

FORESTRY

CHAPTER 1

THE FOREST

1. At the Time of Settlement

Looking at the woodlands of the Thames Watershed today, one feels like the archaeologist who discovers a few bones of some prehistoric monster and from it strives to create a picture of what the animal was actually like in its native environment. In the case of the forest in Southern Ontario, we are somewhat more fortunate than the archaeologist in that we have the works of contemporary writers to help us in reconstructing the scene, and from these we are also able to learn the reasons for the animosity of the pioneers to this great, oppressive and fearsome thing which overlay the good earth and must be hacked, slashed, beaten down and burned if they themselves were to survive.

Anna Jameson¹, travelling by stage coach from Toronto to Detroit in 1837, gives the following picture of the forest between Brantford and Woodstock as seen through the eyes of a visiting Englishwoman:

"No one who has a single atom of imagination can travel through these forest roads of Canada without being strongly impressed and excited. The seemingly interminable line of trees before you; the boundless wilderness around; the mysterious depths amid the multitudinous foliage where foot of man hath never penetrated, and which partial gleams of the noon-tide sun, now seen, now lost, lit up with a changeful, magical beauty...the solitude in which we proceeded mile after mile, no human being, no human dwelling within sight."

Later on she gives a vivid sketch of the typical clearing:

"The aspect of these was almost uniform, presenting an opening of felled trees of about one acre or two...great heaps of timber trees and brushwood laid together and burning; a couple of oxen dragging along another enormous trunk to add to the pile. These were the general features of the picture framed, as it were, by the mysterious woods."

At one place she stops and chats to a settler

1. Winter Studies and Summer Rambles in Canada - Anna Jameson, 1837;

who has one hundred and fifty acres of land of which he has cleared five to six acres in the past five years. He tells her, "You may swing the axe here from morning to night for a week before you let the daylight in upon you",

The settler's aim was to eliminate the trees, for they interfered with all his works of farming, road construction and town-site development and he attacked them with every means in his power. Anna Jameson describes a ghastly sight on the road between Hamilton and Brantford:

"I remember a stretch of about three miles on this road, bordered entirely on each side by dead trees, which had been artificially blasted by fire or by girdling",

and remembering the park-like estates of her own land expresses her feelings thus:

"I cannot look with indifference, far less share the Canadian's exultation when these huge oaks, these unbrageous elms, and stately pines, are lying prostrate, lopped of all their honours, and piled in heaps with the brushwood to be fired, - or burned down to a charred and blackened fragment - or standing, leafless, seared, ghastly having been girdled and left to perish".

Not all the forest was dense and dark, however; the Indians originally cultivated the bottom lands, notably at the confluence of the North and South Branches of the Thames. Mrs. Jameson also describes more open types of forest:

"Oxford, or rather Ingersoll, where we stopped to dine and rest previous to plunging into an extensive pine forest called the "Pine Woods"... The forest land through which I had passed, was principally covered with hard timber as oak, walnut, elm, basswood. We were now in a forest of pines, rising dark and monotonous on either side... These seven miles of pine forest we traversed in three hours and a half; then succeeded some miles of open, flat country called the oak plains and so called because covered with thickets and groups of oak dispersed with park-like and beautiful effect..."

Major Littlehales ¹, returning with Governor Simcoe from Detroit to Niagara in 1793, describes the site of the future City of London as follows:

1. A short, topographical description of His Majesty's Province of Upper Canada. D. W. Smith. 1799.

"A pinery upon an adjacent hill knoll, and other timber on the height well calculated for the erection of public buildings...We ascended the height at least one hundred and twenty feet into a continuation of the pinery already mentioned, quitting that we came to a beautiful plain with detached clumps of white oak and open woods. Then crossing a creek running into the South Branch of the Thames, we entered a thick swampy wood."

The woods of Oxford County were described in 1876 ¹ as follows:

"In its primitive state the towering pines of Blenheim had fellowship in those of Norwich and Dereham (Townships) while the maple leaf was seen in richest luxuriance in the Oxfords, Zorra and Nissouri (Townships)."

Similarly of Perth County it was stated:

"Parts of the County ² - particularly in the townships of Ellice, Logan and Elma abound in swamps of considerable extent, so great in fact, that until within comparatively few years the great morass known as the "Ellice Swamp" and covering many thousands of acres seemed to defy the efforts of man to subjugate it, so far as to make it habitable territory or even to penetrate it, in parts with ordinary highways...Perth occupies the height of land of Western Ontario, two branches of the Thames as well as the Maitland and the Nith (Rivers) rise here."

These early descriptions indicate that the original forest was predominantly hardwood with a sugar maple - beech cover type which, with associated southern hardwood species, occupied the best soils. Soft maple and elm occupied similar but poorly drained soils on the higher land, particularly on the heights of land between watersheds. Oak, in open park-like groupings, held possession of the sand plain while scattered white pine trees towered above the hardwood forests and grew in stands on well drained loam soils. White cedar and mixed woods of white cedar, hemlock, white pine, soft maple and yellow birch grew on the muck areas.

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1. Topographical and Historical Atlas of the County of Oxford, 1876.
 2. Illustrated and Historical Atlas of the County of Perth, 1879.

The suitability of the greater part of the soil of the Thames Watershed for cultivation and the inimicable attitude of the settlers to the forest led to a very rapid depletion of the woods, and the swing of the pendulum carried the clearing of them past the bounds of economic necessity and past the point which would have left the minimum area of woodland required to protect the natural water-storage areas of the watershed.

2. Since Settlement

The attitude of the early settlers to the forest was completely hostile, as has been shown, which feeling was very natural because the forest was undoubtedly the greatest obstacle to the economic development of the land. Part of the animosity may have been engendered, too, by the fact that, not so many years previously, the forest had sheltered the native Indians who had harassed the homesteads farther east. This ingrained antagonism became a sort of vendetta which has only begun to disappear in comparatively recent years.

When a new area was opened for settlement the best land was naturally taken first and the rough and swampy areas were avoided. Land was usually cleared first along the fronts of the farms and the woodland cut farther and farther back toward the end of the farm which lay farthest from the road. This was done, in many cases, without reference to the quality of the soil except where it was swampy, with the result that the majority of woodlots now lie at the back of the farms between the concessions.

The land bordering swamps was eventually taken up, the swamps were partially drained so that the edges became dry enough for partial cultivation, and the forest was pushed back so that today the centres of the swamps form the nuclei of all the larger patches of woodland in the Thames Watershed. These swamps also form the largest natural sur-

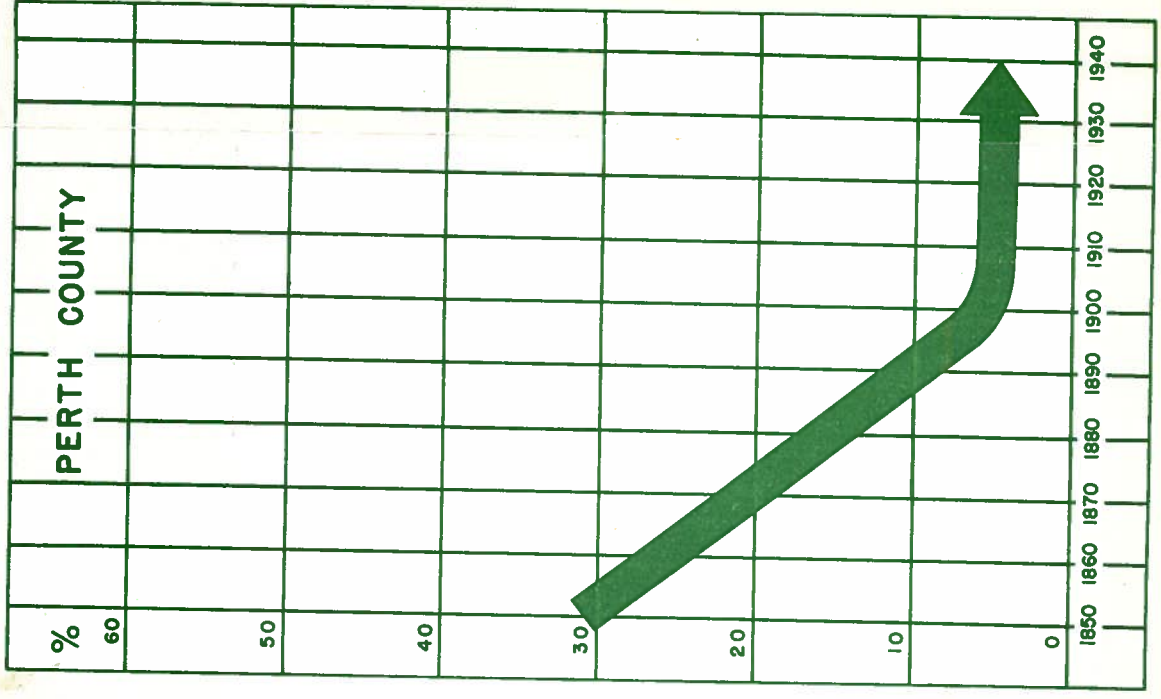
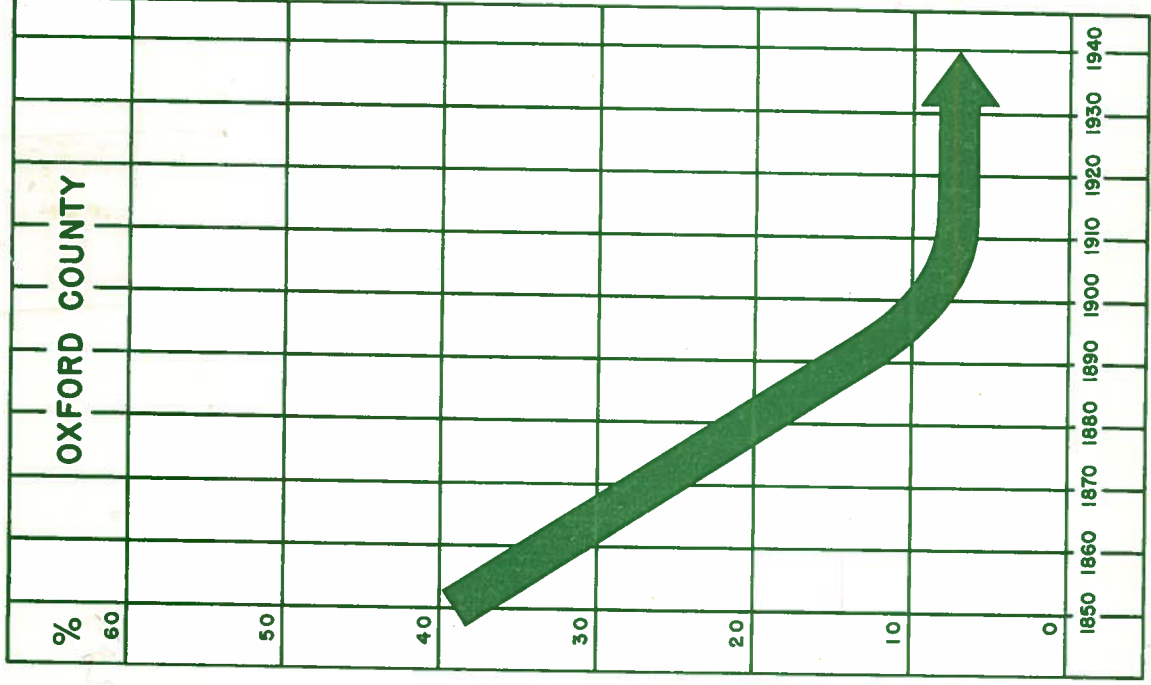
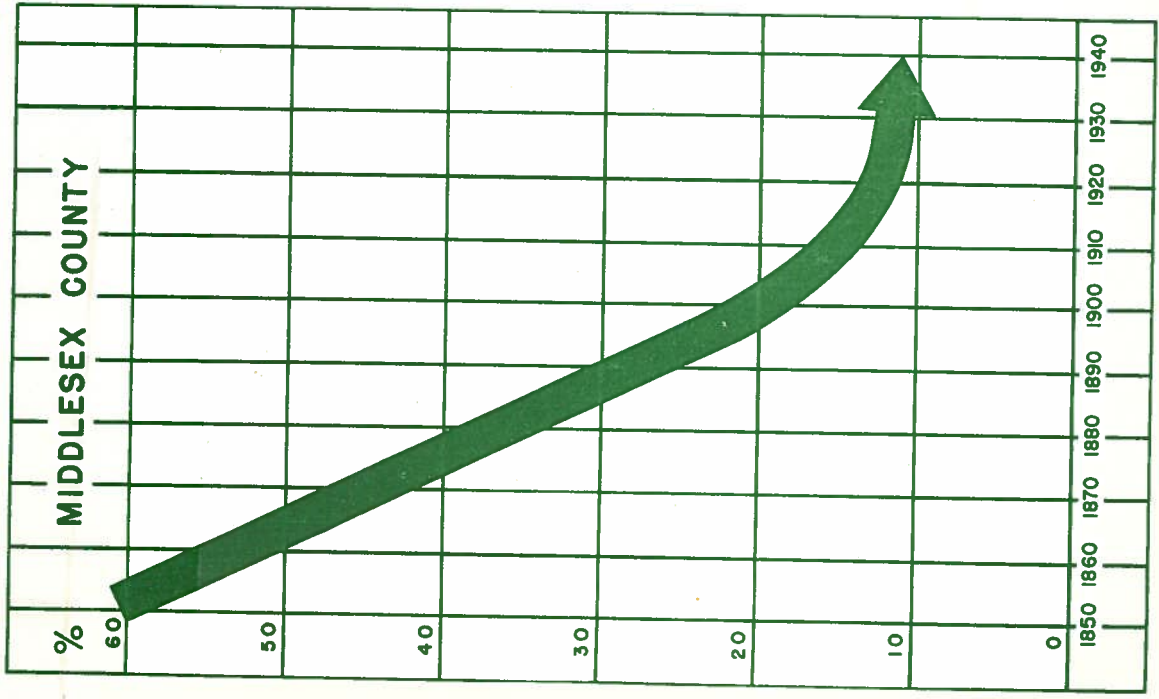
WOODLAND IN PER CENT AND ACRES ON OCCUPIED LAND

