

AMERICAN CANALS

BULLETIN OF
THE AMERICAN CANAL SOCIETY

BULLETIN NUMBER 99

Editorial Address—968 Chapel Road, Monaca, PA 15061

NOVEMBER 1996

PRESIDENT'S MESSAGE

It's the holiday season again, time to study canal sites while the leaves are gone, to ski a towpath, and to come in out of the cold to do some writing.

It's also time to read your e-mail canal messages, according to *NAVVIES*, the newsletter of Britain's Waterway Recovery Group. If you can get e-mail on your computer, send the word "subscribe" (without the quotes) to the e-mail address "canals-request@blacksheep.org." This will bring you 30-40 messages a day on various canal topics from around the world, and you can send your own messages. If "blacksheep.org" sounds familiar it is part of the same World Wide Web address used by ACS and by British canal buffs.

AMERICAN CANALS also welcomes your announcements, notes and queries. Many of us still aren't plugged into e-mail and the Web. One friend doesn't even have a computer because he keeps taking courses in the latest computer technology. He's waiting to buy the "final" version. So here are some old-fashioned notes, printed on paper:

Here in Virginia we're planning to reprint *THE J(ames) R(iver) C(anal) FREIGHT BOAT SARAH JANE*, a burlesque of *H.M.S. PINAFORE*, and we'd like to compare it with other canal burlesques. Has anyone found a copy of *T(ony) P(astor's) S(hip) CANAL BOAT PINAFORE*, or *H(is) M(ud) S(cow), PINAFORE*, *H(arry) M(oses') S(hadboat) PINAFORE* or others like these?

Do beavers cut down the wrong trees on your canal? Instead of killing or removing the beavers you can protect the trees with chicken wire. Or, (according to the can label) you can spray the trees with a repellent called "Ropel" available at garden supply stores. Does it work? (From an article by Hugh Gildea in the Virginia Lakes and Watersheds Association newsletter.)

One of the most useful tools for those who study canals and rivers is an official river mileage system, with a "+" marked every river mile on the standard published topo maps. Such a standard, published mileage system helps us to explore, record, monitor, and preserve riverside and riverbed sites such as dams, locks, canals, mills, old sluices and wing dams, and sunken boats. But we're having trouble here in Virginia, getting the state to establish such a system. How has

A CANAL-BOAT WEDDING?



No, here in Virginia we don't have any 90-foot canal boat replicas yet, but over the last few years small groups have built over fifty full-size replicas of James River Batteaux. Over two hundred years ago, George Washington's canal in Richmond was constructed for boats like these..

your state done it? Is this a national problem?

The latest newsletter of the Delphos Canal Commission is dedicated to memories of the *MARGUERITE II*, their canal boat on wheels "launched" in 1992. Filled with exhibits, she ceremonially traveled the 308-mile Miami and Erie Canal and participated in festivals throughout Ohio. Too old to travel anymore, she will settle down as a permanent exhibit, and plans are afoot to build a new one. Most of America's historic canals are dry now so a canal boat on wheels is a wonderful way to bring back the Canal Era and an appreciation of canal history. Before you build your own boat, be sure to ask the Delphos Canal Commission, P.O. Box 256, Delphos, OH 45833, for practical suggestions based on experience!

Happy Holidays!

Bill Trout

This month, on November 9th, for the first time in modern history — and perhaps for the first time ever — a wedding was held aboard a *batteau*. On the riverfront at Scottsville, an old river town on the James, the guests assembled on the riverbank to watch the *batteau* EDWARD SCOTT ascend the river, poled by the crew in river garb, and loaded with bride, groom, father of the bride, the Mayor of Scottsville, and other dignitaries.

The ceremony took place on the foredeck with the *batteau* nosed into the bank, as recorded in the accompanying photograph by *batteau*man *Nancy Dunnivant*. Here Mayor Bobby Spencer (in tricornered hat) on the foredeck conducted the marriage of Ed Barbour, Captain of the EDWARD SCOTT, and his bride Georgia Hiemenz — all of them dedicated *batteau* people.

The ceremony was followed by cannon shots and a bagpipe procession into Scottsville for a feast, toasts, poetry readings, magic (by the Mayor), and fiddling and music by family and friends late into the evening, after which the revelers were assisted home.

