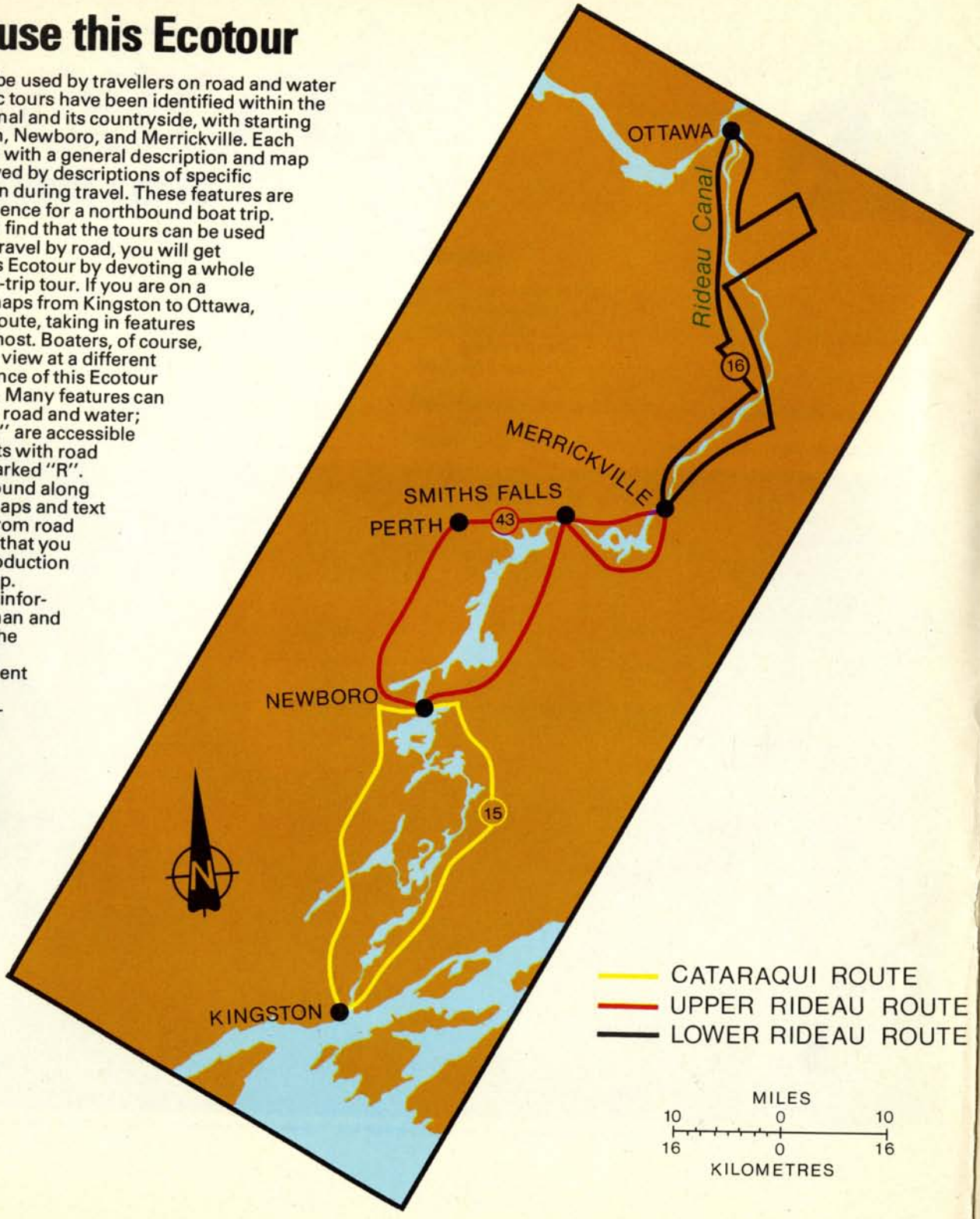
Ecotour
of the Rideau Canal

"Lock, dam, etc. at Davis Mill; barges passing from the lock to the steamboat 'Bytown'" (from an original painting by Thomas Burrowes)

How to use this Ecotour

This Ecotour can be used by travellers on road and water alike. Three scenic tours have been identified within the corridor of the Canal and its countryside, with starting points in Kingston, Newboro, and Merrickville. Each tour is introduced with a general description and map of the area, followed by descriptions of specific features to be seen during travel. These features are presented in sequence for a northbound boat trip. However, you will find that the tours can be used in reverse. If you travel by road, you will get the best out of this Ecotour by devoting a whole day to each round-trip tour. If you are on a one-way trip, perhaps from Kingston to Ottawa, devise your own route, taking in features that interest you most. Boaters, of course, will get a different view at a different pace, but the essence of this Ecotour remains the same. Many features can be seen from both road and water; others marked "W" are accessible by boat only. Points with road access only are marked "R". Points are easily found along the routes, from maps and text descriptions and from road signs. We suggest that you read the main introduction before your first trip. You will find more information on the human and natural history of the Canal at any lock station, where current details of the Parks Canada interpretive program will also be available.



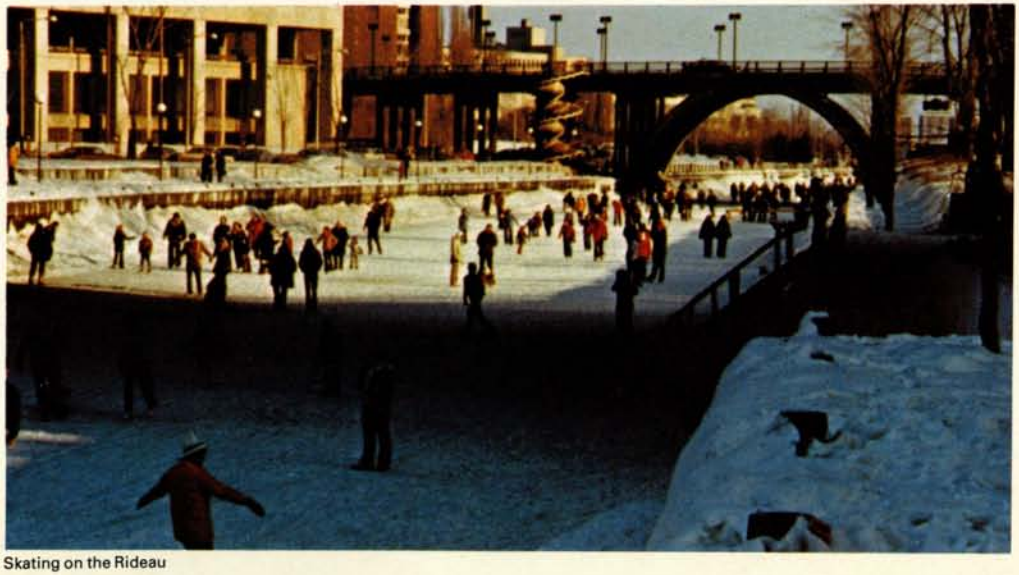
An introduction to the Rideau Canal

The Canal we see today is a product of millions of years of natural processes and some remarkable engineering by Lieutenant Colonel John By. By's task, to create a safe water route between the Ottawa River and the British stronghold at Kingston, was completed in 1832 with the construction of 47 locks, 24 dams and 29 kilometres of artificial channels. Many of these structures retain their original appearance and form a historic monument of unusually large proportions. It is not a museum piece, however, and it has a vitality that has grown, not diminished, over the past 145 years. In its time, the Canal has been an artery for national defence, settlement, and industry in this part of Ontario. Today it yields two vital commodities — pleasure and relaxation — to those who travel along its course.

