

Chapter 1

CARVING A FOURTH SEACOAST

DREAMS OF A SEAWAY

In 1957 legendary CBS newsman Walter Cronkite—lauded as *the most trusted man in America*—stared into the camera and told viewers that the “greatest engineering feat of our time” was under way. He wasn’t talking about the Soviet Union rocketing the stray dog Laika into orbit, or that year’s development of the first wearable pacemaker, or the recent opening of the United States’ first commercial atomic power plant. He was talking about humans “conquering” nature on a scale and in a fashion never before attempted.

“Right now the greatest concentration of heavy machinery ever assembled—over 3,000 pieces of equipment—are at work on one of the greatest projects in the history of mankind,” Cronkite said as he stood in front of a map of the deep blue Great Lakes and the even deeper blue Atlantic Ocean. He fixed his eyes on the camera and spoke boldly of a construction project that would, in effect, do no less than move the Atlantic Ocean more than 1,000 miles inland, to the middle of North America.

The idea was to scrape and blast a navigation channel along and through the shallow, tumbling St. Lawrence River that flows from the

Great Lakes out to the ocean in a manner that would allow giant freighters to steam from the East Coast into the five massive freshwater inland seas. This manmade nautical expressway, as narrow as 80 feet in places and, in one particularly tight section, crossing *over* a roadway, would open up some 8,000 miles of U.S. and Canadian coastline to ships from around the world. The hope was that essentially landlocked Great Lakes cities like Chicago, Cleveland, Detroit and Toronto would blossom into global ports to rival commercial hubs such as New York, Rotterdam and Tokyo.

The project, Cronkite told his viewers, was big, big as “reshaping a continent, completing the job nature had begun thousands of years ago—of creating an eighth sea . . . a sea of opportunity!”

More than a half century later, the hoped-for flood of global cargo has yet to roar into the lakes from overseas, but something else has—an environmental scourge whose scope and costs are spreading by the day. The St. Lawrence Seaway, you see, didn’t conquer nature at all.

It unleashed it in the form of an ecological catastrophe unlike any this continent has seen.



IT IS HARD TO FAULT CRONKITE TODAY FOR HIS OPTIMISM, BECAUSE

the nautical magic he and so many others were convinced the Seaway would uncork had happened before. Some six million years ago, the Mediterranean Sea itself was isolated from the Atlantic Ocean. It was little more than a salty puddle at the bottom of a vast basin laced with dusty canyons, some of which plunged more than a mile below sea level. This arid wasteland had previously been a massive Atlantic Ocean inlet, as it is today. But then a tectonic fusion of Africa and Europe created a narrow strip of land that plugged the Mediterranean’s connection to the Atlantic Ocean near what is now the Strait of Gibraltar. This pretty much killed the ancient Mediterranean Sea, which owed

its existence to a constant inflow of ocean water, just as it does today. With that Atlantic input plugged, the rivers feeding the suddenly landlocked basin proved too feeble to keep pace with evaporation, and the sea all but vanished in about 1,000 years—which is to say, geologically speaking, nothing. But on a human scale the sea would have shrunk at an imperceptibly slow pace; each day on its shores would have seemed exactly like the last.

The Mediterranean Sea basin, one popular theory goes, remained in this desiccated state for the next 700,000 years or so. But about 5.3 million years ago a seismic hiccup at the Gibraltar isthmus opened a small channel for the Atlantic Ocean to begin dribbling back in. The trickle soon turned to a torrent, many of today's geologists reckon, as an ever-widening and deepening tongue of saltwater roared back into the basin with incomprehensible speed, volume and violence. It carried the equivalent of some 40,000 Niagara Falls flowing at about 90 miles per hour. This all happened around the time our ancestors' thigh bones formed a bridge with their hips strong enough to allow them to walk upright and, perhaps—if any of them happened to be in the area at the time the Atlantic came roaring back—to run.

At the peak of the Atlantic cascade the new Mediterranean Sea was rising at a rate of about 30 feet per day, and geologists hypothesize that the entire basin—roughly 2,500 miles long and 500 miles wide—could have filled to sea level in less than three years.

The Mediterranean's revival indubitably wrought devastation for the terrestrial creatures scratching out a life in the scorched basin, including dwarf elephants and hippos. But it proved a boon for the dolphins and fish and even microscopic life sucked in from the North Atlantic. The devastation also, eventually, opened the door for civilization to blossom, because the Mediterranean Sea connected cultures and economies in a manner that would not have been possible had the basin remained a desert. Today the Mediterranean gives 21 countries

from three continents nautical access to each other and—thanks to the eight-mile-wide Strait of Gibraltar carved by the Atlantic Ocean—to the rest of the globe.

About 7,600 years ago, the Black Sea was isolated from the Atlantic Ocean. It was an inland freshwater lake cut off from the Mediterranean Sea to the west by a spit of land called the Bosphorus Valley. At the peak of the last ice age some 20,000 years ago, so much of the earth's water was tied up in glaciers that, according to some estimates, sea level was nearly 400 feet lower than it is today. As the glaciers melted and the oceans rose, so did the Mediterranean. And eventually the Mediterranean did to the Black Sea what the Atlantic Ocean had done to it more than 5 million years earlier: it came crashing in.

The speed with which this happened, as well as its scale, is a matter of some controversy, but a popular hypothesis is that the salty water tumbled in at a force equivalent to 200 Niagara Falls. The inundation that submerged some 60,000 square miles under hundreds of feet of water happened so swiftly—some geologists estimate the sea was rising at a rate of about six inches per day—that it would have sent scrambling any humans who had found the lakeshore an oasis in an otherwise parched landscape. The salty water also ravaged the lake's freshwater biological community, rendering extinct the species that could not adapt and sending others—like the Black Sea sturgeon—darting for safety in the freshwater rivers that still feed the sea today.

To call this a natural disaster of biblical proportions is what two Columbia University geophysicists did when they published a book in 1998 titled *Noah's Flood*. They argue that this geologic event, which is commonly known as the Black Sea Deluge, could be the inspiration for the great flood stories of the past, including the one in the Book of Genesis. That two geologists contend a real flood could be tied to a story in the Bible was not without some controversy in the academic community—and, of course, among believers. But leaving aside any

biblical implications, their geological evidence for the disaster itself is solid. And, like the torrent that roared through the Strait of Gibraltar millions of years earlier, there was an upside to it; the merging of the Black and Mediterranean Seas opened up a critical nautical link stretching from Asia to the Atlantic Ocean. Today the Bosphorus Strait is one of the world's busiest shipping channels, with freighters sailing from the once-landlocked Black Sea to ports around the globe.