Bill Trout

FIRST IRON WARSHIP DELIVERED VIA CANAL

By the 1840s the concept of iron for use in shipbuilding was well established in Europe where shipbuilding timber was in short supply. However the U.S. Navy, with an ample supply of wood available was still very much bound to wood construction. In October 1841, Abel Parker Upshur, a well-informed civilian was appointed Secretary of the Navy. Upshur was unencumbered by the navy's bias toward convention, and was also familiar with the use of iron for ship construction in Europe. Within a month of his appointment, he initiated construction of an iron-hulled, steam-powered warship.

At this time there was still a good deal of tension between British Canada and the United States and British naval vessels were patrolling the Lakes. In recognition of this situation, Congress had passed legislation calling for "the construction of such armed steamers as the president [John Tyler] may think most proper."

Plans were prepared for a vessel to satisfy the requirements for an appropriate warship to guard the lakes. Under Upshur's direction, the vessel would be of iron and he had determined that the firm of Stackhouse and Tomlinson in Pittsburgh had the best materials and facilities for construction. Construction proceeded at a rapid pace through the summer of 1842 with the rolling and shaping of plates completed by fall. The hull was assembled in Pittsburgh to assure proper fitting of all components. By early spring of 1843 the vessel had been disassembled and the components loaded on canal boats for shipment to Cleveland via the Erie-Beaver Extension Canal and Pennsylvania and Ohio Cross-Cut Canal to Akron, thence

the Ohio-Erie Canal to Cleveland. Presumably the components were transferred to a lake vessel for transit on to Erie Pennsylvania.

There the components were reassembled, machinery installed and at 4:00 p.m. Monday, December 4, 1843, she was launched. Well, at least a launch was attempted. Much to the embarrassment of the Navy, when the last block was split, the ship failed to move. It wasn't until the following afternoon that the engineers were able to coax her into the water.

Two days after the actual launching, President John Tyler christened her *USS Michigan* after the recently admitted twenty-sixth state. For the next sixty-one years *Michigan* patrolled the lakes carrying out a variety of roles. With the launching of the new battleships *USS Michigan* in 1905, the aged paddle frigate was renamed *USS Wolverine*. She continued in naval service for another seven years at which time she was turned over to the Pennsylvania militia. She made her final voyage into Lake Michigan in August 1923. For the next many years she lay at Erie with no body accepting responsibility for her maintenance. Finally, in spite of her iron hull still being sound and the formation of an organization to preserve her, the effort failed and early in 1949 she was consigned to the wreckers.

Perhaps ironically, the ship, many years ahead of her time technologically, long outlived the canals that played a major role in making her possible, the canals that even at the time, were nearing technical obsolescence.

Material for this article is derived from the book "Guardian of the Great Lakes" by Bradley A. Rodgers, the University of Michigan Press.

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American Canals

BULLETIN OF THE AMERICAN CANAL SOCIETY

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Annual subscription to AMERICAN CANALS is automatic with A.C.S. membership. Send dues payment (\$15 minimum) to Sec'y/Treas. Charles W. Derr, 117 Main St., Freemansburg, PA 18017. Single copies may be purchased at \$3.00 from the publisher.

Manuscripts on subjects consistent with the objectives of the A.C.S. are welcome. They should be sent to the editor.

Message From England

Roger Squires, our ACS Board Member in England, sends the following excerpts from the Railway and Canal Historical Society Bulletin, November/December 1996:

ELLIS CHARLES RAYMOND HADFIELD (1909-1996)

Members will have learned with great regret that Charles Hadfield died on 6 August, the day after his eighty-seventh birthday. The news was received too late to be included in the September *Bulletin*. Charles Hadfield was known, world-wide, as one of the leading authorities on historic canals in Europe and America.

Roger Squires also included the following clipping from the above issue of *RACHS Bulletin*:

THE BEST FROM AMERICAN CANALS, NUMBER SEVEN 1993-1996, American Canal Society, 88 pp, 150 sketches, photos and maps, soft covers, American Canal & Transportation Center, 809 Rathton Rd.,

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Other publications: *The Best from American Canals*,

William H. Shank, editor and publisher.
American Canal Guides,
William E. Trout III, editor and publisher.

YORK, PA 17403, USA, 1996, \$8.50.

The American Canal Society has made a practice of producing a bound portfolio of key articles that have appeared in their journal 'American Canals'. The latest compilation has just been released and covers the period 1993 to February 1996. Featured in it is a detailed article about the Columbia & Snake Rivers Navigations about which very little has been published previously.