By's strategy was to utilize the natural watercourses of the Cataraqui and Rideau rivers. In uniting these rivers into a navigable waterway, he had to reckon with two features that characterize so much of the Canadian landscape — the ancient Precambrian Shield and the relatively recent action of glaciation. Except for a ridge leading off to the southeast, the Precambrian Shield in eastern Ontario disappears under flat layers of much younger rocks. This ridge of ancient rock is the Frontenac Axis and contains the headwaters of both the Rideau and Cataraqui rivers. It also forms the Thousand Islands as it crosses the St. Lawrence and joins the Adirondacks in New York. Although these rocks are over a billion years old, their final shaping has been quite recent. The last of the great ice sheets ceased scouring the rocks only 12,000 years ago, leaving at first a sea, and then a sculptured landscape of rounded hills and odd-shaped pockets and valleys. Water ran off wherever it could, filling up depressions in the process. The land became dotted with lakes of many shapes, sizes and depths; some were quite shallow and quickly filled with vegetation to form swamps. The height of land created by the Frontenac Axis challenged By's engineering skill but, as we shall see, it was the swamps that caused him greatest difficulty.

The sculptured Shield dominates much of the route between Kingston and Smiths Falls. But the landscape changes drastically after Smiths Falls as the Rideau crosses plains of limestone and sandstone. This land, too, was eroded by ice, exposing the flat bedding plains that characterize these rocks; what got rubbed off was later dumped as deposits of clay, sand, gravel and boulders. The landscapes you will travel through are unusually variable for Canada as they traverse rocks of contrasting age and type. The living elements change, too. Indeed, the vegetation in this area is reputed to change more frequently than anywhere else in Canada except for mountainous regions. Over 70 species of plants find their northern limit here and two important northern trees, jack pine and white spruce, reach their southern limit. The area boasts several rarities such as the pitch pine and the black rat snake, both of which you may see on your trip.

Just as you can interpret human history from buildings and structures along the Canal, so you can interpret natural history from natural features. You will also discover that human history and natural history have often been affected by one another. Indeed the welfare of the Rideau today rests largely on the interaction of you as a user and the Canal as a living system.