About 200 years ago, North America's Great Lakes, the largest expanse of freshwater in the world, remained essentially isolated from the Atlantic Ocean. For thousands of years, the five inland seas wrapped by more than 10,000 miles of shoreline (islands included) sat cloistered in the middle of the continent. The four "upper" lakes—Erie, Huron, Michigan and Superior—lie some 600 feet above the level of the ocean, which made them unreachable from the Atlantic by boat. Much of that elevation is gained at the dolomite cliffs that are Niagara Falls, over which the collective outflows of all those lakes tumble on their way into Lake Ontario and from there down the thundering St. Lawrence River on their rush to the ocean.

Like the plugs of land that once isolated the basins that are now the Mediterranean and Black Seas, erosion has been having its way with Niagara Falls. It is expected the falls will disappear in about 50,000 years—which is to say, geologically speaking, pretty soon. When that happens, the cliffs that have for millennia separated the upper Great Lakes from the Eastern Seaboard will be gone. All that will remain is a fast-flowing, ever-eroding riverbed that will draw the lakes, every day, one step closer to sea level. How this all precisely plays out in terms of perhaps opening a nature-carved sailing route between the middle of the continent and the ocean is a matter of geological conjecture that won't be answered for eons—an unbearably long period for the 19th- and 20th-century Great Lakes politicians and businessmen who were not content to leave the lakes as they had found them, as isolated inland

seas upon which giant cargo boats could float from one Midwestern city to another, but never out to the ocean.

Their idea was to finish the job nature started when the last glaciers carved out the Great Lakes basins 10,000 years ago. Their dream was to create, by the hand of man, a North American “Fourth Seacoast,” thus flexing the Midwest’s burgeoning manufacturing might across the globe, prying open new markets in far-away cities and squeezing from them all manner of exotic bounty. They lusted for their own Mediterranean, for their own Strait of Gibraltar or Bosphorus to emerge, but they were not willing to wait for such a natural disaster to unfold.

So they hatched an unnatural one.



THE MAP PRACTICALLY TAUNTED THE UNITED STATES AND CAN-ada to build the St. Lawrence Seaway. The tendril of blue reaching out to the Atlantic Ocean from Lake Ontario—the Gulf of St. Lawrence and the St. Lawrence River that feeds it—stretches some 1200 miles inland. And, on a map, that flat ribbon of blue continues on from Lake Ontario, through Lake Erie, into Lakes Michigan and Huron and all the way across Lake Superior to Duluth, Minnesota, on its western shore. If you were to plot a voyage based on this map, you might assume you could paddle or sail your way from the Atlantic Coast almost to the dead-center of North America—a distance of about 2,300 miles. And, in a boat, you would indeed find waters as flat as those on a map for almost half the trip. But everything changes about 1,000 miles inland.

Jacques Cartier, the first European known to reach the area by boat, learned this firsthand when the yawning river up which he sailed so effortlessly in 1535 turned narrow and vicious in an instant. The 44-year-old lifelong explorer, descended from a long line of mariners, had been handpicked by France’s King Francis I to find a nautical

shortcut across North America to tap the riches of Asia and, of course, to pick up any gold and silver nuggets he found along the way.

The summer before, Cartier led a two-boat expedition across the Atlantic Ocean that probed as far west as the Gulf of St. Lawrence but stopped short of sailing up the St. Lawrence River that feeds it. He returned to France that fall, his cargo hold empty of precious metals but his head filled with Native American tales that a vast sea did indeed lie at the head of the St. Lawrence River. The next year the king gave Cartier 110 men and three boats, including one specially modified to sail up rivers.

The boat wasn't special enough for the St. Lawrence job. No boat would be for hundreds of years.

Just upstream from the island that is now downtown Montreal, Cartier encountered a set of oversized rapids, a word that doesn't adequately capture how angry and impenetrable to upstream navigation this river was. There were waves approaching six feet in height, like those you'd expect to see on an ocean beach when the red no-swim flags are snapping. But these waves didn't crash. They forever arced, never tumbling into a froth that might be breached by some well-timed paddling. It was a standing, ever-rolling wall of water created by the plunging St. Lawrence riverbed. Cartier remained convinced there were loads of gold beyond the waves and, perhaps, the fabled shortcut to Asia, but the water was so violent it stopped him mid-voyage. He turned around and sailed back down the river. The French explorers who came after remained convinced that somewhere beyond this violent water lay the riches of China, and the rapids today remain named Lachine, which is French for that promised land.

The voyageurs who eventually pressed further inland by portaging their birch bark canoes around the rapids quickly learned that far upstream lay something almost as miraculous: a set of connected

fish-filled freshwater seas larger than any explorer had ever encountered, surrounded by forests of pine and hardwoods that teemed with game—and pelts—on a scale incomprehensible in Europe. But the Lachine Rapids were just the first line of defense for what would one day be called the Great Lakes. In the thousand miles or so it took to sail from the Atlantic to Montreal, the St. Lawrence River rose all of 18 feet. In the 189 miles upstream from Montreal to Lake Ontario the river climbed some 245 feet in a series of impassable torrents.

Then the real whitewater started. On the far side of Lake Ontario lay another frothing river that gained about 160 feet in just 35 miles. Anyone who tried to paddle or portage up that gorge hit a wall. Literally.

Niagara Falls are what made the Great Lakes unique in the natural world. The falls are the most famous 1,100 yards of a 650-mile-long ridge of sedimentary rock arcing from western New York, into the province of Ontario, and down into Wisconsin. This escarpment is the rim of a 400-million-year-old seabed that cradled a shallow, tropical ocean that once sloshed across what is today the middle of North America. At about 170 feet high, the falls that tumble over the Niagara escarpment near present-day Buffalo, New York, are nowhere near the world's tallest or even largest by volume. But they were among the most ecologically important because they created an impassable barrier for fish and other aquatic life trying to migrate upstream from Lake Ontario into the other four Great Lakes.

Other giant freshwater bodies that have evolved over tens of thousands or even millions of years have been subjected to epic changes in temperature, salinity, water levels as well as wave upon wave of invading and evolving organisms, all in a manner that leaves those water bodies inhabited by a cast of species steeled by the crucible of evolution. This gives them something of an “immune system” when it comes to maintaining ecological stability in the face of disruptions from the outside world. The Great Lakes of Cartier's time, on the other

hand, were what biologists today call “ecologically naïve.” This means the lakes were inhabited by fish and other aquatic species whose isolation left them uniquely exposed to foreign perturbances. None of this, of course, was pondered by the early explorers desperate to exploit their ecological bounty.

The ditch-digging to open a commercial passage into the Great Lakes by first building a canal around Lachine Rapids started in 1689 but was scuttled soon after when French crews equipped with only the crudest of tools ran into more stubborn rock than expected—and attacks from Native Americans. Work on that tiny section of river alone would sputter all the way into the 1800s, even as progress was made in taming other St. Lawrence rapids farther upstream toward Lake Ontario, particularly after the English captured Canada from the French in 1763.