County	Township	1 8 6 0		1 8 9 0		1 9 1 0		1 9 2 0		1 9 3 0		1 9 4 0		Total Area
		%	Acres	%	Acres	%	Acres	%	Acres	%	Acres	%	Acres	
	Biddulph	38.5	19,441	16.7	8,460	6.4	2,252	5.7	2,000	6.9	2,431	3.8	1,337	35,328
	Dorchester N.	50.0	23,531	17.7	8,294	7.0	3,528	7.4	3,724	7.9	3,989	7.8	3,951	50,545
	Lobc	46.0	43,740	13.4	12,650	9.8	4,577	8.4	3,904	8.0	3,715	8.6	4,007	46,812
	Nissouri W.	43.7	21,042	16.1	7,745	5.6	5,268	6.8	6,431	6.8	6,448	6.4	6,025	94,158
	Westminster	38.4	23,715	15.5	9,583	7.5	3,633	6.4	3,099	5.8	2,814	5.3	2,574	48,178
	Middlesex		37.8	287,681	20.4	156,798	9.9	75,690	8.1	61,585	8.4	64,309	7.8	59,342
	Blandford	34.2	9,874	15.4	4,456	6.4	1,850	8.3	2,397	7.8	2,238	9.2	2,666	28,888
	Dereham	43.1	19,903	13.1	6,043	8.0	5,233	8.8	5,741	7.3	4,737	6.5	4,204	65,107
	Nissouri E.	35.9	12,103	14.3	4,820	5.6	3,943	7.5	3,463	7.2	3,320	6.8	3,144	46,371
	Oxford E.	49.1	10,443	11.5	2,457	6.2	1,874	5.4	1,821	5.9	1,995	5.4	1,813	33,795
	Oxford N.	35.0	9,187	8.8	2,301	5.0	1,319	6.8	1,451	6.5	1,375	6.1	1,290	21,268
	Oxford W.	36.6	21,086	12.0	6,938	7.9	1,307	7.3	1,916	4.6	1,230	4.5	1,178	26,225
	Zorra E.	45.7	25,917	14.5	8,217	7.9	4,556	6.7	3,866	6.0	3,476	5.5	3,197	57,696
	Zorra W.	37.7	176,851	15.7	73,697	7.3	4,508	6.8	3,879	7.9	4,473	6.5	3,678	56,727
Oxford						34,308	7.4	34,858	7.1	33,119	6.7	31,465	469,562	
	Blanshard	51.6	24,294	10.7	5,060	3.7	1,751	4.6	2,158	4.4	2,074	5.0	2,340	47,172
	Downie	47.7	23,028	14.0	6,786	6.4	3,105	7.5	3,606	7.0	3,366	7.0	3,376	48,431
	Easthope N.	36.2	15,390	19.0	8,069	12.6	5,352	11.7	5,008	12.1	5,152	12.1	5,176	42,558
	Easthope S.	37.4	8,790	17.8	4,171	9.6	2,242	8.4	1,980	8.5	2,000	7.3	1,720	23,511
	Ellice	24.5	13,419	16.5	9,010	4.1	2,250	6.1	3,342	4.1	2,268	4.2	2,318	54,748
	Fullarton	46.6	17,933	18.0	7,463	8.2	3,414	7.2	2,990	8.5	3,541	7.0	2,897	41,554
Hibbert	55.8	23,124	12.1	5,507	8.8	3,631	8.1	3,349	7.9	3,276	6.7	2,787	41,456	
Logan	34.6	18,587	14.7	7,928	3.1	1,657	3.7	1,962	4.6	2,453	4.0	2,171	53,767	
Perth		46.3	241,519	14.6	76,140	6.6	34,377	6.7	35,140	6.5	34,099	6.1	31,749	521,106

face water-storage areas, and in many cases are the sources of headwater streams. Trees will grow here in most cases and are probably the most profitable crop which can be raised, especially since they perform the additional function of protecting the source areas from too rapid run-off.

Although settlement did not begin until the early part of the nineteenth century and the forest was almost unbroken along Governor's Road for miles west of Ingersoll as late as 1837, so rapid was the reduction that by 1860 the forests of Middlesex and Oxford Counties were depleted by more than 60 per cent, by 1910 by more than 90 per cent, and by 1940 the Census of Canada showed woodland figures for the counties embodying the Thames Watershed above London to be: Middlesex 7.8 per cent, Oxford 6.7 percent, Perth 6.1 per cent.

The accompanying table shows the rate at which the forests were cut rather than the actual areas of woodland remaining at the dates shown, because the definition of woodland varies with the individual person. For instance, a farmer may consider cut-over land which is used as pasture to be pasture, while the forester may consider similar cut-over land, on which the reproduction is good, as potential woodland and records it as such. The actual measurement of woodland in the Upper Thames Watershed made in 1950 shows a total of 57,025 acres or 6.7 per cent.



PER CENT WOODLAND
 CENSUS OF CANADA FIGURES

CHAPTER 2
FOREST PRODUCTS

Because the forests of the Thames Watershed were predominantly hardwood and settlement came later than in the counties farther east, the pattern of history of the forest products is somewhat different from that of other parts of Ontario.

All the timber taken out for export had to travel first westward down the Thames and then eastward through the Great Lakes to reach the seaport; consequently comparatively little of it was exported to Britain though large quantities went to the United States. Softwood timber was never abundant and most of it was required for local use¹, also the building of ships for the lakes trade soon became a thriving business, notably at Chatham, and this absorbed a great deal of timber. For these reasons the masting and square timber trades were never as large as in many other parts of Ontario, though very considerable quantities of oak were exported as square timber. On July 5, 1837, Anna Jameson writes: "The Thames is very beautiful here, and navigable for boats and barges, I saw today a large timber raft floating down the stream, containing many thousand feet of timber".²

In the March 18 issue of the St. Mary's Argus of 1858 it was stated that "an immense quantity of cedar posts, rails, hewn timber passed down the river today" and again on March 17, 1881, "At the present rate of consumption

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1. "In the London and Western Districts (of Upper Canada)... there are not more pine and cedars than suffice for building materials and fencing timber for home consumption. Indeed there are several townships in the Western District entirely destitute of pine timber ... a circumstance ... attended with many serious inconveniences." E. A. Talbot. Five Years' Residence in Canada. 1824.
 2. Anna Jameson. Winter Studies and Summer Rambles in Canada. 1837.

the standing hardwood of this country will last only twenty years longer". How true this latter statement was is borne out by the tables.

1. Early Policy

Previous to 1826 the only persons authorized to cut timber on the public lands were the contractors for the Royal Navy, or those holding licences from them, and there was great infringement of the regulations and much illicit trade. But in this year the first steps toward making the forest resources a source of revenue to the Province and "so securing to the public a share of the wealth drawn from the public domain" led to co-operation among the officials and the termination of the contractor's monopoly. The inauguration of a system under which anyone was at liberty to cut timber on the ungranted lands of the Ottawa lumber region on payment of a fixed scale of rates to the Crown overcame in large part the annoyance of the people and authorities in the colony against the export of the sound Canadian timber for the British Navy.

2. Masting

The selection of mast timber was made by government agents who went through the forest blazing with a broad arrow - the mark of the British Government. As late as 1827, when Peter Robinson was appointed Surveyor-General of His Majesty's woods and forests in the province of Upper Canada, he was instructed "to make a survey of the districts where there may be any considerable growth of masting and other timber fit for the use of His Majesty's Navy".

The mast and spar export to Britain was thriving in the thirties and forties and it was continued intermittently as late as 1855. The British trade dropped off noticeably after 1854 and this may be attributed to the Reciprocity Treaty with the United States in that year, "securing the free exchange of the natural products between Canada and the United

States, including timber and lumber of all kinds, round, hewed, and sawed, manufactured in whole or in part", and the building of railway connections with the United States border cities.

3. Square Timber

The square timber trade commenced, no doubt, somewhat later than the mast trade and was carried on simultaneously with it from the thirties.

Square timber was obtained by selecting large trees, mostly white pine, and squaring the best part into one long stick. In the earliest days of the industry the timbers were squared on all four sides to a fine "proud edge", but later, when the best timber had been cut, they were squared with a rounded shoulder or "wane", and were known as "waney timber". Such methods, of course, were wasteful since the finest grained wood was sacrificed in the operation, but this was the type of material called for by the British market.