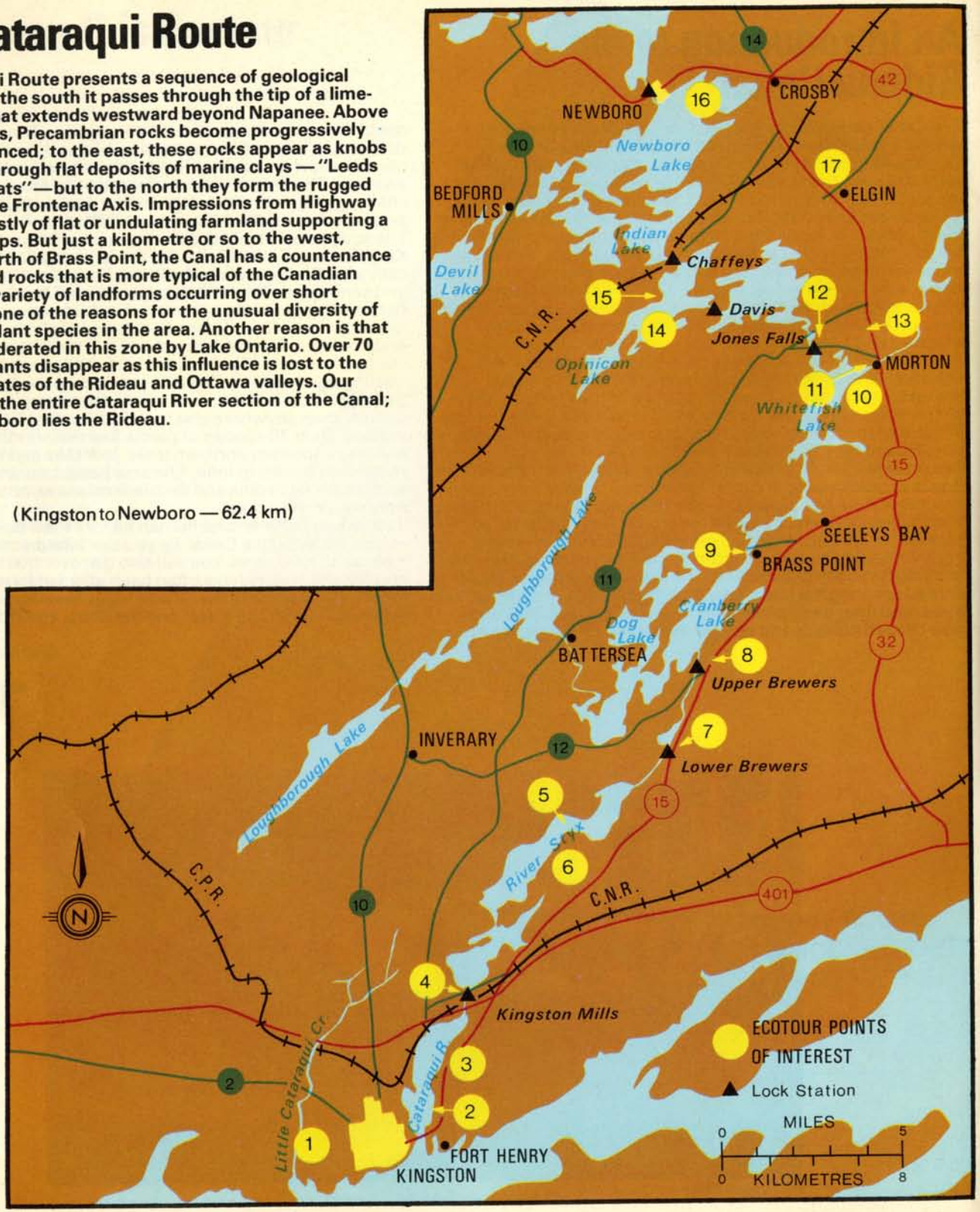


Skating on the Rideau

The Cataraqui Route

The Cataraqui Route presents a sequence of geological contrasts. To the south it passes through the tip of a limestone plain that extends westward beyond Napanee. Above Kingston Mills, Precambrian rocks become progressively more pronounced; to the east, these rocks appear as knobs protruding through flat deposits of marine clays — "Leeds Knobs and Flats"—but to the north they form the rugged uplands of the Frontenac Axis. Impressions from Highway 15 will be mostly of flat or undulating farmland supporting a variety of crops. But just a kilometre or so to the west, especially north of Brass Point, the Canal has a countenance of forests and rocks that is more typical of the Canadian Shield. This variety of landforms occurring over short distances is one of the reasons for the unusual diversity of animal and plant species in the area. Another reason is that winter is moderated in this zone by Lake Ontario. Over 70 species of plants disappear as this influence is lost to the harsher climates of the Rideau and Ottawa valleys. Our route covers the entire Cataraqui River section of the Canal; beyond Newboro lies the Rideau.

(Kingston to Newboro — 62.4 km)



Kingston Mills lock station circa 1840 (artist unknown)

"Sawmill, etc. at Kingston Mills, as it appeared in May 1828" (from an original painting by Thomas Burrowes)

1. (R). Before you start your engine, have you thought of walking to Ottawa? Cataraqui Creek Conservation Area is the start of the famous 315 kilometre Rideau Trail developed in 1971 by the Rideau Trail Association. For the less energetic, this site still offers fascinating walks through the Little Cataraqui Marsh (now managed by the Cataraqui Region Conservation Authority).

2. Despite its size, Cataraqui Marsh offers only a modest variety of wildlife during summer. Cattails dominating the usually productive shallows provide habitat attractive to only a few species of water creatures.

3. The main product of this quarry is crushed limestone, prepared from rocks laid down in warm seas 400 million years ago. The earth's atmosphere was once much richer in carbon dioxide; over millions of years it has been removed by marine organisms to form oil and limestone. When we burn oil, some of this carbon dioxide goes back into the atmosphere and may ultimately affect our planet's climate.

4. The Blockhouse at Kingston Mills is a reminder that the Canal was built for military purposes. The uneasy peace after the War of 1812-1814 between the United States and Britain's North American colonies finally led to the construction of the Rideau Canal. In the event of another war British troops and supplies could now move from the east coast to the Great Lakes without exposure to hostile American guns on the south shore of the St. Lawrence River. Exhibits and a theatre in the lockmaster's house by the basin tell this tale dramatically.

5. (W). River Styx was undoubtedly a forbidding "river of sticks" as the rising waters behind Kingston Mills dam drowned low-lying forests. Its appearance probably reminded an early traveller of River Styx, the underworld boundary, in Greek mythology, between the two worlds of life and death. Even today there is something forbidding about the mats of vegetation that threaten the navigable channel; nevertheless, abundant insects on these mats provide good feeding for black terns.

6. (W). This quarry exploits the Precambrian rocks, rather than more recent Palaeozoic formations, for building materials. The product here is mainly facing-stone for fireplaces and house exteriors.

7. Deep soil at Lower Brewers forced Colonel By to build on an earth foundation instead of bedrock as at other locks. The result was a long history of troubles, finally cured with complete reconstruction in 1976. Little is evident of the modern overhaul, however, and the lock and king truss bridge continue to contribute to the 19th century atmosphere that Parks Canada strives to maintain on the Canal.

8. Gananoque still draws a third of its electricity from three generating stations on the Canal. Because of its need for water, the power company assisted in the water storage scheme in which many upper lakes were tapped. Long penstocks at Upper Brewers and Jones Falls demonstrate the versatility of wood as a construction material.

9. The pastoral view from Brass Point Swing Bridge gives little hint of the horrors of Cranberry Bog that challenged Colonel By. "Swamp fever" was rampant and almost took his life. This fever was, in reality, malaria, then thought to be the product of "bad air" emanating from swamps. The dam built at Upper Brewers to link Cranberry Lake with Whitefish Lake and thus form one navigable reach was expected to eliminate swamp fever. We now know that malaria is spread by mosquitoes. The disease was probably carried to Canada by soldiers returning from India.

"Dam at Jones Falls; when nearly completed, showing the last temporary passage provided for the surplus water" (from an original painting by Thomas Burrowes)

"Locks, etc. at Jones Falls from the rocky hills south west of them" (from an original painting by Thomas Burrowes)

10. (W). The Dunders, approachable from Morton Bay and just visible 1.6 kilometres south of Morton Village on Highway 15, are plutons — hard rock cores that tower above neighboring rocks because of their resistance to erosion. Their peculiar composition, formation, and location provide habitat for several rare plants, including pitch pine. Virtually unexploited in Canadian forestry, pitch pine is recognizable by needles sprouting from its trunk, in clusters of three, and by numerous old cones clinging to branches.

11. By had to build a dam at Morton, otherwise the rising waters of Whitefish Lake would have been lost down Morton Creek into the Gananoque River. In those days, water conservation did not present many problems. But by the 1880s, deforestation of local watersheds allowed spring water to run off quickly, causing spring floods and summer shortages. Many more lakes had to be harnessed through control dams; for example, Devil, Desert, and Loughborough lakes to the west now supply the Cataraqui while Bobs Lake feeds the Rideau. Today, management of the watershed is based on information such as snow depth in the hills, and flow rates of tributaries.

12. Unlike many other 19th century canals the Rideau relied heavily on engineering works rather than channel excavations. The Royal Engineers essentially created a series of pools by damming up watercourses. These pools were then linked together by a system of locks. Here at Jones Falls the "hardware" of the Canal is particularly impressive.

The site called for bold engineering. With the aid of John Redpath (a contractor who later founded a well-known sugar industry), Colonel By built what was then the highest dam in North America, and third highest in the world. This magnificent 20 metre keystone arched structure, with its attendant locks, waste weirs, spillways, and original blacksmith's forge, are well worth a visit. The site was cleared for defence purposes (hence the defensible lockmaster's house) but has since been colonized by over 20 species of trees. Those growing in the damp soil below the dam have found a favorable habitat, and help to screen a more recent engineering project, a generating station.

13. (R). At nesting time, the usually solitary great blue heron finds there is security in numbers; a heronry is visible in the dead swamp forest by Highway 15. Road works and abundant beaver in this region have drowned swamp forests of elm, ash, and maple. However, herons and woodpeckers find ideal habitat among the dead trees.

14. (W). As the Canal's dams were built, Lake Opinicon, like all the original lakes, rose and spread into low-lying land. The new shallows were rich in nutrients and became increasingly so as shoreline development proceeded. Today, Opinicon is quite eutrophic and has a serious waterweed problem.

