, at least, we wonder that if in the long run you can possibly measure the value of a conservation programme in dollars. Sooner or later a (1. E. C. Weitzell "Economics of Soil Conservation --- Individual and Social Considerations" Journal of Land and Public Utility Economics Volume XIX, No. 3, Aug., 1943.) province or nation comes to a point of necessity where conservation has to become purely physical, with all considerations of a so-called economic conservation thrown aside in order to survive. Sheer necessity more than justified the terraces vineyards along the Rhine, the ancient terraced fields of the Incas, the tiny terraced farms of Japan. Yet in everyone of these cases these conservation works were economically unjustifiable.

But while Canada has hardly started on a path towards such necessity, in our economic conservation programme it should be the highest total net benefits that will guide the application of measures designed to achieve conservation. The aim of conservation of soil, of woodlots, of farm wildlife --- is to create conditions which will make full use of present resources while maintaining for future generations the same productive capacity.

Conservation must be carried out both by private enterprise and public enterprise (i.e. governmental works programmes). Now the farmer is not only a private entrepeneur but he is also a consumer, and important fact for an industrial economy; and it as a private entrepeneur it is up to him to be the conservator to the extent that public control measures are lacking. In the best interests of society

throughout their lifetime, the income of society is thereby maximized in perpetuity.

The new agrarianism means a belief in living on the continuous productivity of the land --- the land is more important than any one farmer, or any one generation of farmers. Therefore in order to conform with this belief the farmer at times may be forced to make sacrifices in labour and income in order to maintain his land, or to rehabilitate poor land. The get-rich-quick idea is especially evil in a rural community, resulting as it does in mining the land, and minimizing the income of society in perpetuity. The land, the farm woodlots, and the farm game are precious resources and the greatest net gain from them is derived only by increasing personal care of and labour on them with the view of maintaining maximum production. This is where the concept of the stewardship of the land and its resources enters in. The best interests of the farmers as a whole are coincident with best interests of the society as a whole, no matter what the individual farmer under pressures of the moment may think.

As we have said before the new agrarianism of the new industrial economy of Canada must be a progression toward a more highly specialized and technical agriculture which in turn through increasing the farmers' incomes will result in an increased consumption, properly comensurate with increased industrial production. Therefore after educating the farmers in the need for conservation, and developing in each one a sense of his own responsibility to himself and society in conservation, the farmers must be shown that it really pays (immediately and in the long run) to follow the methods of management and operation in conservational farming whereby it is placed on a par with industrial efficiency. Through institutional adjustments by the government and through education the "time

preference" in agriculture must be changed. The time preference is a tendency on the part of individuals to consume and disinvest in their resources, rather than to conserve for a somewhat uncertain future.

1. Weitzell has set down four basic causes promoting in the individual a present time preference. They are as follows:
"(1) Urgent needs (subsistence) in the present, irrespective of what the future may hold; (2) uncertainty and distrust of the future and the lack of acceptable productivity;

1. E. C. Weitzell -- Economics of Soil Conservation -- Individual and Social Considerations. Journal of Land and Public Utility Economics, Aug., 1943.

(3) the finity of human life; and (4) the careless or prodigal desire to exploit. All are based on the desire to consume in the present and, in terms of soil conservation, the possibility of passing the costs on to the future in the form of damaged land. Thus, future owners or society must reinvest in and rehabilitate lands depleted in the past if these lands are to be used in the most effective manner in the future". Look at the concrete example of Ox-bow Farm where Park now pays for the carelessness and neglect of Patterson, the former owner. In order to build up the farm, a good deal of expense and labour will be involved.

Present time preference is therefore opposed to conservation; but future time preference is consistent with the maintenance of productivity. The Socialists, glibly throwing around the concept of time preference, have used it as a delightful excuse to bombard the public with such ridiculous generalizations that only the State (and the Socialist State at that) can afford to save the soil and its resources since the private, independent farmer is always forced to the present time preference; and that therefore this means that the land must be "socialized" --- a euphemism for theft and

and confiscation and liquidation of the kulacks, in this instance. "Socialization" of the land is not the answer. The solution lies in reconciling the interest of the individual with the interests of society in making expenditures for conservation of the land, the woodlots, the wildlife.