In the next two decades the English military, eager to maintain control of the region in the face of rebellion from the 13 U.S. colonies, began chewing its way upriver to supply troop outposts. The first big bite through the St. Lawrence barrier came in 1781, during the height of the Revolutionary War, with the opening of a canal running parallel to the northern bank of the St. Lawrence River, about 25 miles upstream from Montreal. It stretched scarcely the length of a football field and was less than six feet wide and three feet deep. But it was not the size of this little detour around the rapids that made the canal so significant. It was the technology built into it. It had three navigation locks that may well have been the first constructed on this continent.

In a navigation lock, an upriver-bound boat enters a watertight chamber that has a downstream front door and an upstream back door. At the time an upriver boat noses through the open downstream door and into the chamber, the upstream door is already closed. Once the boat is fully within the chamber the downstream door is closed as well. Then a gate is opened to a sluice fed by river water on the upstream side and

the chamber is filled until it matches the water level on the upper side. The upstream doors swing open so the boat can smoothly progress upriver. Downstream boats go through the process in reverse. The only engine a system like this needed was gravity to send the water into and out of the chambers, and human muscle to crank the lock doors open and shut.

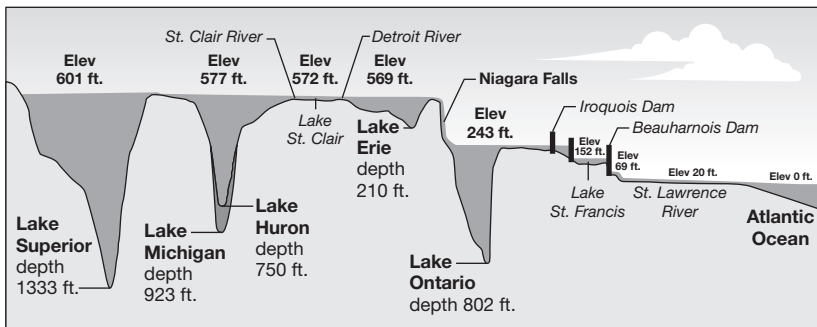
This first short canal allowed a boat to ascend, or descend, a mere six feet before it returned to the main river channel. It was a modest breach in the defense of the Great Lakes, but the canal building inexorably progressed upriver and soon stretches that had been accessible only by birch bark canoes that could be portaged around rapids were being plied by flat-bottomed rowboats 40 feet long. These “bateaux” had a draft of less than three feet but each could carry more than three tons of cargo—furs and timber downstream and food, tools and people upstream. By 1800, the river beyond Montreal had become accessible to larger Durham boats (the kind George Washington used in 1776 to cross the Delaware River in his Christmas night raid) that could be equipped with a sail and haul more than double the cargo of a bateau. Yet at the beginning of the 19th century the Lachine Rapids at Montreal had yet to be breached with an adequate canal, and in other particularly rough stretches along the St. Lawrence River cargoes had to be unloaded as the boats were tugged through the whitewater. It took about 12 days to make the 180-mile trip that started just above Lachine to Lake Ontario.

Moving cargo and people along the river got much easier in 1825, when the Lachine Rapids were finally bypassed with their own lock and canal system. The manmade waterway was more than 8 miles long and included seven lock chambers that collectively raised boats about 45 feet. Completion of the canal finally provided boats a reliable float from the Atlantic Ocean into Lake Ontario, and the impact this had on goods flowing into North America’s interior was almost immediate. By the

early 1830s about 2,000 trips on the river between Montreal and Lake Ontario occurred annually and 24,000 tons of cargo was hauled—four times the volume of traffic in the year before the Lachine canal opened. It took a century and a half of chipping rock and plowing earth to put this crack in the geographic barrier protecting the Great Lakes from the outside world below, but it was about to turn into a chasm.



THEY MIGHT BE CALLED THE GREAT LAKES, BUT THE FIVE INLAND seas are essentially one giant, slow-motion river flowing west-to-east, with each lake dumping like a bucket into the next until all the water is gathered in the St. Lawrence River and tumbles seaward.



The surface elevation (in relation to sea level) of the Great Lakes, and the natural barrier at Niagara Falls.

Lake Superior sits at the system's headwaters. It is about 350 miles long and 160 miles wide, and it holds enough water to submerge a landmass about the size of North and South America under a foot of water. The lake basin might have been carved by the glaciers, but the 1,300-foot-deep sea is not simply an oversized puddle of ancient ice melt. Lake Superior is a dynamic system, ever filling up with precipitation and stream inflows, and ever flowing out toward the Atlantic.

Lake Superior inflows are balanced by its outflows down the St.

Marys River. Along its 60-mile course the river drops about 22 feet in elevation until it spills into Lake Huron, which is, really, the same body of water as Lake Michigan. They are two lobes of the same big lake connected at the five-mile-wide Straits of Mackinac. Both Michigan and Huron flow into the St. Clair River, which flows toward Lake Erie, whose elevation is only about 9 feet lower than that of Michigan and Huron. All of Erie's waters move eastward toward its outlet—the Niagara River that plunges 325 feet into Lake Ontario. Most of that drop happens midway down the river at Niagara Falls.

For thousands of years there was no way anything in or on the water below the falls could breach this barrier between Lake Ontario and the upper Great Lakes, but its collapse came swiftly, and it came on the United States' side of the border.

President George Washington was among the first to grasp the danger of allowing settlement of American territories west of the Appalachian Mountains to take its own course. Washington believed there was no reason the inland immigrants on that isolated frontier, severed from the 13 seaboard states by the mountain crests of the Appalachians, would maintain allegiance to their new country instead of the settlers allied with Great Britain to the north, or with the Spanish to the south. He wanted a canal extending west from the Mid-Atlantic's Potomac River, but he recognized that a connection to the West had to be made, one way or the other—and in one place or another.

"I need not remark to you Sir, that the flanks and rear of the United States are possessed by other powers, and formidable ones too; nor how necessary it is to apply the cement of interest, to bind all parts of the Union together by indissoluble bonds, especially that part of it, which lies immediately west of us . . ." Washington wrote to Virginia Governor Benjamin Harrison in the fall of 1784. "The Western settlers, (I speak now from my own observation) stand as it were upon a pivot; the touch of a feather, would turn them any way."

Black powder and pickaxes affixed these western settlements to the United States. It took 40 years and it did not follow the route Washington championed, but his dream of an umbilical cord stretching westward from the colonies to the interior was realized with the opening of the Erie Canal in 1825. Much of the New York state route between Lake Erie and the Atlantic Coast had already been carved by nature. Like the lower St. Lawrence River, the Hudson River rolls ever so gently into the sea, its tilt so tame that ocean tides push upriver as far as Albany. That made for 145 miles of smooth sailing into what was then the deep American interior. Due west and through some 300 miles of thick forest and stubborn Allegheny Mountains, lay the outpost of Buffalo on the shore of Lake Erie. The overland trip by stage coach between Albany and Buffalo took about two weeks in the early 1820s, most of it over roads so rough that passengers often had to get out and push the carriage up a bumpy slope, through mud and over ruts. There had to be a better way.