Ordovician limestone lying unconformably on Precambrian rock at Elgin

15. (W). For many years the Canal has provided a training ground for young researchers at Queen's University Biological Station. Their work covers such varied subjects as bats, bluegills, parasites of dragonflies, and, particularly pertinent to Canal management, water plants. Submerged plants intercept sunlight and convert much of it to heat. Surface waters heat up, the bottom remains cool, and the plants themselves prevent currents that might mix up the layers. Meanwhile, the shoot tips of certain species wallow in the warm surface waters and grow at an astonishing rate.

16. Flooded bays of Newboro, Opinicon, and Sand lakes are highly productive and provide ideal spawning areas for largemouth bass in particular. Try fish watching — but not fishing! — in the designated fish sanctuaries.

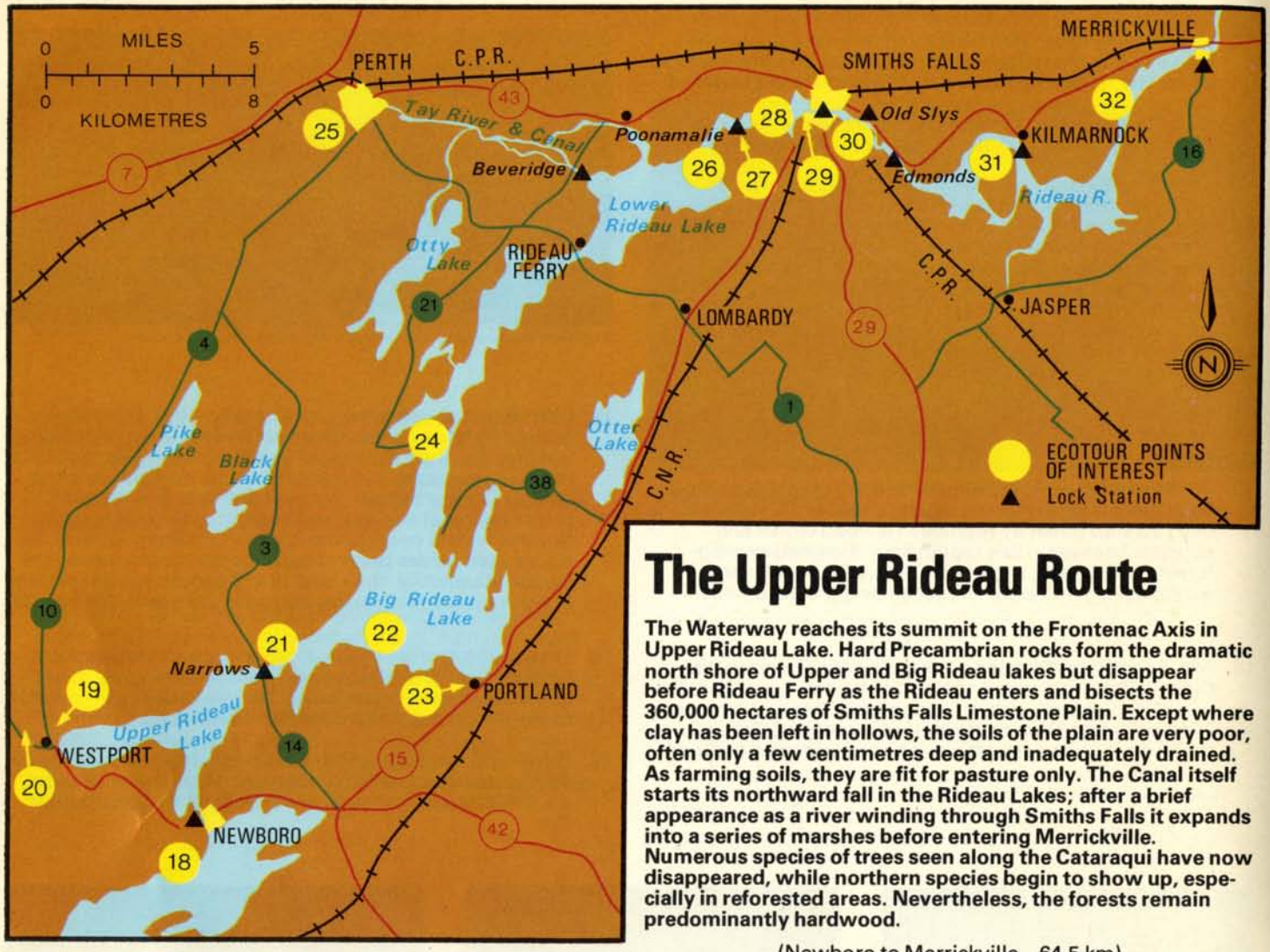
17. (R). A highway rock cut exposes Ordovician limestone 400 million years old resting unconformably (and somewhat uncomfortably) upon upturned rocks of the Precambrian era.

Pitch pine:

a) entire tree

b) foliage

c) cone



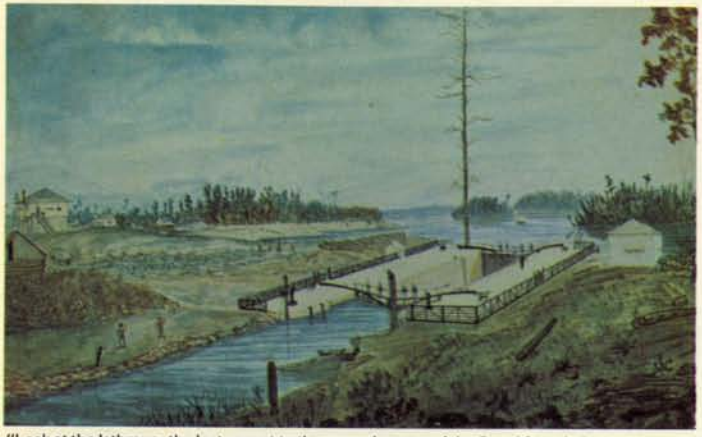
The Upper Rideau Route

The Waterway reaches its summit on the Frontenac Axis in Upper Rideau Lake. Hard Precambrian rocks form the dramatic north shore of Upper and Big Rideau lakes but disappear before Rideau Ferry as the Rideau enters and bisects the 360,000 hectares of Smiths Falls Limestone Plain. Except where clay has been left in hollows, the soils of the plain are very poor, often only a few centimetres deep and inadequately drained. As farming soils, they are fit for pasture only. The Canal itself starts its northward fall in the Rideau Lakes; after a brief appearance as a river winding through Smiths Falls it expands into a series of marshes before entering Merrickville. Numerous species of trees seen along the Cataraqui have now disappeared, while northern species begin to show up, especially in reforested areas. Nevertheless, the forests remain predominantly hardwood.