"Often only one tree in a thousand would yield a finished 'stick' (so was the heavy square timber nonchalantly called in the trade) fit for export. A good stand might yield thirty or forty trees an acre for over the whole area allowances had to be made for 'wants' - the non-bearing patches of swamp, burn, etc. Today a whole township or limit (in Northern Ontario) may not have one good square stick of the quality of the square timber of another day."¹

The timbers were transported by the river, by teams or by railway to the lake and were built into huge rafts on which the lumberjacks built shanties and lived during the trip down to the timber coves at Quebec.

4. Saw Material

From 1800 on the cutting of timber had been one of the most important domestic businesses in most parts of Southern Ontario, and a very considerable business was carried on.

1. A Hundred Years A-Fellin', 1842 - 1942. Gillies Bros. Ltd. 1942.

FOREST PRODUCTS OF FARMS - CENSUS OF CANADA FIGURES - MIDDLESEX COUNTY

Product	Species	Unit	1870	1880	1890	1900	1910	1920	1930	1940
Pulpwood		Cords								
Tanbark		Cords	412	322	12					
Lathwood		Cords	285	1,984	668	29				
Masts & Spars		Cords	10	338	50,164					
Staves		Number		1,960	5,810	2	4			
Fence Rails		Thousands	2,112			3,627	923	21,542	845	
Fence Posts		Number				20,100	4,891	18,531	13,426	
Poles		Number				264	225	501	110	
Railway Ties		Number						321	150	
Square Timber		Cu. Ft.				9,153	2,220			
	Ash	"				120				
	Birch	"								
	Elm	"				157,709	85,036			
	Maple	"				12,652	9,295			
	Oak	"	272,041	481,727	84,253	12,855	5,042			
	Pine	"	7,378	31,740	21,429	220	300			
	Others	"				12,747	6,040			
Logs (Lumber)		Number								
Logs Softwood		Cu. Ft.	16,452	22,322	81,790	341M	446M	39,516	956M	
	Pine	"	35,295	130,624	129,193					
	Spruce	"				13M	2M			
	Tamarack	"	37,598	36,765	3,160					
	Oak	"				499M	373M			
Logs Hardwood		"	8,520	13,021	15,440					
	Maple and Birch	"	299,782	215,968		10,028M	1,765M			
	Elm	"	7,582	2,968	1,042					
	Black Walnut	"	13,440	295,928	800					
	Butternut	"	19,040	42,022	15,201	119M	24M			
	Hickory	"	221,104	287,115	150,611	2,766M	3,085M			
	Others	"				102M	27M			
	Hemlock	"								
Fuelwood		Cords	256,712	267,756	233,266	182,878	95,113	112,923	78,790	47,230
Other Products		Value \$						482	672	23,618

M = 1,000 feet board measure

In order to convert logs into boards the first method used was pit-sawing. This was sometimes done on the bank of the river, as such procedure saved the necessity of digging a pit.

The more usual methods of pit-sawing appear to have been the digging of a pit or building of a platform with a simple but firm and strongly constructed framework. In either case the framework was made the right height for one man to stand underneath, while the other man stood above on the platform or astride the log. This hard method of sawing timber was laborious, and twenty-five boards were a heavy day's work for two men; the boards were nearly always one inch thick, with planks two inches, and the occasional flooring one and a half inches in thickness.

The first power saws were a direct development of the manually operated pit saw. These were called frame, upright or muley saws and consisted of a saw set vertically in a wooden frame and moved up and down by means of a crank connected to the shaft of the water wheel.

"Wherever a settlement is formed in America a sawmill is very soon after, if not at the same time, erected. The number of sawmills in the British Colonies are inconceivable to those who are not familiarized to the rising settlements of new countries.

"A sawmill is in fact a most important establishment. It not only forms a nucleus or centre to a settlement, but a first-rate sawmill, with two frames, will give employment to four first-rate, four second-rate and two third-rate sawyers, besides a measurer, a blacksmith and from thirty to forty men to prepare the timber required and for other requisite work connected with the establishment; twenty oxen and two horses are also necessary for hauling the timber required to streams and to other places. The boards, deals and scantlings sawed at these mills, excepting such as are required for the use of the neighboring settlers, are rafted down the river for shipping. As fresh waters change the colour of the deals from their fresh whiteness to a dark gray and, in the eyes of prejudice, depreciate their value, it becomes an object, but one that can only be attended to occasionally to carry them down in bateaux, scows or on timber rafts."¹

A study of the Census of Canada returns of forest products of farms for the counties of the watershed

1. John McGregor, 1833. British America, Vol. II.

FOREST PRODUCTS OF FARMS - CENSUS OF CANADA FIGURES - OXFORD COUNTY

Product	Species	Unit	1870	1880	1890	1900	1910	1920	1930	1940
Tanbark		Cord	586	444	106	79				
Lathwood		"	193	37	84					
Masts & Spars		Number	634	226	8	20	9			
Staves		Thousands		1,704	81	1,810	899			
Fence Rails		Number								
Fence Posts		"								
Poles		"								
Rwy. Ties		"								
Sq. Timber		Cu. Ft.	13,264	12,791	56,309	32,304	10,542	4,130	1,920	
	White Pine	"	614	1,418	51	313	195	12,815	14,479	
	Red Pine	"			3,005	25	50	15		
	Ash	"			29,601	3,022	4,000			
	Oak	"			800					
	Tamarack	"	41,950	59,921	5,345	2,824	800			
	Birch/Maple	"	52,525	38,291	19,895	4,368	1,550			
	Elm	"	3,545	29,663	8,427					
	Walnut	"	166,196	78,025	46,522	2,624	4,718			
	Butternut	"	300		300	98,457	25,382			
	Hickory	"	1,436	1,000	4,850					
	Others	"	7,830	5,472	11,000					
	Pine	Number	94,557	116,168	40,337	6,881	4,000			
	Hemlock	"	35,788	105,020	55,762	331	178			
	Hickory	"				197	26			
	Oak	"				13	51			
	Spruce	"				164				
	Elm	"				57				
	Others	"				134				
Fuelwood		Number	13,157	164,538	289,767	2,134	1,397	17,770	641	5,542
Other Products		Cord	142,282	165,169	137,571	1,540	1,184	73,816	49,203	14,315
		Value \$				128,640	61,311	100	731	

M = 1,000 feet board measure

given in the table reveals the various trends and changes in the lumber industry fairly clearly.

From 1870 to 1890 much of the timber was squared and measured in cubic feet. In 1870 other products listed were firewood, staves, lathwood, tanbark, and masts and spars. In 1880 the peak production of nearly all items was reached and squared elm alone in Perth County and squared oak in Middlesex ran to almost 174,000 and 481,800 cubic feet respectively in 1880. In 1890 fence posts and telephone poles were added to the list of products, as were railway ties. In the census years of 1900 and 1910 square timber was still recorded in cubic feet and logs were measured in board feet; staves, lathwood, masts and spars and tanbark disappeared from production.

In 1920 no square timber is shown, logs are only counted, not measured, and not even separated by species. The returns of the latest census covering the year 1940 name only one forest product and the rest are all listed together as others valued at so many dollars. The one product which has persisted throughout the records is firewood which in Middlesex County has dropped from a peak of 267,756 cords in 1880 to 47,230 cords in 1940.

One or two interesting observations with regard to individual species may also be made. Tamarack was listed regularly until 1890, after which it no longer appears due to the depredation of the larch saw-fly which almost wiped it out at this time. The returns show that some black walnut and hickory were cut in all counties each year until 1880. White pine was, of course, the species most sought after, though not much existed in the counties of the watershed, and next to it red pine of which a little was present in all counties. In 1870 and 1880 elm and oak were the main species which were squared, but as these species became scarce more ash, birch, and maple were made into square timber.

FOREST PRODUCTS OF FARMS - CENSUS OF CANADA FIGURES - PERTH COUNTY

Product	Species	Unit	1870	1880	1890	1900	1910	1920	1930	1940
Pulpwood		Cords	2,556	2,533	1,591	12	11			10
Tanbark		Cords	184	108	45					
Lathwood		Cords	30	507	35					
Masts & Spars		Number	405	1,921			74			
Fence Rails		Thousands							29,769	
Fence Posts		Number			45,845	4,965	580	10,223	5,149	
Poles		Number			646		6	5	49	
Railway Ties		Number							100	
Square Timber		Number								
		Cu. Ft.								
	Ash					20,669	1,800			
	Birch					886	1,000			
	Elm				103,137	113,528	8,742			
	Maple					36,224	39,478			
	Oak		8,933	55,243	2,100	1,830				
	Pine		16,241	47,687	52,815	2,350				
	Others					43,060	8,474			
Logs (Lumber)		Number								
Logs Softwood		Cu. Ft.	61,112	154,017	15,423	162M		17,147	462M	
	Pine		35,187	197,527	51,180					
	Others									
	Spruce					5M				
	Tamarack		7,388	6,530						
Logs Hardwood										
	Oak					66M	75M			
	Maple and Birch		5,806	7,611	2,505					
	Elm		103,902	174,632		2,209M	1,647M			
	Black Walnut		160	525						
	Butternut			131						
	Hickory		530	100	45	5M	1M			
	Others		170,342	330,998	40,375	611M	284M			
	Hemlock					200M	32M			
Fuelwood		Cords	115,030	134,429	95,499	96,568	44,470	56,244	35,952	27,127
Other Products		Value \$						772	740	10,590

M = 1,000 feet board measure

5. Shingle-Making

In the history of roofing used on the Thames Watershed it is found that the first covering for human habitation on the river was the Indian elm-bark lashed roof. The first type of roof used by the early settlers was made of "scoops" which were flattened logs, usually cedar, six inches thick with one face scooped out to a depth of one to one and a half inches. These ran from the peak of the roof to the eaves, being placed alternately so that one scoop had the scoop side up and the next one the scoop side down, the edges overlapping the two scoops below.