New York governor and one-time mayor of New York City DeWitt Clinton gets much of the credit for spearheading construction of the state-funded Erie Canal across this rough route, and he was the politician who sold the concept to the public. But the engineering idea that made it possible was hatched from a prison cell. Jesse Hawley, a flour merchant in western New York, had gone broke trying to move his product down the mess of roads and trails that wended their way out of the wilderness of western New York. Hawley spent 20 months in debtors' prison beginning in 1807, and while there he scratched out more than a dozen letters to the *Genesee Messenger* arguing for construction of a canal linking the Hudson River to the Great Lakes. He wrote that he was motivated by wanting to atone for having led a life of "little purpose" up to that point. The letters laid out the general route that the Erie Canal would eventually take. Hawley knew he was thinking big, acknowledging later in life that his argument was initially received as

“the effusions of a maniac.” But there was a genius in it. The way he saw it, God put the Great Lakes so high above sea level for one reason—to provide the energy to fill the locks to lift the boats. Had Lake Erie been at an equal level in elevation to the Hudson River but still separated by a mountain range, such a canal would not have been possible. But once men who knew how to build navigation locks went to work, the upper lakes’ greatest line of defense to the outside aquatic world proved to be their greatest weakness.

“It appears the Author of nature, in forming Lake Erie with its large head of waters into a reservoir,” Hawley wrote, “. . . had in prospect a large and valuable canal, connecting the Atlantic and the continental seas, to be completed at some period in the history of man, by his ingenuity and industry!”

The idea was derided across the nation as impractical, if not technologically impossible. But it stirred the passions of the only man who mattered—Clinton. As mayor of New York in the early 1800s, the young lawyer initially saw the canal as a means for his city to keep pace with Boston and Philadelphia. But by 1816 he had sold the canal as essential to the economic future of the nation and had won financial backing for it from Congress, though that support was snuffed by a veto from President James Madison.

Clinton, who became New York governor in 1817, pushed forward with the canal as a state project that began that year on July 4. Public support for an enterprise the press mocked as “Clinton’s Folly” would wane in the following years to the point that Clinton lost his office. But as his vision took shape in the form of a 40-foot-wide ditch wending hundreds of miles through the western New York wilderness, enthusiasm for the canal—and its deposed champion—soared. Clinton won reelection as New York governor in 1825—eight years after canal construction started and just in time for its opening ceremonies in Buffalo. On October 26, 1825, at precisely 10 a.m., the first gates on the 83-lock

system swung open and Lake Erie water entered the canal. Clinton and his entourage climbed aboard the *Seneca Chief*, a barge tugged by four gray horses, and headed for Albany at a speed of about four miles per hour.

Their departure was marked by a cannon blast, followed by another farther downstream once that first boom was heard, and so on, all the way down the canal's path to Albany, and then down the Hudson River to New York Harbor. It took about 90 minutes for the chain of cannon reports to hit New York City, which responded with its own blast that started a reverse, upstream-bound string of booms. Buffalo and New York City—the East Coast and the Western frontier—were now linked by a water road smooth as any modern interstate.

When the party got to New York City 10 days later, Clinton hoisted a green cask containing water drawn from Lake Erie. He tipped it into the sea. “This solemnity, at this place, on the first arrival of vessels from Lake Erie,” he proclaimed as he splashed the Great Lakes water into the harbor, “is intended to indicate and commemorate the navigable communication which has been accomplished between our Mediterranean seas and the Atlantic Ocean.”

It was just a dribble, but it was also a watershed event not unlike what had happened some five million years before on the other side of the ocean when the first drops of Atlantic waters crested the divide separating it from the dried-up Mediterranean basin. Less well documented, but far more portentous, is what happened on the *Seneca Chief's* return trip. A judge from Buffalo brought back a cask inscribed with the words “Neptune’s Return to Pan”—referring to the respective mythological gods of the sea and of the woods—filled with water from the Atlantic Ocean. The *Seneca Chief* reached Buffalo on Wednesday, November 23. Two days later the barge, loaded with dignitaries and pulled by a fleet of sailboats, pressed on into the open waters of Lake Erie. The judge made mention of the mixing of the waters in New York

City three weeks earlier, and then proclaimed: “We, in return, now unite those of the ocean with the Lake.

“This, fellow-citizens, closes the ceremonies which have grown out of an event hereafter to be held in grateful remembrance, and commemorated by annual demonstrations of gratitude, as one of the most important which has distinguished the history of mankind, and one from which not only the present, but generations yet unborn, even to the latest posterity, are to derive innumerable blessings.”

And—it would come to pass—incalculable curses.



THE ERIE CANAL STRETCHED 363 MILES INLAND FROM ALBANY

to Buffalo, climbed 568 feet in elevation and was 40 feet wide and a mere 4 feet deep, but it is hard to overstate the impact this trickle out of the continent’s interior had on the United States. Some 40,000 people sailed on the Erie Canal in its first year. It slashed a bumpy two-week ride from Albany to Lake Erie to a five-day glide. But the canal wasn’t just about squeezing time from the trip; it was about expanding the volume of goods moving between the deep interior and the coast. A single Erie barge could carry 30 tons, dropping the price to move a ton of freight from Buffalo to New York from about \$100 to \$10. In its first year alone there were about 7,000 boats operating on a canal that was so instantly successful in drawing business that within a decade tolls covered its \$7 million construction cost. By 1845 more than 1 million tons moved on the canal annually, and that figure reached 2 million tons just seven years later.

Just as along a well-traveled highway, towns thrived along the canal. Think of a major city in the state of New York and it likely sprouted along the canal, or the waters it connected—Rochester, Syracuse, Utica, Buffalo, Albany, and, of course, New York City. The canal had an equally big impact on the Great Lakes themselves. Once a connection

between the coast and Lake Erie was secured, goods and people could float from New York Harbor all the way to Detroit, Chicago and Milwaukee, because the nine-foot rise in the river system between Lake Erie and Lakes Huron and Michigan was naturally navigable.