(Newboro to Merrickville 64.5 km)

18. The isthmus between Newboro Lake and Upper Rideau is the height of land for the Canal. Several hundred men labored here digging and blasting a 2 kilometre channel to link the Rideau and Cataraqui systems. Of over 60 buildings erected during construction of the Canal, only the block-house remains. The camp included a hospital to aid those injured or stricken with swamp fever. At Newboro alone hundreds died before the job was done. Today's problem, bank erosion from boat wake, seems minor in comparison. The isthmus cut, however, must be dredged periodically for navigation.

19. (R) Foley Mountain Conservation Area, maintained by Rideau Valley Conservation Authority, offers one of the finest vistas in eastern Ontario, excellent trails, and an interpretive centre. Eastern red cedar, whose wood is used for closet liners and cedar chests, is abundant along the drier slopes. The black rat snake, Canada's largest snake and rodent killer *par excellence,* finds its northern limit here.



"Lock at the Isthmus: the last ascent to the summit water of the Canal from Lake Ontario" (from an original painting by Thomas Burrowes)

"Lock, blockhouse, etc. at the Narrows, Rideau Lake — the first descent from Summit towards Bytown" (from an original painting by Thomas Burrowes)

20. (R). All largemouth bass currently stocked in Ontario come from the Westport Fish Hatchery. This is a lake water hatchery, so bass are reared during summer when the water is warm. As the water cools in fall, the hatchery is stocked with lake trout from spring-fed hatcheries elsewhere. Young trout may treble their weight before being released into deep lakes such as Big Rideau. Spring is the best time to visit the hatchery.

21. "The oftener I examine the excavation now in progress... the more I am convinced it is going to be a more difficult piece than has been suspected."

    So wrote Colonel By of the excavation work at Newboro. The final solution lay here at the Narrows, 7 kilometres downstream. Prior to Canal construction, early settlers forded the lake at this location when travelling the road from Kingston to Perth. Colonel By constructed a dam and thus raised the water level of Upper Rideau Lake by 1.2 metres. This reduced substantially the amount of excavation needed at Newboro to join the Rideau and Cataraqui systems. The importance of this dam for navigation of the cut at the isthmus is illustrated by the blockhouse built in 1833 to defend the station.

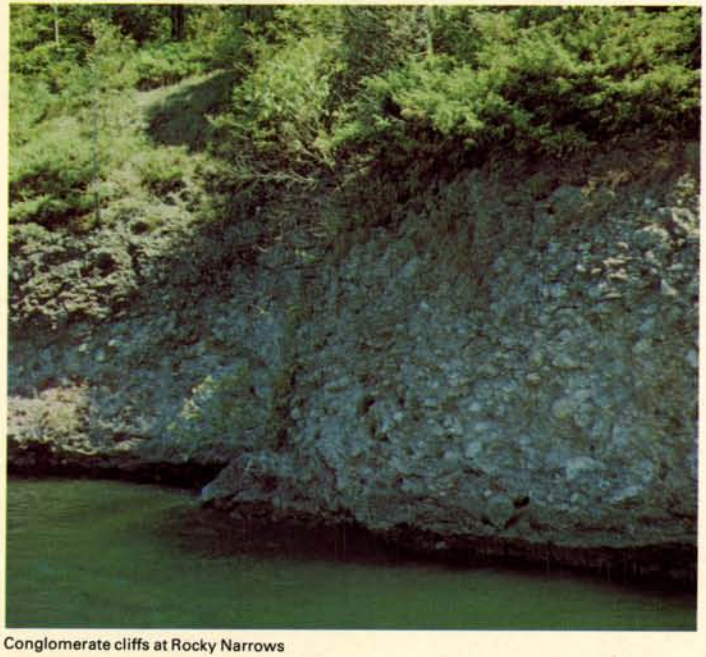
22. Lying along a fault in the earth's crust, Big Rideau Lake provides the deepest water (up to 100 metres) in the system. With the right tackle fishermen can reach the haunt of lake trout in the deep, cold water spots. While lake trout do breed naturally here, about 80 percent of the fish have been stocked. Stocking began in 1916.

23. Portland was one of several settlements that flourished on the wood industry. While square timbers of pine, oak and elm from the Rideau Valley were floated north to Quebec for the British navy, a considerable trade in sawn timber developed with Americans. Portland had two sawmills; their many products included boxes of locally made cheese. The Canal continued to serve the new lumbering capital of Bytown (now Ottawa) long after its environs had exhausted their prime trees. Thousands of lumbermen passing through Bytown meant markets for local agricultural produce. Poor soils and short seasons limited crop yields, however, and the growing demands were met with American produce, shipped up the Canal.

24. Murphy's Point Provincial Park forms the west bank of Rocky Narrows. Accessible from the Canal and County roads 1 and 21, this new park offers wildlife (including the black rat snake) and facilities for camping, picnicking and hiking. In the north part of the park are several mica mines. Earlier in this century mica was transported to markets via the Canal. Facing the park, on the east bank, are cliffs of unusual conglomerate: large water-worn boulders of granite once settled here at the edge of an ancient sea where they became embedded in sediments, later to become hard crystalline limestone.

25. Perth was founded in 1816 by discharged soldiers and Scottish settlers. Only 14 years later businessmen were financing construction of the Tay Canal as a link with the new Rideau Canal. The branch canal was finished by 1835, although the Beveridge Locks were built in 1886 to replace original wooden locks after the federal government took them over from the Tay Navigation Company. Square timbers and a variety of produce (including a 10-tonne cheese for the Chicago World's Fair of 1892) were shipped down the Tay. If you sail to Perth, you pass through Tay Marsh, a product of canal engineering with considerable potential as wildlife habitat. Sailor or driver, you will find Perth and its charming 19th century buildings well worth a visit.

Aerial view of Perth



Conglomerate cliffs at Rocky Narrows

26. (W). Ospreys appear to forego privacy for the sake of security when it comes to home building. A pair frequently nest on top of a utility pole in the mouth of Bacchus Bay at Hunter Rock. These magnificent fishermen can be seen through much of the Rideau, plunging feet first to grasp unwary fish in their talons.

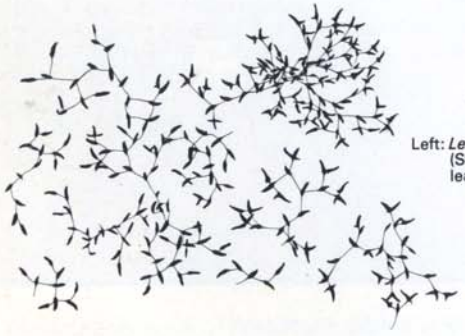
27. Eastern white cedars form an impressive approach to Poonamalie Lock. These trees will form swamp forests, yet cope with very shallow, dry soils, especially over limestone. Though soft, the wood is highly resistant to decay, as is evident from the many fine old cedar rail fences in the area.