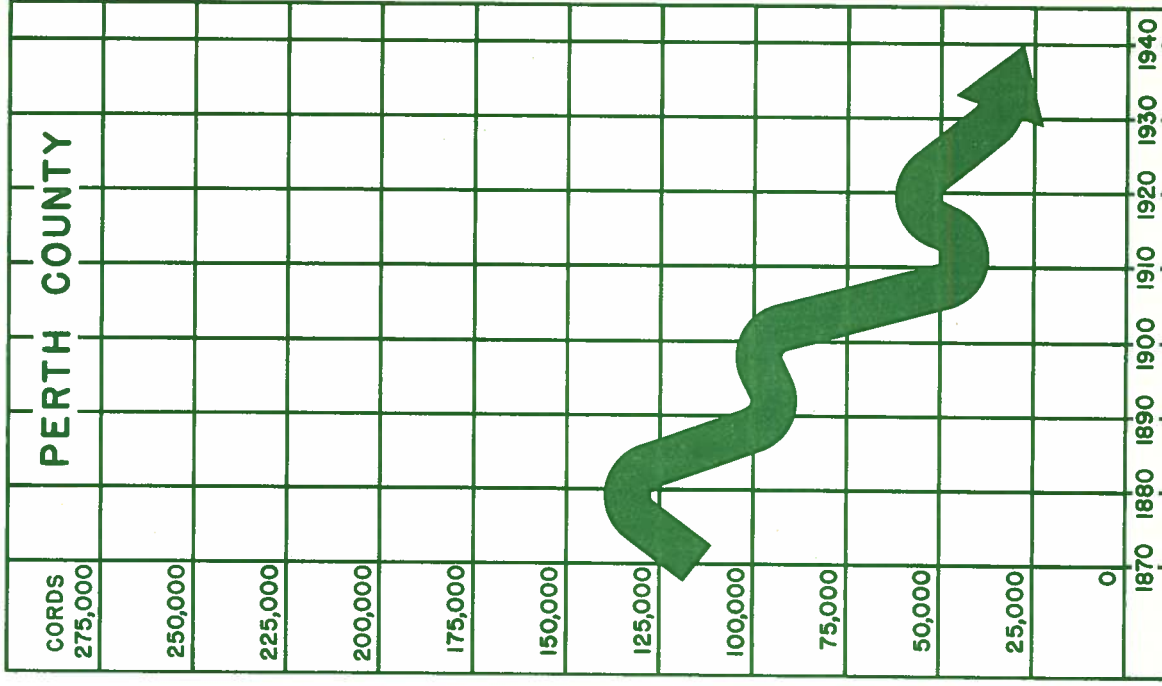
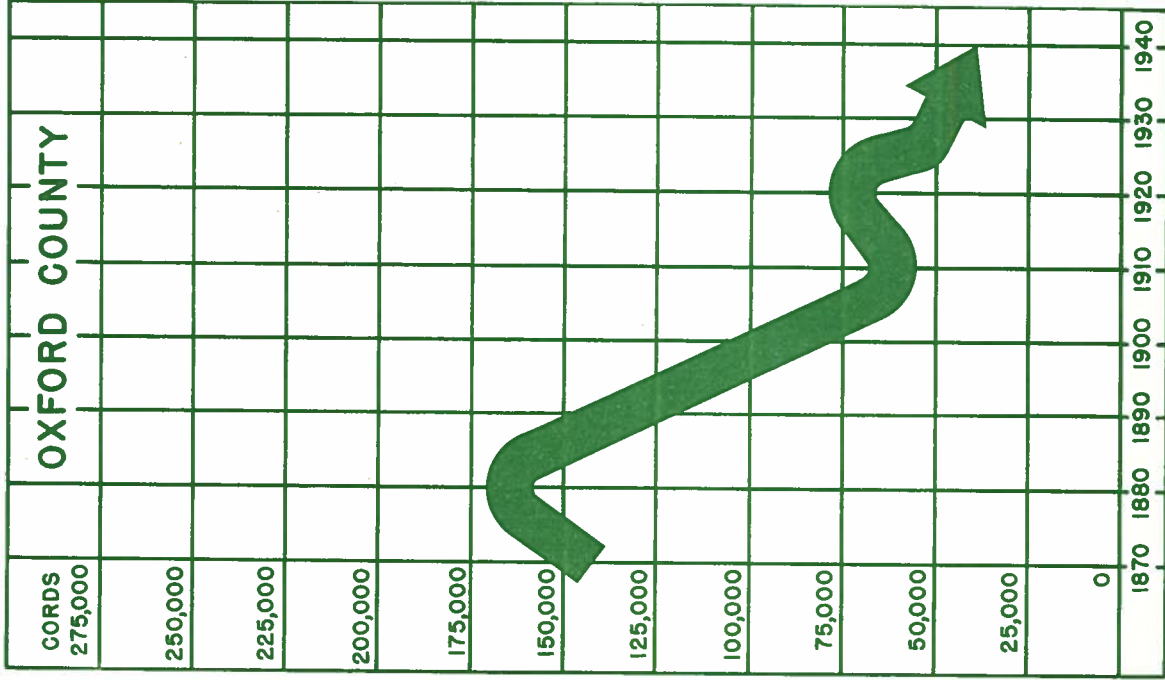
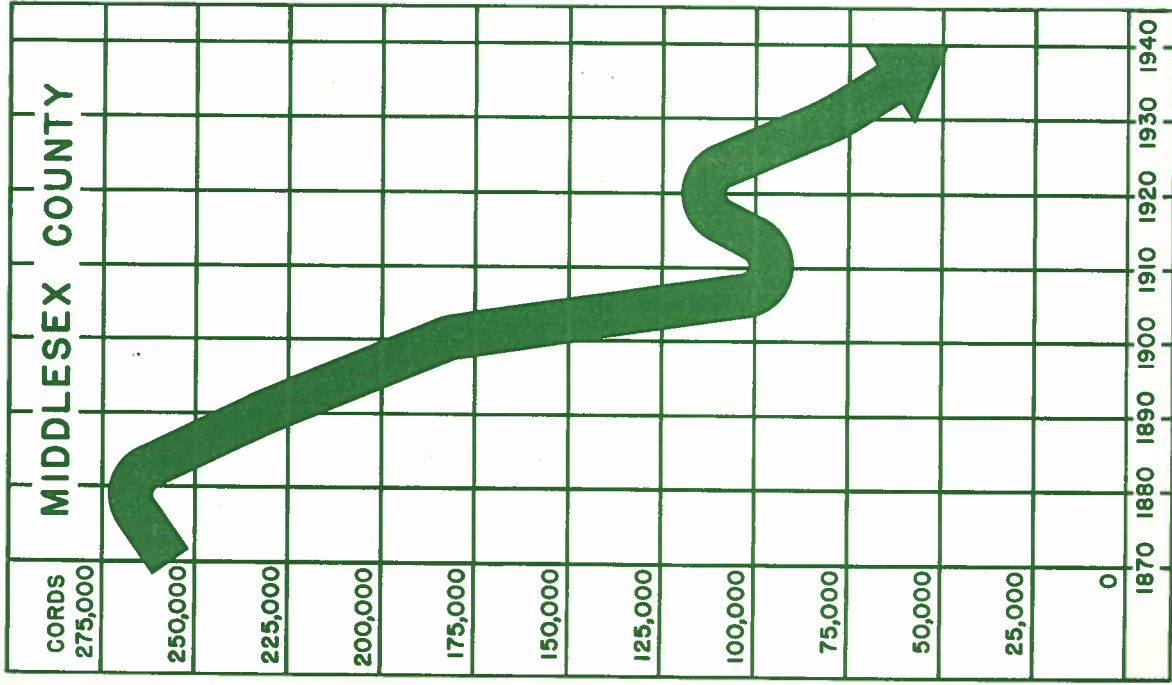
The second type of covering was a rude type of shingle called a "shake". These were made with an axe or frow and were cut from pine or cedar three or more feet in length. Although not shaped they were a great improvement over the early types of covering.

Very early in the history of settlement, however, hand-made shingles were introduced. The shingle-maker would saw the logs into short lengths or bolts and split them with a frow to the right thickness. The shingle was then fastened by one end in a device called a shingle horse and by means of a heavy drawknife the shingle was tapered to an edge. This method was rapid and it has been said that a good shingle-maker would turn out from eighty to a hundred of these hand-made shingles an hour.

Up to the seventies and even later the shingle-maker continued to use drawknife and frow, but gradually in the seventies the generation of craftsmen died out and the shingle mill, where shingles were sawn, became the general source of supply.

6. Fuel and Ties

From the earliest days of settlement on the Thames to 1850, wood was the sole source of fuel supply. All species were used for this purpose including beech and maple -



FUELWOOD PRODUCTION

CENSUS OF CANADA FIGURES

although these were furniture woods as well. With the inception of the railway and steam-driven factories, the forests of the area were ruthlessly cut to feed industry.

In the very early days of the steamship, 1832, the Honourable Adam Fergusson writes: "Wood is furnished upon the St. Lawrence for one dollar, or five shillings per cord while upon the Hudson it now costs three times as much. A man may prepare two cords a day, but it is severe work, and the price, which is one dollar per cord, will do little more than compensate maintenance and labour - and an ordinary steamboat consumes fifty or sixty cords or about 7,000 cubic feet each trip (from Montreal to Quebec)". The price of cordwood in 1825 was quoted at \$2 a cord.

With the completion of the Great Western between Toronto and London in 1853, locomotive requirements took large quantities of the best body hardwood, chiefly beech and maple. "Coal at that time was not to be had and the result was that hardwood was gradually becoming of some value. For cordwood the settlers usually realized from \$2.50 up to \$3.00 per cord, delivered at the various stations along the railway line. Railway facilities also stimulated the lumber industry."¹

7. Road Materials and Fencing

In the early days the making of corduroy roads furnished another important wood use. The Indian trails had followed the ridges and natural conformation of the country, but when the "T-square" roads had been laid out in government offices they followed the arbitrary lot and concession lines regardless of natural contours. Many of these roads were built through swamps and in these places corduroy construction was used. Many corduroy bridges and culverts were also placed over the river and its tributary streams.

1. Waterloo County Forests and Primitive Economics, E. W. B. Snider, 6th Annual Report of the Waterloo Historical Society, 1918.

The building of plank roads - a form of highway in which the planks were laid crosswise and side by side - was done in several parts of the Province. Plank roads alternating with gravel stretches connected the main centres in the southern part of the watershed in 1851.¹ The road from London to Woodstock via Ingersoll was one of these and the road to Port Stanley was planked all the way from London.

Much wood was also used for fencing and for this cedar from the swamps was most common. The troublesome pine stump also was used for this purpose in many parts of the Province, although in very early times it seems that it was left in the field. Around 1900 the wire fence came into use generally and thereafter a fence post industry was developed. These were cut as a rule to a standard length of eight feet, while the diameter varied greatly.

8. Woodworking and Planing Mills

The extensive hardwood forests which formerly existed over the greater part of the region were the reason for the large number of wood-using industries which were established, many of which are still doing a big trade although much of their raw material is now imported.

During the early years of settlement in the rural districts and communities, house trim for exterior and interior use was made by the same man who constructed the frame of the house. The custom up to the fifties at least was for the carpenter to board with the family the winter before the new frame house was to be built and work all his timber into shape by hand, both for exterior and interior use.

The early carpenter also made door and window frames and all interior trim of the house by hand and for all these products pine was the usual type of timber chosen. It would seem that doorsteps were one of the very few things

1. Canada: Past, Present and Future. W. H. Smith, 1851.

for which oak was used in house building, at least up to the sixties.

Generally, as time passed, the building trades became more differentiated and more craftsmen settled on the watershed.

After the appearance of the planing mill in the fifties the end of the hand-made door and window frame was foreshadowed and much of the general carpenter's work was taken over by mill or factory. By the 1860's the planing mill business was well under way.

9. Wooden Implements and Vehicles

(a) Early Tools

From the very early days hickory was preferred for the making of axe-helves or handles, while for beams or ox-yokes beech was used extensively and, for the loop, ironwood would have been selected. Spike handles were made of rock elm, white ash, hickory or ironwood; the beetle-head (a mallet used for pounding hemp and flax) was also made of ash, elm, hickory or ironwood. The hardwoods growing on the watershed were used almost entirely for making handles of implements, whereas pine was preferred for all building operations when it could be obtained.