Canada did not sit idle as tens of thousands of Americans started to flood into the continent's interior, and millions of tons of grain, furs and forest flowed out. In 1824, less than a year before the ceremony celebrating the marriage of the waters in Buffalo, the Canadians went to work digging their own canal into Lake Erie, one that would cut across a hilly, narrow spit of land between Lakes Erie and Ontario. The Welland Canal was as much a hydraulic elevator as it was a canal. It was a system of 40 locks built specifically to bypass Niagara Falls and hoist mammoth boats 325 feet up the rock ledge separating the two smallest Great Lakes. The Welland's locks were far bigger—110 feet long and 8 feet deep—than those on the Erie Canal. This is because the Welland was built for giant freight-carrying schooners of the time; the Erie Canal existed to ferry goods down a tiny, tame channel on specially built, comparatively small barges. In this sense, the Welland, which opened in 1829, was a much more ambitious project than the Erie Canal. The idea behind it was not to just link two Great Lakes. The Welland, coupled with lock expansions downstream on the St. Lawrence River, was designed to provide giant sailing vessels and, soon enough, steamers, a direct connection between the Great Lakes and the Eastern Seaboard—and beyond.

This was both a promise and a problem that would chronically haunt the Welland Canal—all the way up until today. No matter how large the locks and canals grew in the Canadians' St. Lawrence shipping corridor, they were always doomed to become too small as the size of the world's cargo-carrying fleet inexorably grew.

By 1850 Canada's Welland Canal and St. Lawrence River locks were large enough to handle ships nearly 150 feet long and 26 feet wide,

and by the early 1860s schooners were commonly sailing from the Great Lakes to Europe, hauling abroad things like beef, salt, lumber and grain and returning with steel and textiles. Promising as that early overseas traffic was, the number of such trips was destined to shrink as the world's fleet expanded. Even ships built to sail only between ports within the Great Lakes soon grew too wide or deep to squeeze through the Welland Canal, which was rebuilt once again in 1887 to lock dimensions of 270 feet long and 14 feet deep.

On the U.S. side of the border, the Erie Canal was expanded in 1862 so its locks were 70 feet wide and about 7 feet deep. That increased the cargo-carrying capacity of Erie barges from 30 tons in 1825 to 240 tons. The United States went forward in 1903 with yet another Erie expansion that was completed in 1918. The new canal could handle barges carrying 3,000 tons—100 times the size of the vessels on the original Erie Canal. Despite the upgrades, the new canal would be made obsolete later in the 20th century by trains and roads that could move goods much more quickly, and—equally importantly—do it throughout the winter months when the canal froze solid.

While the Canadians' Welland Canal and St. Lawrence locks were plagued by similar winter shutdowns, the Canadians pressed on with more expansions. Construction on a fourth Welland Canal began in 1913 and lasted until 1932. The first boat that nosed into its locks was 633 feet long and 70 feet wide, and it drew about 19 feet of water. It carried about 15,000 tons of wheat.

The problem was that this boat was basically an oversized ship in a bottle; it could roam across all five Great Lakes but couldn't squeeze through the old locks along the St. Lawrence River. This was a plug navigation advocates on both sides of the river that doubled as the U.S.–Canadian border were just itching to pull. The idea was to, once and for always, create a "Seaway" deep and wide enough to give the largest

freighters of the day unfettered access from the Atlantic Coast to the heart of the continent.

"Nature has already done most of the work of building that seaway," Hanford MacNider, the former U.S. ambassador to Canada, proclaimed in 1939. "Let's finish the job!"

But the idea of a North American Mediterranean didn't sit well with U.S. politicians on the East Coast who feared it would compete with their own port cities, and throughout the first half of the 20th century Congress repeatedly turned down overtures from Canada to work together to expand the St. Lawrence locks and channels. After yet another Congressional rejection in the summer of 1952, Ontario Premier Leslie Frost had enough. "Our good neighbors to the south have decided, in their wisdom, not to come in with us," Frost steamed to the Canadian Broadcasting Company in June 1952. "They have made that decision. Now we ask them to please get out of the way and let us get on with the job."

Newly elected President Dwight D. Eisenhower had no intention of letting the Canadians dig a navigation corridor along the international border that would allow foreign vessels to sail within yards of U.S. soil and provide global access to the shared Great Lakes. "If Canada proceeds unilaterally, the United States would be precluded from exercising an equal voice in the control of traffic through the Seaway, not only in time of peace, but also when the United States is at war," warned Eisenhower's National Security Council planning board in April 1953. The Eisenhower Administration also worried that if iron ore deposits in Minnesota and Michigan's Upper Peninsula dried up, that could cripple the Midwest steel industry, which, in the context of the Cold War, the president's advisors viewed as "the most strategic of all strategic industries." Eastern Canada, however, had bountiful ore deposits, and a Seaway could mainline them to the U.S. mills in the middle of the continent.

Congress heeded the worries of the World War II general-turned-commander-in-chief, and legislation authorizing Seaway construction was signed by Eisenhower in May 1954 with a pen that held a piece of timber from old Fort Detroit, a vestige of the days when the United States and England battled over control of the Great Lakes and the rivers flowing out of them.

Just weeks later, the two countries unleashed an army of 22,000 workers to build seven 30-foot-deep locks on the St. Lawrence River between Lake Ontario and Montreal to replace the hodgepodge of 21 smaller Canadian locks. The United States would build two of the locks. Canada would construct the five others and the costs—ultimately \$133.8 million for the United States (to be paid back over 50 years through tolls paid by shippers) and \$336.5 million for Canada—were split accordingly. A related project included a \$600 million hydropower dam arcing more than a half mile across the river—and directly over the border. The dam, whose cost was evenly split, was also integral to Seaway navigation because it created a 30-mile-long manmade lake behind it that allowed ships to sail over a series of once-impenetrable St. Lawrence River rapids.

Construction crews from both sides of the border tore into the river channel with so much violence and with such heavy earth-moving machinery that they could accomplish in a day what took the earliest, pick-swinging canal builders months, if not years. Just one piece of equipment, known to local school children as the “Gentleman,” was a 16-story-high crane with a shovel big enough to scoop more than 56,000 pounds of earth a minute. It was soon teamed with a similarly sized crane called the “Madam.” Together they helped make up what was, at that point, the largest concentration of heavy machinery ever assembled on the planet.



IN THE SUMMER OF 1955, JUST AS THE SEAWAY CONSTRUCTION

was getting underway, a *Newsweek* reporter on the banks of Lake Erie at the city of Buffalo was left grasping for words to convey the scale of the project and its prospects to transform such a city. “You can stand here today and see tomorrow—the multitude of ships flying the flags of the world, turning the Great Lakes into a Mediterranean and turning the lake cities into world cities . . .”

The prospects of the Seaway left a *Time* magazine reporter of the time similarly lathered: “The river and the Great Lakes it drains will be transformed into a manmade Mediterranean which seagoing ships can sail westward into North America’s heartland. The seaway’s impact on both the geography and economy of the continent will be enormous. More than 8,000 miles of new coastline will be added to the United States and Canada. Such lakefront cities as Chicago, Cleveland, Duluth, Buffalo, Toronto and Hamilton will become genuine deepwater ports . . .”