28. Cattails along the east bank hide large open marshes of lilies, pickerel weed, and sedge meadow. Cattails hinder duck breeding but also protect the marsh from disturbance. Their floating mats can be broken by wave action from boats, and they scatter and re-establish elsewhere. Some mats have thickened and have accumulated sufficient debris and silt beneath them to form firm banks that are being colonized by elm and silver maple. Highway 43 passes through a similar marsh.

29. A Canadian National Railway rolling lift bridge reminds us that freighting on the Canal ended with the coming of the great railway era last century. American coal needed by the railway divisional point at Smiths Falls continued to be barged until 1920. But what the railways started, the highways finished. The Canal survives today for recreation and leisure.

Above: *Potamogeton robbinsii* (Robbins' pond weed)

Above: *Potamogeton amplifolius* (Large-leaved pond weed)



Left: *Lemna trisulca* (Star duck weed, ivy-leaved duck weed)

30. A woodlot just below Old Sly's Lock has been left undisturbed for many years, allowing old forest species such as black cherry, yellow birch, beech, and eastern hemlock to re-establish themselves. The woodlot also holds blue beech (whose hard, heavy wood was used by loggers as splitting wedges), hop hornbeam (another strong wood used for tool handles and, years ago, sleigh runners), bitternut hickory, and prickly ash.

Children holding skin of black rat snake

31. (W). Marshes are productive environments, for their shallow water and nutrient-rich silt favor plant growth necessary for animals to breed and feed. Black duck, blue-winged teal, bittern, and red-winged blackbirds breed in Kilmarnock and Easton marshes, but as on so many Rideau marshes breeding populations are limited by dense mats of cattails ringing the shallows. These marshes are more important as stopovers during migration periods—hence the duck blinds.

32. This official Migratory Bird Sanctuary affords protection from hunting and holds many waterfowl in fall. Conditions are not favorable for breeding, however, and there is no guarantee that the marsh will be preserved. Birds need habitat, not laws.

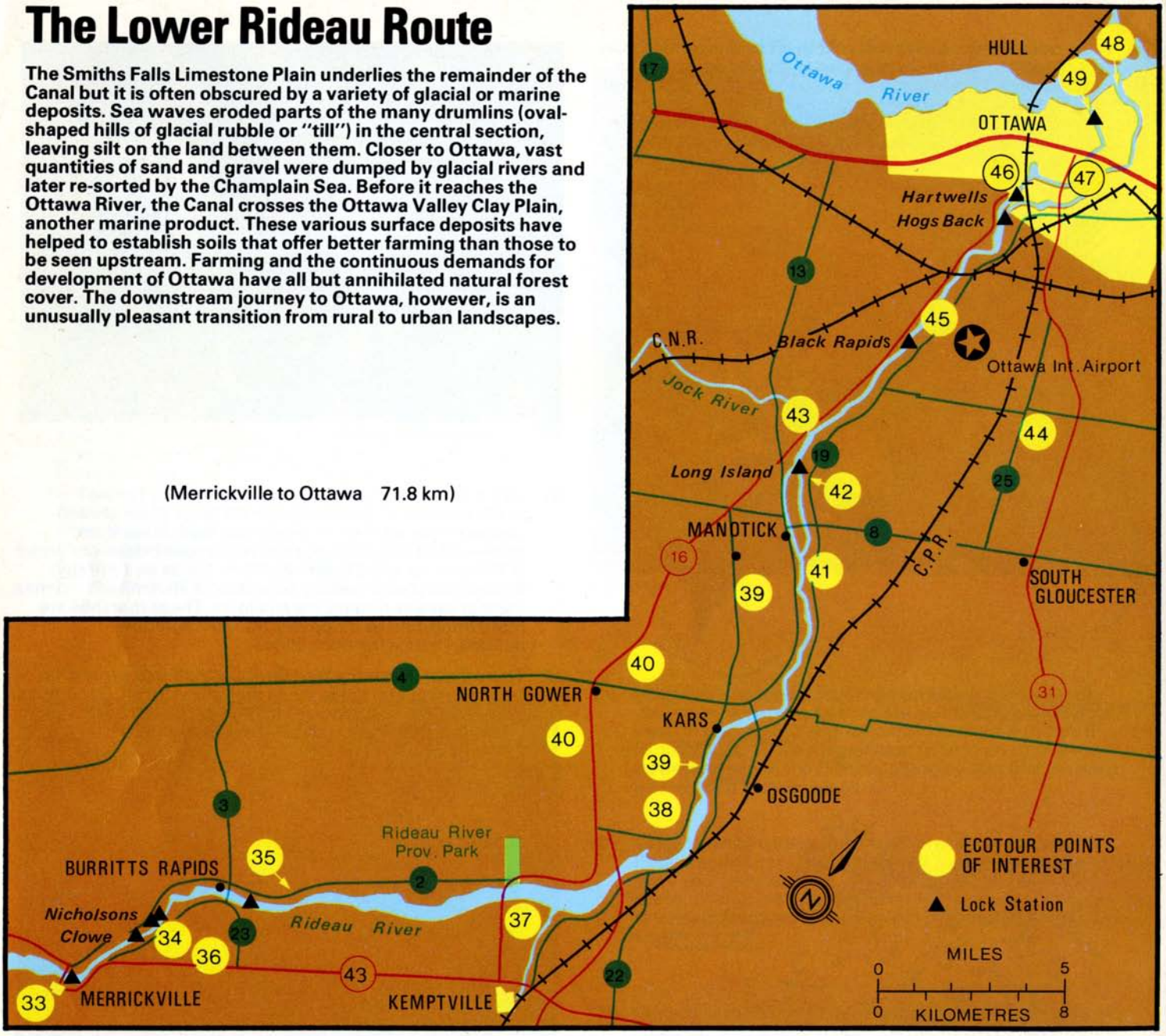
Left: *Anacharis canadensis* = *Elodea canadensis* (Canadian water weed, water-thyme, ditch-moss)

Right: *Myriophyllum exalbescans* (Eurasian milfoil, whitish water-milfoil)