(b) Vehicles

From early times the making of vehicles progressed as carts, wagons, sleighs and hay and woodracks were built by the farmers. In the building of carts and wagons, whiffletrees, wagon-tongues and binding poles were made of rock elm, white ash, hickory and ironwood, as were also sleigh-runners and hay and woodracks. Usually the wheels or runners of these conveyances were bound with iron, although the use of metal was limited in early days since the supply had to be imported by water.

10. Indirect Products and By-Products

The three indirect products of greatest

importance were potash, maple sugar and tanbark. Maple sugar furnished the staple sugar for the pioneers, cane sugar not having been procurable at that time; lye or potash was used domestically in making soft soap - almost the universal soap; tanbark was utilized by the shoemakers in dressing leather.

(a) Potash

The ashery played an important role in the drama of pioneering life; and besides communal asheries the individual ash house and the ash barrel on a platform for leaching was a characteristic of each farm in the days before the soap factory.

"Only from the sale of potash (exported to Great Britain and the United States for the dyeing of textiles) was there money for all other requisites. The potash was laboriously produced, men, women and children sharing in the heavy work. No less than 60 large maple trees were required for a barrel of 650 to 700 pounds of potash. The ashes of the burnt wood were leached in wedge-shaped wooden troughs and this liquid was then boiled down and cooled in huge vessels or coolers where the lye solidified. Two coolers would fill a barrel. If the settler marketed this on his own, 'toting it out' to the nearest buyer for ready cash, he might get only \$8.50 to \$9.00, but if he could wait and accept a down payment from the traders and shippers who teamed and hauled at a season of their own convenience, he might get \$10 or \$12 with a possible second payment after marketing it at Montreal where a barrel might bring \$30, less of course commission, risk and portage costs. The need for this pitifully hard-won money led to clearing of more land than could be cropped and not infrequently to concealing for years the fact that the holding itself might not be profitable or capable of sustaining the settlers from the growth of its poor soil."¹

(b) Maple Sugar

The table shows the Census figures for maple products in Middlesex, Oxford and Perth Counties. It is interesting to note that up to 1910 production is all recorded as pounds of sugar; from 1910 on both pounds of sugar and gallons of syrup were shown, indicating the change from a pioneer necessity to the modern luxury. For purposes of comparison the sugar figures have been converted to their syrup equivalents and from these shown in the second table it will be seen that production for

1. A Hundred Year A-Fellin', 1842 - 1942. Gillies Bros. Ltd. 1942.

MAPLE SUGAR PRODUCTION

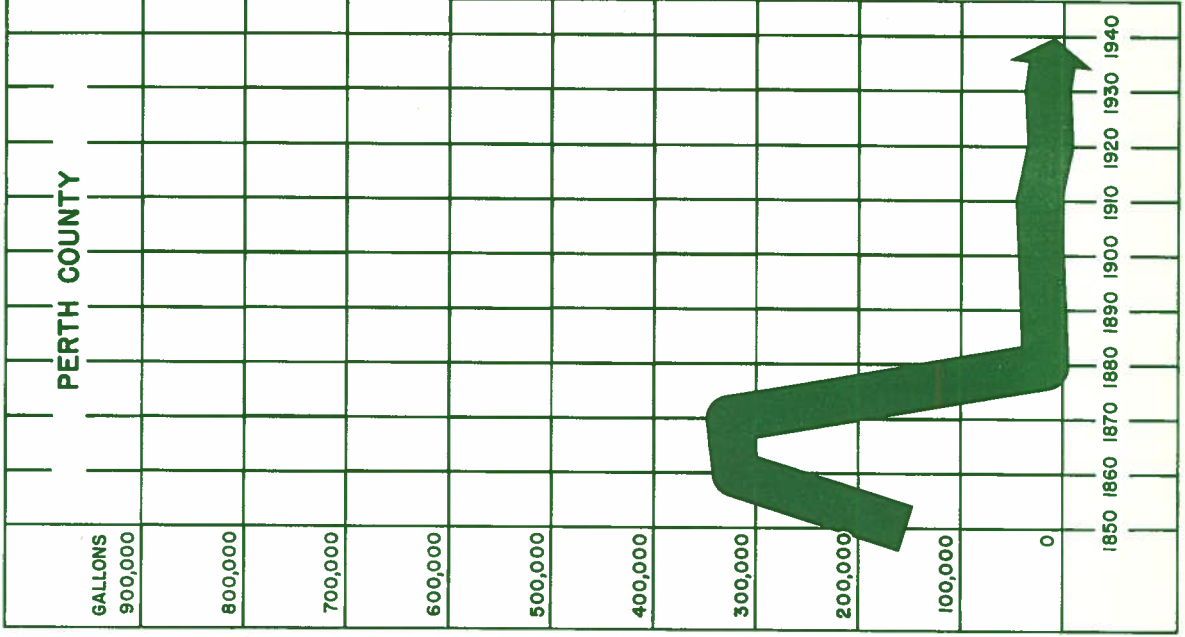
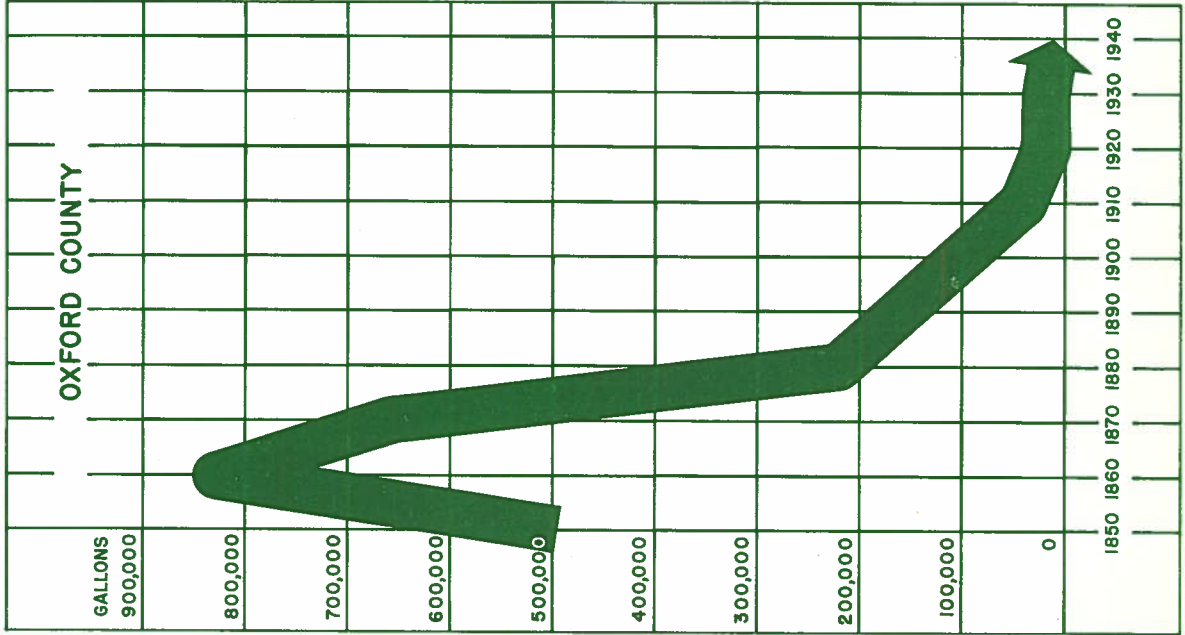
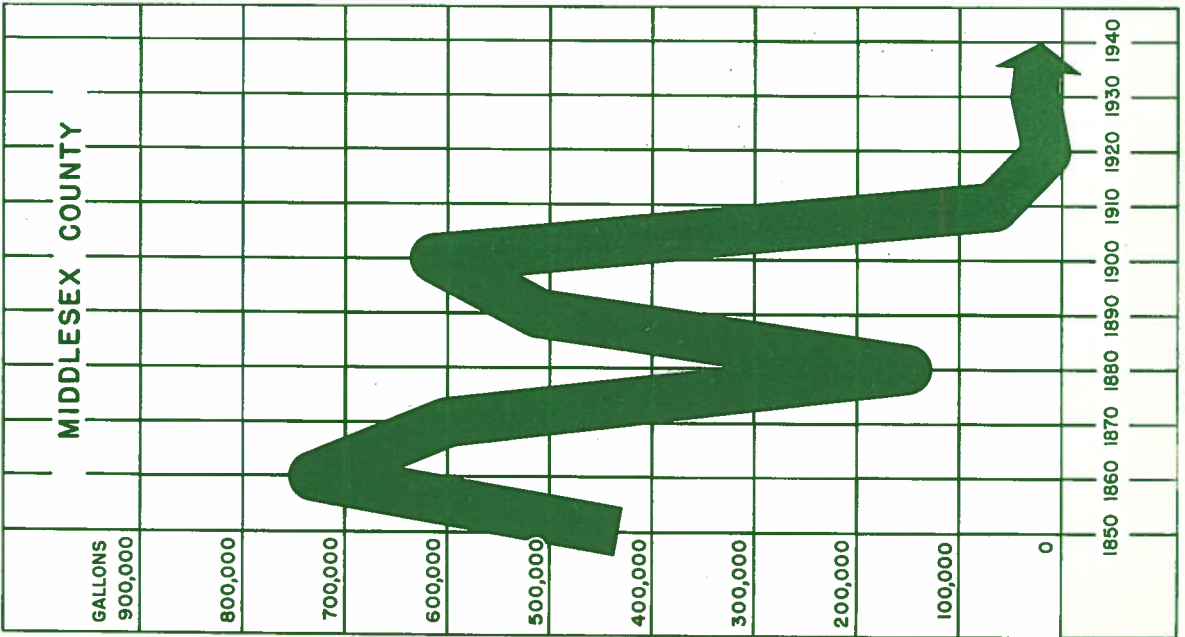
CENSUS OF CANADA FIGURES

County	1850	1860	1870	1880	1910		1920		1930		1940	
	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Gals.	Lbs.	Gals.	Lbs.	Gals.	Lbs.	Gals.
Middlesex	279,475	478,627	287,795	99,971	6,001	48,513	1,446	14,052	820	25,721	1,859	15,331
Oxford	320,952	538,373	425,105	142,880	2,580	35,110	50	17,926	215	16,689	194	9,705
Perth	99,125	207,286	210,224	9,037	803	21,269	209	9,503	140	13,627	810	6,343
	Gals.	Gals.	Gals.	Gals.		Gals.		Gals.		Gals.		Gals.
Middlesex	430,391	737,086	597,204	153,995		57,775		16,279		26,984		18,194
Oxford	494,266	829,094	654,662	220,035		39,073		18,003		17,020		10,004
Perth	152,653	317,148	323,745	13,917		22,506		9,825		13,843		7,590

Figures for 1890 and 1900 not available.
 In the second table, pounds of sugar have been converted to their
 equivalents in gallons for purposes of comparison.

Middlesex County dropped steadily from the peak of nearly 737,000 gallons in 1860 to 18,194 in 1940, and a similar fall is shown in the other counties.

Wood-using industries of the present time are given in Chapter 10 and there is no reason why, with optimum land use, a good deal of the timber required to support these industries cannot be grown within the watershed in perpetuity, using land which is unsuited to agriculture and land which requires woodland cover for natural water storage and run-off control with the consequent advantages to both urban and rural communities.