The reporters were only regurgitating what they were hearing from Seaway advocates; leaders of every Great Lakes city with a dilapidated dock were telling constituents that their gritty harbors were about to be transformed into sparkling international ports rivaling any on the globe. “The St. Lawrence Seaway will be the greatest single development of this century in its effects on Milwaukee’s future growth and prosperity,” Milwaukee port director Harry C. Brockel brayed just before the Seaway opened in 1959. A downtown Milwaukee store that spring had already opened a special “foreign shop” to market all the exotic goods Brockel and other local leaders were convinced would flood the city docks.

In Detroit, Chrysler was predicting 80 percent of its auto exports would float out the Seaway, and Minnesotans were convinced the ocean was about to lap at their state line. “The Seaway will pull Europe closer to Duluth and away from New York and Philadelphia,” editors of the

Winona *Republican-Herald* wrote just after Congress passed the Seaway legislation. "The 'landlocked' Midwest is landlocked no more." And Chicagoans, predictably, saw the Seaway as a chance to shed their second-city status. "The only thing that made New York the biggest city in the country is that everything had to stop there," Robert Kohl, president of the Chicago-based Midwest Steamship Agency, told the *United Press*. "Now there'll be no reason to stop. We'll come right to Chicago with imports and leave from here with Midwestern products for foreign countries."

There was reason for this optimism. Egypt's Suez Canal had changed the way the world works when it opened less than a century earlier, in 1869. The 120-mile manmade waterway connects the Mediterranean with the Red Sea and provided sailors a straight shot between Asia and Europe, trimming about 4,300 miles from the treacherous route around Africa. Today the canal handles about 18,000 ships annually, carrying some 800 million tons of cargo. The Panama Canal further revolutionized global commerce a half century after Suez opened when it cracked the Western Hemisphere in half with a 50 mile cut between the Atlantic and Pacific Oceans that slashed the sailing distance between the U.S. East and West Coasts by about 8,000 miles.

Panama handles around 14,000 vessels annually, carrying more than 300 million tons of cargo, and that volume of cargo is expected to double in the coming years with its recent expansion. Both Panama and Suez continue to be linchpins in global commerce, still hailed as modern wonders of the world.

But the Seaway harbors a much more dubious distinction; it has been said that it stands alone among modern engineering marvels in that it is less famous today than it was in the years before it was built. And the reason: the Seaway locks were built so small they were obsolete almost before the freshly poured concrete could dry.

Even though the Panama Canal was already 50 years old when the

first earth was turned on the Seaway, the United States and Canada opted not to build Seaway locks to Panama scale, 1,000 feet long by 110 feet wide. Instead, they decided to build Seaway locks to match those of the smaller, pre-World War I-designed Welland Canal—766 feet long and 80 feet wide. Cost was the reason.

Seaway architects figured that building Seaway locks to Panama scale would be useless unless the Welland locks were expanded as well, and that project alone would cost about \$300 million. This would almost double the Seaway price tag, and all but guarantee it would not be funded. In November 1954, just as construction was getting under way, the U.S. Seaway administrator and his staff tried to assure the public that the new Seaway would be plenty big enough. “The majority of general cargo seagoing ships,” the Seaway public relations people insisted, “will be able to ply the Seaway when it’s completed.” And they were right—at that moment.

In May 1956 the Seaway dedicated the new U.S. Eisenhower Lock near Massena, New York, one of the two locks constructed on the U.S. side of the St. Lawrence River. Some 2,000 people attended an event that was covered by both Canadian and U.S. networks. But a bigger deal happened across the state line in New Jersey, just four weeks earlier. That event drew almost no attention, but the world of shipping would be never be the same, and the Seaway would never recover from it.



MALCOLM PURCELL MCLEAN, SON OF A NORTH CAROLINA FARMER, had few education or career options when he graduated from high school in the depths of the Great Depression. He took a job pumping gas at a local service station. Three years later he bought a used truck for \$120 and went into business for himself hauling dirt for Works Progress Administration road construction projects. Within a few years he was able to buy a fleet of five trucks and pay other men to do the driv-

ing. When business sagged a couple of years after that, he was forced back into the driver's seat and began making runs from North Carolina to the New York area. He was stuck in his truck on a Hoboken pier in late November 1937 with a load of cotton bales waiting for his turn to unload when a notion struck. As he watched the stevedores scramble with their cranes and slings their load the cargo, he was not left in awe by their industriousness. He was flabbergasted by all the clumsiness.

Loading a ship at that time was far more an art than the mechanical process it is today. Different products of different shapes, sizes, weights and fragility had to be placed in cargo holds with great care. Some cargoes arriving at the dock had to be held until others arrived so everything could be tucked into a ship's hold just so. It was not unlike packing a grocery bag—the eggs might be the first in line, but they have to wait for the flour and canned soup to be bagged lest they get crushed. This meant that the loading process for a ship in the 1930s sometimes took longer than its voyage across the Atlantic. *There has to be a better way*, McLean thought that day as he sat in his idled truck. It was a thought that would run through his mind over and over, for more than two decades.

On a raw day in late April 1956, McLean was ready to put into action the thought experiment that wormed its way into his brain after that day on the Hoboken dock. Just as Seaway crews were preparing to congratulate themselves for chewing nearly halfway through an enterprise that was, at that time, the largest construction project under way on the globe, McLean quietly, and almost singlehandedly, launched a globe-changing one. He took a run-of-the-mill oil tanker he had named *Ideal X* specifically for his experiment and installed a raised platform on its deck with slots to hold the bodies of 58 trailer trucks that had their wheels removed. "These were not trucks in any conventional sense—the 58 units had been detached from their running gear on the pier and had become *containers*," Brian J. Cudahy wrote in a 2006 report

published by the Transportation Research Board of the National Academies. “Arriving in Houston six days later, the 58 trailers were hoisted off *Ideal X*, attached to fresh running gear, and delivered to their intended destinations with no intermediate handling by longshoremen.”

McLean calculated the cost to move a ton of cargo aboard *Ideal X* was less than 16 cents, compared to \$5.83 per ton for cargo hauled on a traditional ship. The next year McLean converted a World War II cargo ship so containers could be stacked like Legos on top of each other, both below deck and above. The ship was 450 feet long and could carry 266 containers.

McLean’s innovation did not change things in an instant. It took years for ship owners, railroads and trucking companies to build the fleets, ports and transfer facilities so the boxes—typically 8 feet wide, 8½ feet tall and either 20 or 40 feet long—could be moved seamlessly between factory, boat, train, truck and warehouse. But what came to be known as the container revolution demanded ever-bigger ships, and by the 1960s the largest container vessels were more than 100 feet wide—already 20 feet too wide for the Seaway’s locks. By the 1980s container ships were 1,000 feet long and more than 130 feet wide—50 feet wider than the Seaway locks. Today the biggest container ships are more than twice as wide as the Seaway locks.