The Lower Rideau Route

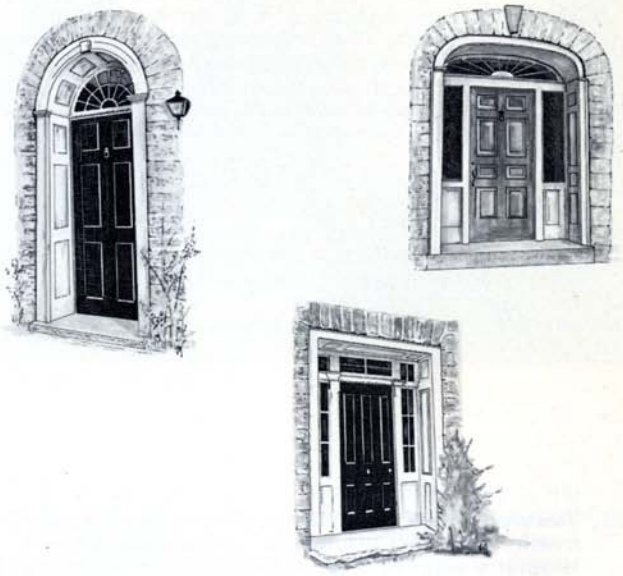
The Smiths Falls Limestone Plain underlies the remainder of the Canal but it is often obscured by a variety of glacial or marine deposits. Sea waves eroded parts of the many drumlins (oval-shaped hills of glacial rubble or "till") in the central section, leaving silt on the land between them. Closer to Ottawa, vast quantities of sand and gravel were dumped by glacial rivers and later re-sorted by the Champlain Sea. Before it reaches the Ottawa River, the Canal crosses the Ottawa Valley Clay Plain, another marine product. These various surface deposits have helped to establish soils that offer better farming than those to be seen upstream. Farming and the continuous demands for development of Ottawa have all but annihilated natural forest cover. The downstream journey to Ottawa, however, is an unusually pleasant transition from rural to urban landscapes.

(Merrickville to Ottawa 71.8 km)

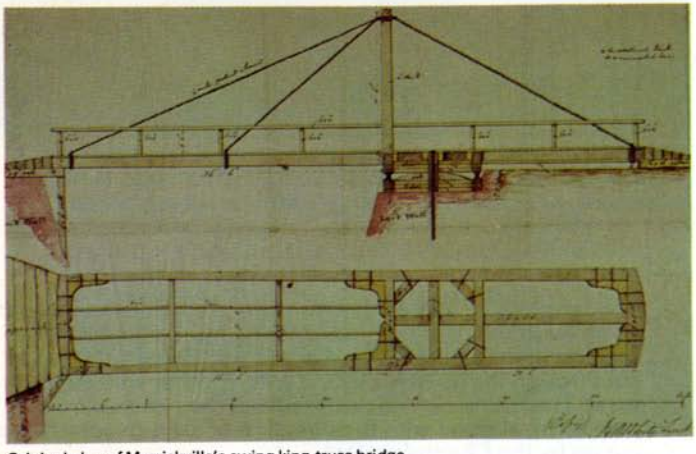


33. The coming of the Canal stimulated settlement and industry in the Rideau-Cataraqui region. Steamboats were soon providing an economical means of transporting goods to and from markets. In the 40 years prior to Canal construction Merricks Mills had grown slowly to a community of 300 people. Thirty years after Canal completion, the village, now renamed Merrickville, boasted a population of 1200. Mitchell's Canada Business Dictionary for 1864-1865 stated that the town did a large trade in lumber and had good water power, extensive sole leather tannery and woolen factories, flour, grist and saw mills. A visit to the Blockhouse Museum (operated by the Merrickville and District Historical Society) and a stroll through town recapture the spirit of 19th century enterprise.

34. The country along the Rideau Canal has a legacy of period houses built in styles combining British and American Loyalist influences. Many were built by stonemasons after they had finished work on the Canal. There are several distinctive styles of roof lines, doorways, and gables. Using the illustration, you can estimate the age of certain houses from their decorative transom doors. Look between Merrickville and Burritts Rapids for beautiful examples in stone and brick, square timber and clapboard.

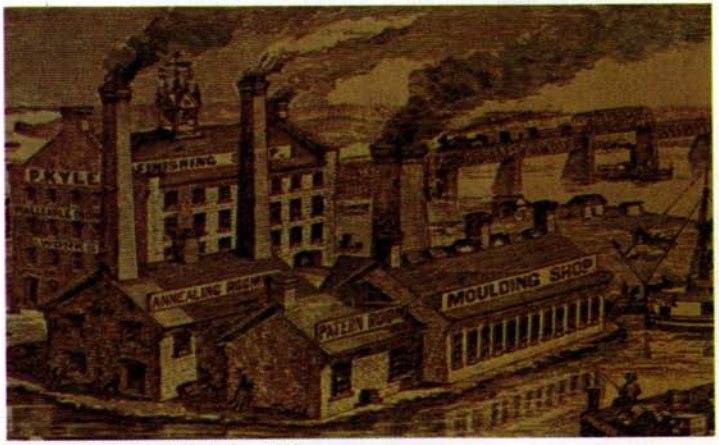


Transom doors of houses around Burritts Rapids



Original plan of Merrickville's swing king-truss bridge

35. This is one of several reaches of the Canal that suffer from serious erosion. Wake from fast boats and overgrazing and trampling from cattle are the main causes. Clays deposited in the Champlain Sea are particularly prone to massive slumping after heavy rain if they have developed steep slopes. Disastrous landslides with loss of life have occurred on these same clays elsewhere.



P. Kyle Malleable Iron Works circa 1885

36. The shallow soils of limestone plains present difficulty in reforestation. The Ontario Ministry of Natural Resources is trying, with some success, to establish jack pine and white spruce on this site, one of its many parcels of land in the area.

37. The G. Howard Ferguson Station is one of several large provincial forest nurseries. It rears pines, spruces and other species for reforestation in southeastern Ontario. Kemptville Creek, while often stagnant like Jock River, plays important roles in fire protection and irrigation here. Bring your walking shoes, bicycle, or even skis and enjoy the Station's many trails and tours, or camp at Rideau River Provincial Park in the original red pine plantation.

38. Even with its reservoir lakes and control dams, the Rideau usually floods in spring, yet development continues on the floodplain. Look for water lines well above basement windows of new houses between Kemptville and Kars.

"North entrance to the Rideau Canal from the Ottawa River taken from the Royal Engr Office, Bytown" (from an original painting by Thomas Burrowes)

39. You won't need a four-wheel drive to travel down this riverbed. A river through the last ice-sheet left a 17 kilometre esker in its path; the road from Highway 16 to Kars, and a farmhouse on the Canal, are perched on top. Pits to the side reveal gravel that once rolled along the icy torrent.

40. (R). The Celtic word for a little hill is "drumlin", a term now used to describe tapered mounds that glaciers sculptured with till. The hills along Highway 16 on each side of North Gower are parts of an extensive drumlin "field". Their depth of soil and good drainage enable farmers to cultivate crops that won't grow on poorer, low-lying land.

41. One cannot fail to be impressed by the prosperity evident along the Rideau. Summer cottages, year-round residences, and numerous dairy farms contribute unwanted riches to the Canal, however. For example, there are about 300 cattle per kilometre of waterway here — that's a lot of urine, for a start. Of course, excretion is an essential phase in the natural recycling process, but too much causes nature to respond with a surfeit of algae and certain waterweeds. The worst offender locally is Eurasian milfoil, an introduced plant that appears to be better adapted to the "enriched" Canal than are native species.