The State and the Individual must work together to this end. They must compromise and co-operate. They must resolve their differences on a common ground, and follow a middle road, avoiding extremes. Unregulated, rapacious private enterprise may be as bad as unbridled, complete state-control always is. We do not wish to insinuate that there are no good Canadian farmers. Indeed there are very many. Neither do we hint that the federal and provincial governments have ignored the farm problem, for that would be false and misleading. But we say there must come a greater co-operation between the governments, representing the State, and the farmers, representing the Individual, whereby the State provides the Individual with certain aids to aid his economic and spiritual development, and whereby the Individual repays the State with a deep sense of his responsibility to society as a whole, in the present and in the future. Therefore any government in attempting to improve social welfare must combine the general interest in current welfare (that is the short-time welfare of the Individual, his present time preference, instinctive because of the shortness of his life and his desire to enjoy it) with appropriate provision for the well-being of posterity (that is the long-time welfare of the State, the future time preference necessary for the good of society as a whole and necessary to provide for future Individuals).

Therefore the government must control private enterprise (i.e. in this particular case we emphasize farming) to the extent that certain evils in the free enterprise system as it exists to-day

be eliminated, at the same time applying certain measures whereby the resourcefulness and independence of free individuals in running their own enterprises (more particularly we mean farms) may develop more fully within a protective framework of controls which guard the right of future individuals.

Much is being said and done in Canada to-day about various conservation schemes to be carried out as parts of the post war rehabilitation schemes. Much money is likely to be spent in order to keep up employment. But there is no excuse in spending foolishly. Public funds should not be spent in restoring, conserving and building up privately owned resources if the owners are likely to continue exploiting these resources, disregarding the cost to society as a whole and to whoever follows them in ownership of the resource. The government rather should buy up submarginal lands and proceed to reforest them, if forests were their original cover, or restore them to their origianl swamp, if such they were, to conserve water resources And in both instances the work of reforestation, of forest management, and of swamp or marsh restoration should be carried out in such a manner that optimum conditions for wildlife are created. (To plant and manage a forest so that it becomes a biotic community rather than endless rows of timber trees with no wildlife will break the hearts of silviculturists. But is the equanimity of a silviculturist more important than our farm and forest wildlife resources?)

Wherever there are any agricultural areas that the government may intend to rehabilitate, and whenever any soil conservation service is set up, the conservation plan which may be applied to any areas should be a carefully thought out, integrated plan which would include in itself the necessary measures for soil conservation, for improving the environment for wildlife, and for reforestation.

Especially should the work of a Soil Conservation Service include as subsidiary but necessary adjuncts the practices designed to build up wildlife and farm woodlot resources. Never should the soil conservationist be concerned only with conserving soil, the zone forester only with growing forests, the wildlife manager only with managing wildlife. Each should have a knowledge of the others problems; and all should work in conjunction. (This of course is presupposing wildlife managers. We already have zone foresters to aid the farmers, and soon perhaps we will have our first soil conservationists, per se. The wildlife managers may be a long time in coming.) There should be at least one representative of each field in each county and over a group of several counties a "co-ordinator" of conservation could be placed to supervise and co-ordinate the respective projects of the three fields that the efforts toward building a new countryside may be concerted and harmonious. Moreover it is most highly important that, before entering into any grandiose conservation schemes, such as a plan covering an entire watershed like that of the Grand, or the Thames, the government know exactly what it intends to do. Let there be careful planning among the various government departments, ministries, and agencies beforehand, in order that once the over all task is begun there will be no clash of purpose or results of the various smaller projects composing the main scheme. Sound planning and co-ordination before hand will save a lot of red faces and expense afterward.

We offer these comments in this final summing up as suggestions for the building of a better Canada. We have seen what can be done with one farm; we can visualize what can be done with a county, with a province. Improving rural conditions, and conserving rural resources is but one phase of the task; yet it is one of the most important phases.

Let us build our Canada into a great nation. Let us turn our great energies from warmaking, when peace is come once more, to laying the foundations of a good society, to conserving our natural resources, and to rehabilitating our waste areas, that our descendants may live in a land yet more fair. Above all let us serve her wholeheartedly.

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