MAPLE SYRUP PRODUCTION

CENSUS OF CANADA FIGURES

CHAPTER 3

PRESENT WOODLAND CONDITIONS

The upper Thames Watershed lies almost wholly within the Huron-Ontario Section of the Great Lakes-St. Lawrence Forest Region¹. This section is characterized by a forest in which maple and beech are the dominant species. With them are basswood, white elm, white ash, some yellow birch and red maple and red, white and bur oak. Small groups of hemlock and white pine occur within the association as well as a scattered distribution of large-toothed aspen, bitternut hickory, butternut, ironwood and black cherry; blue beech, slippery and rock elm and black ash are found locally on specialized sites such as bottomlands and swamps. White pine occurs mostly on the lighter soils of the moraines. Trembling aspen occurs on the poorly drained soils where the stands have been cut and burned in the past.

The almost level till plain which includes Logan, Ellice and parts of North and South Easthope and Downie Townships was originally covered with a hardwood swamp forest, composed chiefly of silver maple and white elm. Most of this has been cleared and drained for agricultural purposes, but the remaining woodlots are largely of this type. The large swamps such as the Ellice and Gads Hill Swamps supported a mixed forest of conifers and hardwoods but repeated fires have reduced these to aspen and scrub willow areas.

South and west of these townships the till plain is much more broken up by moraines, spillways and drumlinoid features which created better natural drainage and the forest was of the beech - sugar maple type which is also reflected by the remaining woodlots, though even here the poorly drained areas such as the Golspie and

1. Forest Classification for Canada. W.E.D. Halliday, 1937.

Dorchester Swamps were characterized by hardwood types such as silver maple - elm.

In the large moraine area south of the Thames River the topography is rougher, the natural drainage more pronounced, and it is here that most of the white pine of the watershed grew, particularly on the lighter soils. The kame moraine running south-west from near Harrington West supported fair stands of white pine on its lighter soils, but these have largely been replaced by beech - sugar maple woods. Some cedar occurred in the spillways, particularly on muck, and it is here that the remaining stands are still found.

The extreme south-west corner of the Thames Watershed south-west of the city of London lies in the Deciduous Forest Region. The Deciduous Forest reaches its northern limit here and is composed almost entirely of broad-leaved trees including black and chestnut oak, shagbark and pignut hickory and walnut. White pine occurs on the drier sites and hemlock on the cool well-drained slopes.

1. Survey Methods

Each member of the Forestry party was provided with aerial photographs which were on a scale of 1,000 feet to the inch and each photograph covered an area of approximately 1,000 acres, usually a block lying between two adjacent concession roads and two adjacent side roads. Mapping was done in the field directly on the photographs.

Every area of woodland, brushland, marsh, swamp and rough land down to one acre in area was examined and notes made describing it. In the case of woodlots and plantations, detailed notes were made of their condition. Overgrazed woodlots and woodlots with very scattered trees which could be restored were classified as woodland. In short, where doubt existed as to whether an area should be classified as woodland or not, woodland was given the benefit of the doubt.

FOREST COVER TYPES

Township	No. of Woodlots	Total Acres	4	4A	6	8	9	10	11	12	13	14	14A	15	24	25	26	45	47	49	50	51	52	57	58	59	60	60A	61	88			
Biddulph	77	382	3																														
Blandford	202	1,260	297																														
Blanshard	167	1,469	53																														
Caradoc	80	608	26																														
Delaware	144	833	179																														
Dereham	276	2,045	179																														
Dorchester S.	18	179	19																														
Dorchester N.	562	4,647	550																														
Downie	311	3,267	68																														
Easthope N.	219	2,806	1,039																														
Easthope S.	217	1,261	51																														
Ellice	292	3,676	1,997																														
Elma	11	42	10																														
Fullarton	362	3,064	46																														
Grey	4	17	4																														
Hibbert	79	753	14																														
Lobo	147	857	81																														
Logan	231	1,728	284																														
London	744	5,607	124																														
McKillop	2	16	11																														
Mornington	11	84	53																														
Nissouri E.	495	3,617	103																														
Nissouri W.	365	2,541	107																														
Norwich N.	15	113	11																														
Oxford E.	118	1,177	61																														
Oxford N.	243	1,129	90																														
Oxford W.	274	1,971	90																														
Osborne	57	406	20																														
Westminster	440	2,815	103																														
Zorra E.	499	3,083	103																														
Zorra W.	617	5,572	362																														
Total Acres	7,279	57,025	5,762	82	14	58	77	15	527	717	1,326	5,634	123	122	2,535	197	2,179	82	14	978	286	235	23	12,497	812	3,696	11,350	7,151	38	675			
Per Cent		100.0	10.1	0.1	0.0	0.1	0.1	0.0	0.6	1.3	2.3	9.8	0.2	0.2	4.4	0.3	3.8	0.1	0.0	1.7	0.5	0.4	0.0	22.3	1.4	6.5	20.0	12.6	0.0	1.2			

All woodlots were grouped according to the following classification:

<u>Diameter Breast High</u>	<u>Hardwood</u>	<u>Mixed Wood</u>	<u>Coniferous</u>
Virgin	H-1	M-1	C-1
Over 18 inches	H-2	M-2	C-2
10 - 18 inches	H-3	M-3	C-3
4 - 10 inches	H-4	M-4	C-4
Under 4 inches	H-5	M-5	C-5

In this classification the term "hardwood" is used to denote all broad-leaved trees irrespective of whether the wood is physically hard or not. A hardwood type is one in which 80 per cent or more of the stand is composed of hardwood trees, a coniferous type is one in which 80 per cent of the stand is composed of coniferous trees and a mixed stand embraces all others.

Stands were also recorded according to forest cover types¹. (Refer to the table, the description of forest cover types and the forestry map folded at the end of this report.)

The forestry map is on the scale of one mile to the inch and covers the whole of the Thames watershed above the confluence of Dingman Creek. It shows all existing woodland, existing Authority and County forests, scrub land, and land recommended for acquisition by the Authority.

A forest cover type may be either temporary or permanent; for example, the present stand may be aspen which has seeded in the area following fire. Aspen seed is light like dandelion seed and is carried easily by the wind, thus it quickly covers large areas; also it is not exacting in its soil requirements and may be the only species which will grow under the soil conditions existing at the time.

1. Forest Cover Types of the Eastern United States. Report of the Committee on Forest Types, Society of American Foresters. 1940.

The fact of its growing and dropping its leaves on the ground gradually improves the condition of the soil so that more exacting species can grow. In addition its light shade frequently provides the correct light conditions for better species to get a start. As it is a short-lived tree, it will die early and the other species will dominate the area. This succession may be carried through two or more stages until the species best suited to the area or best able to maintain itself on the area takes over; this is called the forest type or climax type, as distinguished from the forest cover type which is the type occupying the ground at the present time. The most common forest type on the Upper Thames Watershed is sugar maple - beech.

No classification of forest cover types has been made in Canada for Southern Ontario, so the system used is a slightly modified form of that drawn up by the Society of American Foresters, which covers the whole of the eastern United States; consequently there are many types in their classification which do not enter Canada and this accounts for the gaps in the numerical listing of types occurring in the Thames Watershed. The forest cover types of the Thames Watershed may be listed as follows:

<u>Number</u>	<u>Name</u>
4	Aspen
4A	Poplar - oak
5	Pin cherry
6	Paper birch
8	White pine - red oak - white ash
9	White pine
10	White pine - hemlock
11	Hemlock
12	Sugar maple - beech - yellow birch
13	Sugar maple - basswood
14	Sugar maple
14A	Black cherry
15	Yellow birch
24	White cedar
25	Tamarack
26	Black ash - white elm - red maple
45	Bur oak
47	Black locust
49	White oak - black oak - red oak
50	White oak
51	Red oak - basswood - white ash
52	Red oak

<u>Number</u>	<u>Name</u>
57	Beech - sugar maple
58	Beech
59	Ash - hickory
60	Silver maple - white elm
60A	White elm
61	Cottonwood
88	Willow

Type 4: Aspen

Aspen is a pioneer type coming in after fire or overgrazing. Though it avoids the wettest swamps it does grow on soils that are wet throughout a good part of the year, as well as on dry soils. Its associates may be white elm, paper birch, red cherry and balsam poplar, with occasionally large-toothed aspen and green ash. It forms over 10 per cent of the woodland of the watershed, with fairly extensive stands occurring on the peat and muck areas such as the Ellice Swamp.

Type 4A: Poplar - Oak

This is a residual type on the light soils of the moraines following logging and fire. The oak usually consists of trees of white, red and sometimes bur oak which have survived due to their resistance to fire, and poplar, either trembling or large-toothed, which has seeded in later. The site is usually a white pine site and scattered trees of this species frequently occur with patches of good white pine reproduction appearing through the area. It includes only 82 acres of woodland in Lobo and Delaware Townships.

Type 6: Paper Birch

This is a pioneer type of clear-cut and pastured areas succeeded by other northern hardwood types or white pine. Its associates include small proportions of aspen, white pine, hemlock, red maple, red oak and basswood. Frequently an understory of conifers or tolerant hardwoods develops. It occurs on sandy soils in Delaware and Westminster Townships, but is rare on the Thames watershed, only 14 acres having been mapped.

Type 8: White Pine - Red Oak - White Ash

This type occurs with red maple as the most common associates though others which may be present are basswood, yellow birch, large-toothed aspen, sugar maple, beech, paper birch, black cherry and hemlock. Only 58 acres were found on the watershed.

Type 9: White Pine

White pine typically occurs on fresh, sandy loam upland but also on clay, in swampy areas and on loamy sand. On sandy soils on the moraines it tends to be permanent but on heavier soils it is usually succeeded by the following types, sugar maple - beech - red oak - basswood - white ash, white pine - red oak - white ash, white pine - hemlock, sugar maple - basswood, or white oak.

Its associates on light soils are aspen, red maple, pin cherry and white oak; on heavier soils yellow birch, black cherry, white ash, red oak, sugar maple, basswood and hemlock. It was never very abundant on the watershed but now occupies only 77 acres of the wooded area, mostly in North Dorchester Township.

Type 10: White Pine - Hemlock

Associated with this type are many species but none is particularly characteristic. The principal ones are beech, sugar maple, basswood, red maple, yellow birch, black cherry, white ash, paper birch and red oak. It occurs on a range of sites from sand plains to heavy upland soils, but favours cool locations such as the slopes of ravines. It constitutes only 15 acres of the woodland.

Type 11: Hemlock

This type occurs mostly in widely scattered bodies in cool locations, moist ravines and north slopes, frequently in the sugar maple - beech type. Its associates are beech, sugar maple, yellow birch, basswood, red maple, black cherry, white ash, white pine, paper birch and red oak. It makes up a little over 1 per cent of the remaining woodland



Mixed forests of broadleaved trees and conifers occurred sparingly on the lighter soils but due to the scarcity of softwood timber have largely disappeared.



The few stands of white cedar have been severely overcut and badly damaged by cattle. Those remaining should be fenced and managed as a source of posts and poles.

of the Thames Valley but was never abundant because of its preference for cool ravines, of which not many exist. It occurs mostly in North Dorchester, Delaware and Oxford Townships.