    Transatlantic exchange of waterweeds began in 1836, when Canadian waterweed first appeared in Europe. It, too, clogged waterways but is not as abundant as it once was. A rather attractive "gift" from Europe is the flowering rush; however, this plant is a menace to boaters.

42. The remarkable arched dam at Long Island locks was built as an overflow dam but proved to be more vulnerable to erosion than Colonel By had expected; he was obliged to cut through the tip of the island with another spillway to the west. The island carries drumlins but their characteristic oval form, aligned with the direction of ice movement, was cut up by the Champlain Sea.

43. Jock River is not a healthy river. It has few reservoir wetlands and its catchment area is the now deforested Smiths Falls Limestone Plain. Water flow is, therefore, prone to extremes, with rapid runoff in spring when Richmond village may be flooded, and virtually no flow in summer. Jock River was once the route for log drives to Ottawa and for sawn lumber shipped from Merrickville to a military establishment at Richmond.

44. (R). These gravel and sand deposits were dumped onto a limestone plain by glacial rivers and re-sorted by the Champlain Sea. Their removal leaves gaping holes in the landscape, but with research and hard work sterile pits can be revegetated and stocked to provide habitat attractive to wildlife, fishermen, bird watchers, and hunters. Their proximity to urban centres like Ottawa gives them a high recreational potential. The marshes nearby developed when drainage became impeded by the highway. Water has nowhere to go in these very shallow soils.

45. Beluga whales in southern Ontario? About 12,000 years ago sea water flooded into southeastern Ontario as the land lost its burden of ice. Waves and currents reworked materials that had been left by glaciers, while the Champlain Sea itself acted as a giant settling tank for more materials carried south in glacial rivers. These materials were graded naturally, often forming deposits valuable to modern man. A huge sand delta is exposed here at cuts from which sand was once barged down to Ottawa, and it was here that whale skeletons were found. The delta also provided an ideal site for Ottawa's Uplands Airport.

46. There is little trace of the enormous difficulties that faced Colonel By in the final 8 kilometres of the Canal. The falls at Hog's Back, at the site of a fault, were awesome, and the river wandered through almost impenetrable swamp before cascading into the Ottawa. Again, Colonel By's plan was bold: instead of fighting the swamp he bypassed it with an entirely artificial channel that maintained levels above the Rideau River until the flight of locks in Entrance Valley was reached. The plan entailed construction of a 15 metre dam (that collapsed twice before completion) and a long embankment that flooded Dow's Great Swamp, and now carries Colonel By Drive. Unknown to By, Dow's Swamp was to become a priceless recreational asset to the citizens of Canada's capital, for it is now Dow's Lake.

47. An urban forest! Enlightened planners earlier this century bequeathed today's boater, cyclist, pedestrian, and driver the Colonel By Drive with its serene landscape of trees and water. Unfortunately, they could not foresee how elms would succumb to Dutch elm disease. Forest scientists have helped to preserve trees on Parliament Hill but the method is expensive. The effect of another problem, road salt, can be seen among the white pines bordering the Drive. White pine suffers more than most trees from this urban pollutant.

48. As the massive glacial ice melted, the depressed Rideau Valley and surrounding land were inundated by the Champlain Sea (part of the Atlantic Ocean) and then rebounded to their present position. Meanwhile, the Ottawa River cut its course to a lower level, leaving the Rideau River hanging 11 metres up on the edge of the escarpment. The graceful falls, likened to curtains (hence "Rideau") by early voyageurs, are worth seeking out opposite City Hall on Sussex Drive.

Lieutenant Colonel John By's grave near Frant, Sussex, England

Colonel By is commemorated with a statue in Major's Hill Park nearby. By and the Royal Engineers would be pleased with their Canal today, not only with the way it has been maintained and restored, but also with the untold pleasure it affords Canada's citizens and visitors. It would be nice to erase the unwarranted ignominy By suffered as a result of his endeavors in Canada. The maximum cost of the Canal was inadequately estimated by one Samuel Clowes at $230,785. Colonel By's problems began when he revised the estimate to $576,757; the final cost of $776,023 was a bargain even in the 19th century, but some British government officials did not think so. Colonel By was recalled to England for an inquiry. After much humiliating criticism, he was neither acquitted nor convicted, but died in 1836, the victim of hardships in Canada and crushing dishonor in England. By's final resting place is in the churchyard of Frant in the English countryside of Sussex.

49. Laborers, stonemasons, carpenters and contractors built the Rideau. Their efforts were directed by Lieutenant Colonel John By of His Majesty's Royal Engineers. The work was difficult, the countryside a wilderness. Colonel By described his recovery from a near fatal bout with "lake fever" and a subsequent inspection trip to his superiors as follows:

> "... exposed to very great hardships, by being frozen in on Mud Lake, and passing the night in a small uninhabited island, I have not suffered; and trust my health is so established as to permit me to continue my arduous duties until this great work is completed."

By's offices here in Entrance Valley and his nearby residence provided the nucleus for Bytown, later renamed Ottawa. The only remaining building on the lock station dating to the construction period now houses the Bytown Museum and is the oldest building in Ottawa.

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Glossary

Bluegill: common panfish of eastern North America.

Drumlin: elongated oval hill of glacial material.

Esker: long ridge of gravel and boulders marking the course of a river within a glacier.

Eutrophic (lakes): rich in dissolved nutrients, often shallow and tending to be deficient in oxygen.

Fault: fracture in the earth's crust, usually with vertical displacement of rock.

Flight of locks: series of interconnected locks, resembling a flight of stairs.

Isthmus: a narrow strip of land separating two bodies of water and connecting two larger areas of land.

Keystone arched dam: a curved dam constructed of many pieces of cut stone, each of which acts as a keystone.

King truss bridge: bridge supported by two vertical posts (king posts) each carrying a triangular truss (similar to a roof truss).

Marsh: an area of shallow water overgrown with aquatic plants.

Overflow dam: a dam built to raise water levels and to allow excess water to pass over it.

Penstock: a pipe conducting water to a turbine.

Reach: level section of canal between two locks.

Spillway: a channel for passing water over or around a dam. Also a geological term for a channel through which melt water from a glacier flows past an obstacle.

Swamp fever (also lake fever): malaria disease formerly suffered by construction workers on the Canal.

Till: unsorted mixture of sand, gravel, clay and boulders deposited by glaciers.

Unconformity: a discontinuity in deposition of two strata of rocks, often representing a long period of erosion and tilting of the lower stratum before the upper rocks are laid down.

Waste weir: bypass between closely spaced locks for the removal of excess water. Lockage water passes through sluices in the lock walls.