ON JUNE 26, 1959, PRESIDENT EISENHOWER AND QUEEN ELIZABETH, wearing a blue dress with white purse dangling under her left arm, boarded the Royal Yacht *Britannia* to mark the Seaway’s completion by steaming through a ceremonial gate at Montreal. The gate was made from the timbers of an old wooden lock that had been built to bypass the previously impenetrable Lachine Rapids, the torrent that had kept so many boats at bay for hundreds of years. The ride up the Seaway that day was pure ceremony—the Seaway had already been

open for a couple of months and the leaders of the free world were only on a day trip, and not actually sailing for the Great Lakes. That was a good thing, because what was going on further up the Seaway was a royal mess.

As the first deep-draft overseas ships started sailing for the Great Lakes earlier that spring, the difficulties of operating an elevator system to move 50 million-pound ships 60 stories high were quickly revealed. In the weeks before the first ships sailed in, waters above Niagara Falls remained under a blanket of ice up to three feet thick. By late April the ice in places was still stubborn enough to back up a convoy of 130 ships just below Montreal. Once the ships were allowed to steam inland they just kept bumping into each other.

There were three-day-long jams at the Welland Canal. Jams at Detroit. Jams at Chicago. A blown fuse on a bridge over one of the new canals below Lake Ontario knocked out the bridge's lift and an oil tanker knocked into the bridge, corking the whole Seaway for the better part of a day. A German freighter carrying soybean oil and tallow ran aground in the St. Lawrence River below Lake Ontario. Another tanker hit a St. Lawrence shoal and was almost sunk as it raced for the safety of a dock. A Greek ship got so beat up in Seaway lock chambers that it arrived in Lake Ontario with smashed navigation lights, a busted propeller and a buckled bow. Yet another ship got stuck in the Welland Canal like a semi-truck wedged under a highway bridge. Its captain had to shear off a portion of the ship's bridge to get by. Once clear of the new Seaway locks and the Welland Canal, things in the upper lakes only got tighter because dredging upper lakes' river channels and ports to Seaway specifications would not be finished until the 1960s. A frustrated German captain of 1 of 10 ships anchored near Detroit waiting for the congested docks to clear finally barked: "Didn't you people expect ships?"

The captain of the first American ocean vessel that arrived at

Detroit got so frustrated waiting for dock space he steamed on to Cleveland to pick up other cargo. When he got back to Detroit there was still no space for him to dock. He left without his planned cargo, which included 132 cars and trucks bound for Venezuela. A train ended up taking some of those autos to the coast where they were loaded onto a boat at a port that could handle the job.

“The St. Lawrence Seaway, dream of Midwestern and Canadian shippers for a half century, has now been operating for a month. Experience has been more than a dream, however,” one Pennsylvania newspaper editor steamed in May 1959. “In some respects it borders on nightmare.”

Things got a little smoother later in the summer as the local pilots got familiar with the channels (Seaway regulations required foreign captains to turn their wheel over to a local sailor on a ship’s trip through the system) and the Seaway lock operators got more practice at helping the ships squeeze through the harrowingly narrow chokepoints, but not a lot better. Shippers quickly lost their patience. The Grace Line, one of two U.S. shipping firms regularly serving the Port of Milwaukee during the Seaway’s first season, announced at the start of the second season that the Seaway wasn’t worth the hassle. The company claimed more than \$1.2 million in Seaway-related losses the previous year, in part because of damage ships suffered banging through the locks and channels. Company officials also grumbled the voyage took more than two weeks longer than planned due to bottlenecks at the locks and inadequate port operations. The bad rap spread. The next year, the U.S. deputy administrator of the Seaway blasted American shippers for their “disgustingly small number” of vessels using the Seaway. By the early 1970s, barely 10 years after the Seaway’s opening, even some of its biggest supporters were shaking their heads.

“The Seaway—I like to forget it,” Dick Miller, information director for the U.S. Seaway for most of the 1960s, lamented to the *Canadian*

Press in 1970, long after it had become apparent that the hoped-for volume of exotic cargoes from foreign ports just wasn't going to enter a navigation corridor best suited for relatively small ships hauling iron in from the Canadian coast and Midwest grain out. "The thing was built on romantic issues—the fourth seacoast and so on," he said. "But you can't romanticize iron ore and wheat."

By 1982 Seaway revenues were so sluggish that Congress forgave the U.S. Seaway agency its \$110 million debt, and this was after lawmakers in 1970 allowed the Seaway to stop paying interest on the debt. Without the break, Seaway operators said they would have been forced to increase their tolls by 70 percent, which could have fatally crippled the struggling operation. Five years earlier, Canada forgave its own Seaway agency a debt of about \$800 million.

By 1986 the United States stopped charging Seaway tolls, but the volume of traffic Seaway operators sought still didn't come. By 2002 the Army Corps of Engineers reported that the Seaway could only handle about 2 percent of the cargo-carrying capacity of the world's bulk carrier fleet, and 5 percent of the capacity of the world's container fleet.

"The overriding, overwhelming regret is that we built it too small," the late U.S. congressman from Minnesota, Jim Oberstar, a longtime Seaway booster, once told me. "The railroads didn't want to see larger-sized locks in the St. Lawrence Seaway that would compete with the railroads, and the East Coast ports didn't want to see competition from the Great Lakes, and together they combined to limit the size of the Seaway locks."



SHIPPING WITHIN THE GREAT LAKES AND ALONG THE SEAWAY and the North Atlantic coast remains a huge business to this day, moving some 200 million tons per year of raw industrial materials like ore, sand, salt and chemicals. And much of it travels through the Seaway

locks. But the overseas component of the Seaway's traffic, which peaked at 23.1 million tons in the late 1970s, has dropped in some recent years to less than 6 million tons. Today overseas cargo typically accounts for about 5 percent or less of the overall Great Lakes and St. Lawrence Seaway shipping industry.

Because of the locks' small size, there has long been a push to repurpose the Seaway not as the Great Lakes' gateway to the world, but as a regional navigation corridor in which Seaway boats compete with railroads by ferrying into the lakes containers from East Coast ports. This might make sense on paper, but not on the water—or, more precisely, the ice. The Seaway must shut down for about three months each winter when its locks and channels freeze over, and a navigation route that is shuttered for a quarter of the year cannot compete with trucks and railroads in a world in which businesses manage inventory based on “just-in-time shipping” that demands fast, predictable and perennial delivery schedules.

The U.S. Merchant Marine Academy's Jon S. Helmick once illustrated in a presentation just how choreographed deliveries had become in the 21st-century transportation chain. He pointed to Toyota Motor Corporation's system of delivering engines from Japan to a Kentucky assembly line. “Upon arrival in a Southern California port, the containers are discharged from the ship and then loaded aboard an eastbound double-stack train for overland transport to Chicago. At the terminus of the rail move, the containers are pulled from the train and placed on a truck chassis for the final leg of the journey,” he said. “The astonishing reality is that after 17 days in transit, the engines arrive at the plant in Georgetown within pre-scheduled 15-minute delivery windows, at which time they are stripped from their containers and moved directly to the assembly line for installation.”