Type 13: Sugar Maple - Basswood

This is a fairly important type occurring on loamy, upland soils. Its associates are white elm, green ash, yellow birch, white pine and red oak with ironwood and blue beech as subordinates. It forms almost $2\frac{1}{2}$ per cent of the woodland of the watershed and the percentage is probably being continually reduced as basswood is a more sought-after species than sugar maple.

Type 14: Sugar Maple

This type undoubtedly originally covered a considerable part of the watershed but since it occupied fertile, well-drained soil with good moisture much of it has been cleared for agriculture. A small proportion of other species such as yellow birch, white ash, red and white oak may be present. Today it covers almost 10 per cent of the wooded area. Its area may have been increased in recent years by the removal of beech from Type 57.

Type 14A: Black Cherry

This type is not common but second growth stands occur usually on fertile, moist, well-drained soils, frequently those formerly occupied by hemlock. Its associates may be sugar maple, red oak, red maple, white ash, basswood, butternut, white elm and hemlock. Only 123 acres were found on the Thames Watershed, mostly in the south part.

Type 15: Yellow Birch

This type is really an intrusion from further north and occurs only in the cool swamps of the glacial melt-water channels; its associates are white cedar, hemlock and red maple. It is of minor importance and comprises only 122 acres.

Type 24: White Cedar

The associates of this type are tamarack, yellow birch, paper birch, black ash, red maple, white pine and hemlock. It occurs on sites of slow drainage which are not strongly acid, including the muck soils of the watershed, and is also present on poor pasture land and bottomland. It forms over 4 per cent of the woodland and is the chief source of fence posts and poles.

Type 25: Tamarack

Tamarack occurs in muck swamps with little or no drainage, associated with white cedar and less commonly with red maple, black ash and aspen. The trees are small and have grown since the near-extinction of the species in the early part of the century. No extensive areas existed in the past and today it occurs on 197 acres, mostly in Dorchester North, Nissouri East and Zorra West Townships.

Type 26: Black Ash - White Elm - Red Maple

This type occupies moist to wet soils in swamps, gullies and small depressions. Its associates are balsam poplar, yellow birch, with sometimes white pine, tamarack, white cedar, basswood and bur oak. It comprises almost 4 per cent of the woodland.

Type 45: Bur Oak

This is a very uncommon type in Ontario, the associates of which are red oak, white oak or black oak, and occurs on loamy slopes with south or south-west exposure. Only 82 acres are present on the Thames Watershed.

Type 47: Black Locust

This species does not occur naturally in Ontario but has been planted fairly extensively, largely for erosion control purposes, and has escaped from cultivation. It grows best on dry sites, especially on limy soils. Fourteen acres were mapped on the Thames drainage area.

Type 49: White Oak - Black Oak - Red Oak

This type belongs to the Deciduous Forest Region and occurs on light soils in the south-west corner of



Most of the watershed of the Upper Thames was originally covered with a beech-sugar maple forest and this is still the most common type in farm woodlots.



Very extensive hardwood swamps existed on the flat lands in the north end of the watershed and to-day white elm and silver maple are found on most of the poorly drained areas where the woods have survived.

the watershed. Being at the limit of the region, black oak may be absent. Associates are bur oak, shagbark or bitternut hickory, white or green ash, sugar maple and, occasionally a few black cherry, butternut or large-toothed aspen. Almost 1,000 acres still exist on the Thames Watershed.

Type 50: White Oak

The chief associates in this type are black oak and shagbark hickory. It also belongs to the Deciduous Forest Region and occurs on light soils, mostly in the southwest part of the watershed. There are 286 acres in all.

Type 51: Red Oak - Basswood - White Ash

Associated with the type species are red maple, yellow birch, aspen, sugar maple, paper birch and beech on less well-drained soils. This is a moderately important type, there being 235 acres in the watershed.

Type 52: Red Oak

Red oak may be pure or associated with white oak on ridges in park-like stands. The trees are short-trunked and flat-topped. About 22 acres occur in the south part of the watershed.

Type 57: Beech - Sugar Maple

This is regarded as the typical association of the climax with red maple, white oak, red oak, hemlock, white elm, red elm, basswood, shagbark hickory and black cherry. This type was undoubtedly very extensive in the Thames Watershed but, because it occupied the best land, its area has been tremendously depleted. However, it still comprises over 22 per cent of the remaining woodland and is very generally distributed.

Type 58: Beech

This type also belongs to the Deciduous Forest Region and is, theoretically, the ultimate dominant of the climax, but it is almost invariably associated with sugar maple. Its other associates are red maple, red oak, white ash, white elm, red elm and bitternut hickory. Over 800 acres were

WOODLAND CONDITIONS BY TOWNSHIPS

1950



mapped in the Thames drainage area. A few areas were encountered where the type had originally been 57 and the sugar maple taken out for logs, leaving the inferior beech.

Type 59: Ash - Hickory

This type is not listed in the American classification but has been introduced because of its frequent occurrence in Southern Ontario. It is usually a residual type following cutting and grazing, often of Type 60: silver maple - white elm, though it may occur on any poorly drained, cut-over area. It is usually composed of a mixture of white, green or red ash and shagbark and bitternut hickory with bur oak, cottonwood, blue beech and ironwood as associates. It constitutes over 6 per cent of the woodland.

Type 60: Silver Maple - White Elm

This is a type of meltwater channels and poorly drained soils unsuitable for general farming unless completely and adequately underdrained; for this reason it and the similar white elm Type 60A have survived better than forest cover types on better drained land. Associated species are red maple, slippery elm, cottonwood, white, red and green ash, bur oak and bitternut hickory. This type represents 20 per cent of the woodland of the watershed and is the second most abundant type in the Thames drainage area.

Type 60A: White Elm

Type 60A is very similar to the silver maple - white elm Type 60, but is found on drier sites as well as swamps and swales and its associated species are the same. It is not listed in the American classification but has been introduced here because of its frequent occurrence in Southern Ontario. It comprises over 12½ per cent of the woodland, so that these two types together make up over 32 per cent of the total woods in the watershed.

Type 61: Cottonwood

This type is not common. The species is usually mixed in the two preceding types, but small, almost

WOODLOT CLASSES

TOWNSHIP	NO. OF WOODLOTS	AREA	H1	H2	H3	H4	H5	M2	M3	M4	M5	C1	C3	C4	C5
Biddulph	77	382		2	220	133	27		15	71	105		5	12	3
Blandford	202	1,260		6	377	405	261								
Blanshard	167	1,469		202	812	316	139								
Caradoc	80	608			54	443	80							5	14
Deleware	144	833		3	193	338	184		30	33	29			7	2
Dereham	276	2,045		150	613	814	378	2	30	48				6	
Dorchester S.	18	179		22	40	71	19	4	5	12				10	
Dorchester N.	562	4,647		230	1,342	1,305	643		180	483	115		8	204	137
Downie	311	3,267		192	1,537	1,129	369		10	26	18		10	14	17
Easthope N.	219	2,806		103	1,819	1,198	447							62	
Easthope S.	217	1,261		61	508	547	132			4					9
Ellice	292	3,676		9	694	1,038	1,921			12					2
Elma	11	42			16	20	6		8						
Fullarton	362	3,064	1	44	1,394	962	655								
Grey	4	17			6	8	3								
Hibbert	79	753			336	319	88							1	9
Loba	147	857		39	254	327	124		28	64				11	10
Logan	231	1,728		52	837	662	157	15						4	1
London	744	5,607		141	1,758	2,635	836		53	33	5		1	56	89
McKillop	2	16			5	5	11								
Mornington	11	84			25	30	29								
Nissouri E.	495	3,617		443	1,228	1,154	438		9	232	29			69	15
Nissouri W.	365	2,541		121	1,094	931	377		7	4				7	
Norwich N.	15	113		12	57	29	15								
Oxford E.	118	1,177		6	443	511	42		62	47	6			39	21
Oxford N.	243	1,129		270	270	282	253		11	24	8			2	9
Oxford W.	274	1,971		107	583	675	95	2	98	83	29			250	49
Usborne	57	406		70	248	81	7					1			
Westminster	440	2,815		33	1,183	1,133	445		7	4	10			12	3
Zorra E.	499	3,083		47	1,510	947	342		33	52	51	1		74	69
Zorra W.	617	5,572		227	2,402	1,902	510			239				146	38
TOTAL	7,279	57,025	1	2,592	20,853	20,350	9,033	23	586	1,619	405		74	991	497
PER CENT				4.6	36.6	35.7	15.9		1.0	2.8	0.7		0.1	1.7	0.9

H -- HARDWOOD -- 80% or more of the main stand composed of hardwoods.

C -- CONIFEROUS -- 80% or more of the main stand composed of conifers.

M -- MIXED -- All other stands.

Hardwood Mixed Wood Coniferous

Virgin	Moderately Culled	Severely Culled	Second Growth	Young Growth
H-1	H-2	H-3	H-4	H-5
M-1	M-2	M-3	M-4	M-5
C-1	C-2	C-3	C-4	C-5

pure stands do occur which will give way to the other types as the succession develops. Thirty-eight acres were mapped.

Type 88: Willow

Several species are included in this type but the commonest is black willow. It occurs on wet sites, often on the margins of kettles, and includes 675 acres on the Thames Watershed.