The Old Union Ship Canal: Industrial leftover with potential

The following item, published in the Buffalo (NY) News, Aug. 19, 1996, was sent to us by Don Ebel of Buffalo. The Union Ship Canal has no connection with the Union Canal in Pennsylvania, nor does it have any relationship to the Erie Canal, which empties into Lake Erie further north in Buffalo. (WHS)

As they go north on Route 5, crossing the Buffalo city line from Lackawanna, motorists can peer down from the Father Baker Bridge for a glimpse of the Union Ship Canal — which manages to be both an unwelcoming wasteland and a unique opportunity.

The "canal" isn't a canal in the sense that it goes from one body of water to another. It is a seven-tenths of a mile dead-end channel built in 1905 to bring freighters from Lake Erie to the heavy industry that developed at its sides. Today nearly 150 acres of unused land surround the deep canal.

Heavy industry stopped in 1982 when the Hanna Furnace Corp., a manufacturer of pig iron, and the Shenango Steel Mill shut down forever. Salvagers took what they wanted from the old factories, leaving the ugly ruins behind. One is just a mound of desolate residue. Weeds, scrubby bushes and small trees cover the site. A network of dirt roads runs through it. There has been "midnight" illegal dumping, especially mounds of old tires. Some scavengers still root around the remains for things they can sell to scrap dealers. This waterside property is not a vacation spot.

Freighters will not be in the canal again, as the community recognized when it allowed the replacement for the old Father Baker Bridge to be built too low for their passage.

Despite the ravages, it is possible, with a little imagination, to conjure up a vision of how the Union Ship Canal might become a desirable addition to Buffalo instead of a blot on its landscape. For one thing, it is waterfront property with the water extended into its very heart. For another, it is next door to Lackawanna's successful industrial development park. Route 5 means road access could be easy. Conrail tracks are to the east.

A Vision at City Hall

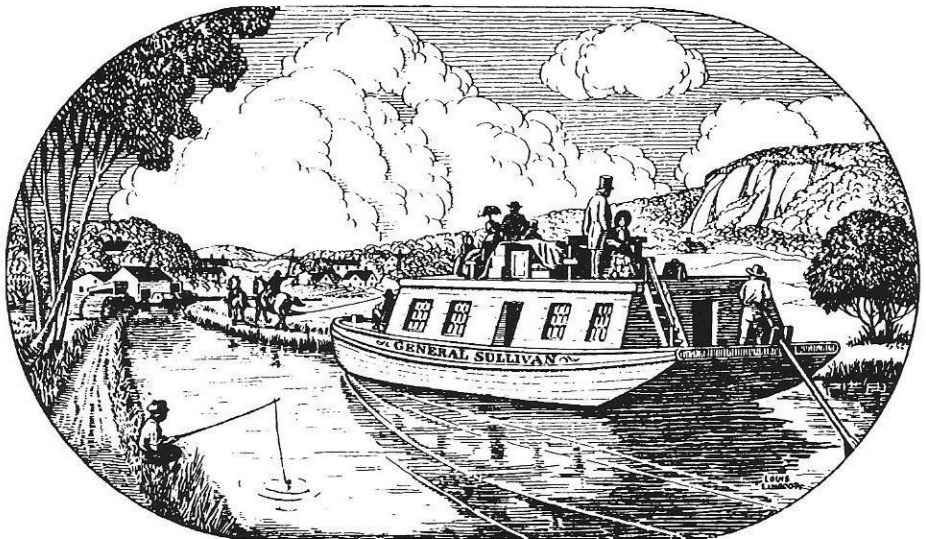
The Union Ship Canal has a determined booster in Buffalo Common Council Member Bonnie Kane Lockwood. She sees it as a prime development site, suitable for a mix of light industry and recreation uses, particularly boating. But there are not specific development plans.

The defunct Horizons Waterfront Commission envisioned a marina and parklands and posed the possibility of extending the canal inland to create waterside residential development.

Two issues cloud the property's future:

The first is ownership. The owner is a salvage company going through bankruptcy in a

MIDDLESEX CANAL PUBLICATIONS



Cover Illustration of the new Canal Guide.

Nolan T. Jones, P.E., President of the Middlesex Canal Association, has just sent us the "Middlesex Canal Guide & Maps" by Burt VerPlanck, which sells for \$18.50 (shipping included).