Seasonal closure was a problem Seaway advocates tried to address even before the Seaway opened. One idea was to build a fleet of nuclear

power plants to generate enough hot water to keep the waterway ice-free. An earlier suggestion by a McGill University professor to keep ice jams from plugging the St. Lawrence below Montreal involved chemical combustion units loaded into tin containers, and then placing those containers in the river to keep the water flowing. Those thermal schemes went nowhere. Neither did a plan to put a pipe at the bottom of the shipping channel that could pump to the surface ice-breaking bubbles throughout the winter. "Assuming that compressed air were pumped through flexible perforated 1½ inch diameter polyethylene pipe, weighted down and anchored, the total cost of the installation is not expected to exceed two million dollars," reported the magazine *New Scientist* in 1958. "If this comes out, it might be the most spectacular feature of one of the most spectacular engineering projects devised by man."

The U.S. Army Corps of Engineers took up the bubble concept in the 1970s, when it spent some \$21 million exploring various ways to stretch the shipping season into the iced-over months. Beyond bubble makers, the agency looked at using a fleet of Coast Guard ice breakers and "ice booms" to shunt the floating chunks away from the locks and channels to keep the water—and ships—flowing. The engineers determined they could indeed keep the upper lakes open for shipping year-round, but the Seaway locks and St. Lawrence River channels would still need to be closed for two months each winter. The concept was scrapped because the cost was astronomical: \$451 million, nearly as much as the Seaway construction itself.

Even as the Army Corps scrambled to make the Seaway more attractive by opening it to winter navigation, early generation container vessels were already sailing into the Atlantic port of Halifax, Nova Scotia, and siphoning off Seaway business by working with the railroads serving Great Lakes port cities like Chicago and Duluth.

"There is not a great deal we can do about it," U.S. Seaway boss

David W. Oberlin testified before the U.S. House Appropriations subcommittee in April 1975. He said the only option was to embrace the container revolution and, despite the seasonal closure, try to convert Seaway freighters into small container vessels. It wasn't good advice.

That same year, the port of Duluth invested \$2.5 million to install a special crane and related facilities to handle containerized cargo. Duluth did attract three small container vessels in the crane's first year of operation, the port's former director told me. The next year none came. After essentially idling for 18 years, the crane was finally sold to a firm in Beaumont, Texas. The boondoggle that Duluthians had dubbed "the world's most expensive seagull roost" was dismantled and shipped out of town. In a final indignity, the former port director recalled, the crane buyers didn't ship their purchase out via the Seaway.

They dismantled it and hauled it out of town on trucks.



ALTHOUGH GREAT LAKES PORT BOOSTERS CONTINUE TO RUE

what might have been had the Seaway been built larger, and had it been engineered to operate year-round, those downstream on the St. Lawrence River still mourn what was lost by its construction.

If you drive down Ontario's King's Highway 2 today just west of Cornwall, across the St. Lawrence River from Massena, New York, you will come across a peculiar road sign. It's a cairn built out of cobblestones. Atop it sits a brown plank with a yellow arrow pointing south toward the river. It reads: MOULINETTE 1/3 OF A MILE. This is curious. Speed limit signs in Canada were converted to kilometers over Labor Day Weekend in 1977. It's even more curious, because if you follow the arrow, the road leads not to the outskirts of a little town. It dead ends about 100 yards to the south at the banks of a St. Lawrence River bloated by a Seaway dam just downstream. Somewhere under that shimmering blue water rests the remains of an entire town, one once big enough

to have its own railroad station, church steeples and service station. No one is sure of the origins of the name; it could be traced to *moulinet*, which is French for “winch,” which is exactly what was used to move boats upstream in this stretch of the river when it was a rushing torrent and not a placid manmade lake.

Moulinette and several other towns—including Milles Roches, Dickinson’s Landing, Wales, Farran’s Point and Aultsville—were flooded in the 1950s to make way for the Seaway. The 6,500 residents in the “inundation zone” were given a choice to be bought out by the government or have their homes moved out of their towns and up to higher ground. Neither option sat well with George Hickey, an 83-year-old retired schoolteacher whom I encountered while taking a driving tour along the Seaway. We met near the banks of the St. Lawrence River where, not far away, 50 years earlier a man from the Ontario power company knocked on Hickey’s door and told him and his wife they had one year to move.

But then the manmade flood hit Hickey as fast as those prehistoric torrents that filled the Mediterranean and Black Sea basins.

“The next day I got home from teaching and my wife said, ‘We’ll be moving tomorrow,’” Hickey recalled with a soft, sad chuckle. They were told that they had been bumped to the top of the moving list and to pack only clothes, nothing more, because they would be housed in temporary quarters during the two weeks it would take for crews to lift the home off its foundation and roll it a few miles up the road.

The new lake swallowed about 38,000 acres, including cemeteries. Sometimes gravestones were pulled up and replanted. Sometimes the dusty bones beneath were left buried under piles of rubble to keep them from washing downstream.

But that manmade flood to make a manmade Mediterranean paled to an entirely different type of flood yet to come, one nobody pondered

when all the giant machinery started to chew its way inland from the sea. Almost nobody.

In spring 1955, eighth-grade student Pat Kenney worried about what no one at that time seemed to be worried about. He fretted an ecological disaster might be triggered by reengineering the river in a manner that would connect the once-isolated lakes to the ocean like never before. “I think there should be something done about it for the sake of our freshwater fish,” the boy from Bronson, Iowa, wrote Eisenhower as Seaway construction was ramping up. The president passed the boy’s concern on to U.S. Seaway boss Lewis G. Castle who, as much as one can in a letter, patted the boy on the head.

“Perhaps you are not familiar with the fact that Lake Superior, which is at the headwaters of our Great Lakes basin, is 600 feet above the Atlantic Ocean. Consequently, the water runs eastward from the Great Lakes area into the mouth of the St. Lawrence River,” Castle wrote the boy, “and there is no prospect of the salt-water contaminating the fresh waters of the Great Lakes in any manner whatsoever.”

Castle was correct that the river would continue to flow out to sea, but he failed to mention to the boy that the overseas ships sailing inland would carry with them their own mini-oceans. A single Seaway ship can hold up to six million gallons of vessel-steadying ballast water that gets discharged at a port in exchange for cargo. And that water, scientists would learn after it was too late, can be teeming with millions, if not billions, of living organisms.

North America officially got its Fourth Seacoast the next year, and the Seaway boosters were right: foreign cargo *did* flood through the Seaway locks and into the lakes—but it wasn’t the type anyone had hoped for. It turns out the Seaway’s most important import could not be bought or sold. And it can’t be killed.