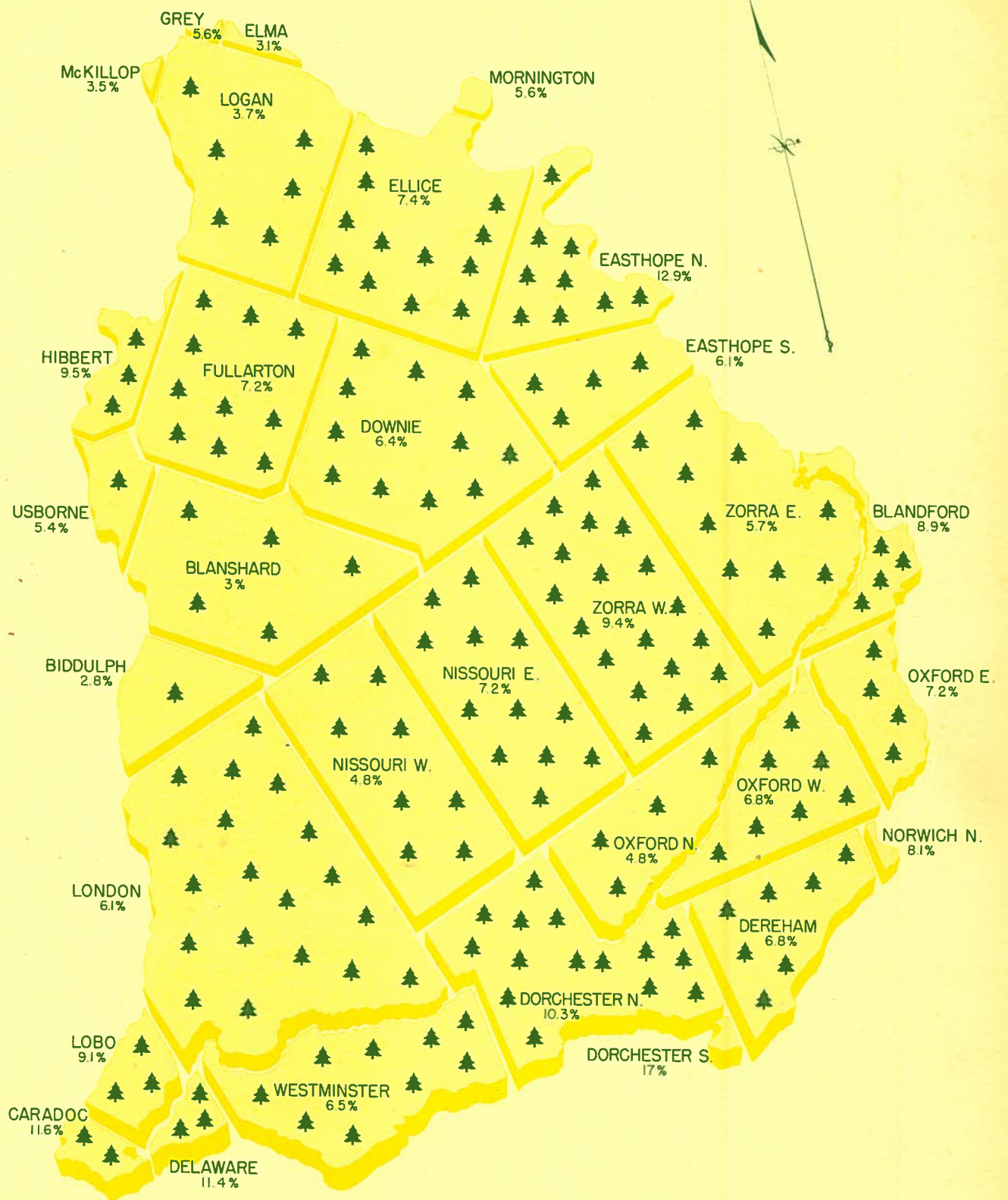
The large map shows the distribution of all types throughout the watershed and from it the following observations may be made:

- (a) Elm swamp types which covered extensive areas have survived pretty well throughout the watershed on level land and in the glacial meltwater channels.
- (b) Cedar and tamarack swamps which were scattered along the valleys of streams have been severely overcut and pastured, but fairly extensive areas still exist.
- (c) Sugar maple types are still the most abundant and are found generally throughout the watershed.
- (d) The chief pioneer type following cutting and pasturing is aspen Type 4, which covers light soils on the moraines and muck and peat areas which have been frequently burned over.
- (d) The forest types of the Deciduous Forest Region may still be seen in the south-west portion of the watershed.

3. Present Conditions

The results of the forest surveys are summarized in the accompanying table.

Woodland within the watershed comprises 57,025 acres, which is 6.7 per cent of the total area of 847,949 acres. The total number of woodlots examined was 7,279 which includes many areas which are considered by their owners as constituting a single woodlot but which, because of the difference in types and age classes of certain sections, had to be considered in



EXISTING WOODLAND

the field as separate units. Conversely, where property boundaries were not marked, woodland extending across two or more properties was sometimes considered as a unit because the type and age class remained constant throughout.

The conifers occurring in the watershed are white pine, hemlock, white cedar, tamarack and black spruce. Red pine occurred in the original forest but no trees were found in the natural state at the time the survey was made. White pine is fairly generally scattered throughout the moraine areas, especially in the south-east. Hemlock is found mixed with hardwoods and white cedar and tamarack are present in the small swamps. Black spruce is very rare, but was found in one small muskeg, an island of Boreal vegetation, near the London Sanitarium. Conversely there is an outlier of the Deciduous Forest near Lakeside where chestnut grew in considerable abundance before its decimation by the Chinese Chestnut Blight. There is no doubt that conifers formed a larger part of the woodland than they do today, but their numbers have been diminished because of the desirability of the lumber they furnish, and recurrent fires have destroyed them while more fire-resistant species such as oak have survived. The situation at the present time is that of the 57,025 acres of woodland, 93 per cent is classified as pure hardwoods, 4 per cent as mixed woods and 3 per cent as pure conifers. In the 93 per cent classified as hardwoods 5 per cent is over 18 inches in diameter at breast height, 36 per cent is 10 to 18 inches, 35 per cent is 4 to 10 inches and 16 per cent is young growth under 4 inches in diameter at breast height.

In the mixed wood classes, comprising 4 per cent of the woodland, 1 per cent is 10 inches to 18 inches in diameter at breast height, 3 per cent is 4 inches to 10 inches, while less than 1 per cent is young growth under 4 inches. In the coniferous woods 2 per cent is second growth, 4 to 10 inches at breast height, and less than 1 per cent is young growth under 4 inches.



White elm and silver maple occur on poorly drained soil which is frequently heavy clay. Cattle not only destroy the young growth and forest floor but puddle and compact the soil.



Before regeneration can be obtained here, it will be necessary to cultivate the soil well in May before the trees seed in June. The trees have become "stag-headed" from the compaction of the soil.

For the whole area the percentage of uneven-aged stands is somewhat more than the even-aged, the figures being 53 per cent of the former and 47 per cent of the latter.

Grazing in farm woodlots is still fairly general, the percentage of grazed woodland being 50 per cent for the whole watershed. The percentage of grazed woodlots is low as compared with other watersheds. Grazing, as is well known, is detrimental to the proper development of any woodland area. The number of cattle and the size of the woodlot have a direct relationship to the damage which is done. For example, a large woodlot is not as seriously affected by a few head of cattle as a small one, but on most farms the woodlot is small and is seriously damaged by large herds. Grazing in a woodlot destroys young growth, open areas appear and become covered with grass, which means that the maintenance of the forest floor, which is so important to the health of the stand, is interfered with and there is less likelihood of a renewing of the stand by reseeding from old trees. These in turn become stag-headed and are easily preyed upon by fungus and disease.

Fire is a factor menacing woodlands in the swamp areas. It is not necessary to burn a tree to kill it: merely raising the temperature of the growing layer inside the bark to 150 degrees Fahrenheit will do the job, and this is frequently what happens.

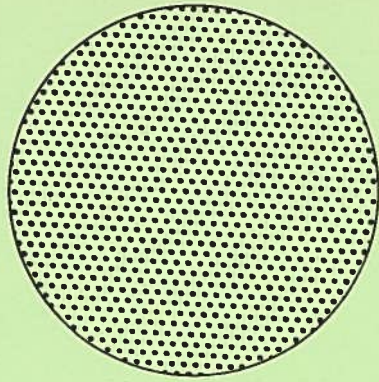
Due to the custom of grazing in the woodlots some stands have become open and require some planting. Of the areas examined 38 per cent are devoid of natural regeneration and 57 per cent require some planting to bring them back to fully stocked stands. Cutting in woodlots and clean-cutting of whole areas has been carried on persistently in the past, but since all the counties of the watershed now have diameter limits this practice has now ceased.

To sum up, 95 per cent of the woods are second growth with a mixture of large trees in many areas, and of

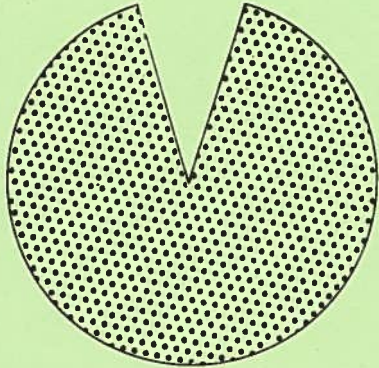
WOODLOT CONDITIONS

TOWNSHIP	NO. OF WOODLOTS	AREA	AGED		GRAZED		FENCED		REPRODUCTION			
			EVEN	UNEVEN	YES	NO	YES	NO	A	B	C	D
Biddulph	77	382	244	138	287	95	156	226	51	39	44	248
Blandford	202	1,260	816	444	625	635	87	1,173	7	87	513	653
Blanshard	167	1,469	840	629	734	735	959	510	34	369	623	443
Caradoc	80	608	406	202	210	398	108	500	36	97	360	115
Deleware	144	833	265	568	421	412	313	520	25	64	361	383
Dereham	276	1,179	866	101	944	1,101	842	1,203	57	249	722	1,018
Dorchester S.	18	179	101	78	19	160		179			78	101
Dorchester N.	562	4,647	2,164	2,483	1,794	2,853	1,164	3,483	63	527	2,564	1,493
Downie	311	3,267	1,498	1,769	1,629	1,638	2,355	912	112	363	1,416	1,376
Easthope N.	219	2,806	1,278	1,528	1,378	1,428	1,091	1,715	238	405	1,441	1,722
Easthope S.	217	1,261	352	909	658	603	657	604	11	255	586	409
Ellice	292	3,676	2,854	822	1,881	1,795	798	2,878	27	222	1,460	1,967
Elma	11	42	30	12	34	8	12	30			13	29
Fullarton	362	3,064	1,278	1,786	1,523	1,541	1,886	1,178	215	556	1,237	1,056
Grey	4	17	11	6	17			17			9	8
Hibbert	79	753	317	436	313	440	549	204	24	183	339	207
Lobo	147	857	492	365	345	512	102	755	25	67	415	350
Logan	231	1,728	1,175	553	803	925	732	996	260	273	648	547
London	744	5,607	3,062	2,545	3,662	1,945	1,415	4,192	418	676	2,399	2,114
McKillop	2	16	16		16			16				16
Mornington	11	84	78	6	59	25	12	72	9		46	29
Nissouri E.	495	3,617	1,648	1,969	2,085	1,532	1,319	2,298	56	634	1,942	985
Nissouri W.	365	2,541	1,657	884	1,728	813	621	1,920	28	306	1,240	967
Norwich N.	15	113	35	78	24	89	67	46		16	45	52
Oxford E.	118	1,177	663	514	536	641	316	861	6	14	673	484
Oxford N.	243	1,129	539	590	602	527	569	560	98	123	465	443
Oxford W.	274	1,971	991	980	673	1,298	1,020	951	28	99	939	905
Usborne	57	406	268	138	214	1,192	1,139	267	18	49	185	154
Westminster	440	2,815	1,216	1,599	1,292	1,523	1,058	1,757	162	397	1,129	1,127
Zorra E.	499	3,083	1,667	1,416	1,493	1,590	1,312	1,771	59	378	1,395	1,251
Zorra W.	617	5,572	3,434	2,138	1,807	3,765	1,091	4,481	84	587	2,803	2,098
TOTAL	7,279	57,025	30,261	26,764	27,806	29,219	20,750	36,275	2,151	7,035	26,090	21,750
PER CENT			53.1	46.9	48.7	51.3	36.4	63.6	3.8	12.3	45.8	38.1

these 16 per cent are young growth, the former ranging from 30 to 50 feet in height. The woodlots containing the largest trees are composed of old hardwoods, elm and soft maple in the swamp areas and sugar maple, beech and basswood on dry sites.



TOTAL
849,949 acres
(100%)



OPEN
771,776 acres
(90.8%)



WOODLAND
57,025 acres
(6.7%)



SCRUB
20,867 acres
(2.5%)



BOG
281 acres
(0.0%)

LAND CLASSIFICATION — TOTAL WATERSHED