It is a multi-page paperback which includes excellent historical guides (with access points indicated) and ten, two-color, 9" x 14" maps, all detailing the present-day remains of the old Middlesex Canal.

Nolan Jones also sent us a 28-minute VCR Video Tape entitled "A Journey Along the Middlesex Canal", which was 2-1/2 years in the making and includes much historical information as well as footage of the remaining canal artifacts along the route. Cost \$11.75, shipping included.

Both the Guide Book and Video may be ordered from the Middlesex Canal Association, P.O. Box 33, Billerica, MA 01821. (Make checks payable to M.C.A.)

federal court in New York City. Local interests under the banner of the Führmann Tift Development Corp. assert they have an option to buy the site with an industrial park as the goal, but they say City Hall won't cooperate.

Lockwood says the development firm is "all speculation" and "no substance" and she won't deal with it. Furthermore, city officials believe the option has expired. Lockwood rightly wants the city to control the site and sees a large load of accumulated overdue taxes as a doorway to that. City assessors peg back taxes at about \$2.6 million.

The second issue is pollution. Evidently, contamination is not as extensive as might be suspected, but there are problems.

An examination by consultants to the state Department of Environmental Conservation turned up no hazardous waste at the Hanna Furnace location, but it concluded ground and surface water quality is below standards and poses "a potential threat to public health and the environment."

The Shenango Steel portion is fouled by cancer-causing polychlorinated biphenyls (PCBs) left behind when "midnight" dumpers used the site to strip transformers. The DEC removed PCBs in July 1994 but didn't get all of them. Hazards remain.

At City Hall, Community Development Commissioner Alan DeLisle says an internal task force has been formed in hopes of untangling the ownership and environmental issues and coming up with reuse plans. He

describes himself as "pretty excited" about the possibilities for such things as light industry, boat launching and a restaurant.

There is reason for optimism because of an emerging interest in government circles in what are called "brownfields," the code name of the moment for unappealing former industrial sites that languish while developers head for "greenfields," the easy countryside locations without environmental or ownership questions.

Go after some "brownfield" money

It has dawned on public policy-makers that efforts to reuse the old urban sites make more sense than breaking into open farmlands.

The U.S. Environmental Protection Agency has become clued in enough to grant Buffalo \$200,000 for the work of a task force to gather information about "brownfields" and develop a city policy. The Union Ship Canal cannot help but be part of the work.

Furthermore, the \$1.75 billion state environmental bond act facing a public vote in November includes \$200 million for cleaning up polluted urban "brownfields" sites. City Hall would be wise to get some plans ready so it can go after the money if the bond act passes. Again, the Union Ship Canal merits a high spot on the list.

It is there — in the distance off Route 5 — that extensive water frontage and much fallow acreage await the right vision and a rebirth.

THE VENICE OF AMERICA



Authentic gondola, imported from Italy, on the Grand Canal in Venice, California. The Gondoliers are Kent Rudebo and Kent Bennett of the Venice Gondola Company. One of the passengers is Helen Kinney Boyle, daughter of town founder, Abbot Kinney. (Photographer: Jeffrey Stanton)

By Bill Shank

During a recent visit with my son in California, we spent several days enjoying what must surely be the "dream city" for all West-Coast canal buffs — Venice, California. We stayed at a cosy "bed and breakfast" establishment known as the Venice Beach House, close to the town center.

Venice, California was the creation of a wealthy East Coast cigarette manufacturer named Abbot Kinney, who settled in Santa Monica in the early 1900's. Kinney envisioned a completely new community in the marshland near Los Angeles, which with its dredged canals, Italian architecture and proximity to the Pacific Ocean, would duplicate the atmosphere of Venice, Italy and could become a cultural and entertainment center for the entire southern California area. His

ideas were dubbed "Kinney's Folly" by the local citizens, but he persisted and started construction in the swamp and sand south of Santa Monica in 1905.

His canals generally ran in a parallel grid pattern, approximately seven miles in total length, with the canals taking the place of streets, and interconnected so that two 30-inch diameter pipes, connected to the Ocean, could serve them all with fresh seawater. An additional grid of smaller canals was soon built on adjacent ground by the Los Angeles Pacific Railroad.

The canals were originally built on undeveloped real estate, but this filled in quickly with people who paid for the privilege of living "on the canals." A number of gondolas were imported from Italy to carry passengers along the canals. A canal tour, with singing gondoliers, became one of the early attractions in the "Venice of America." With a Ship Hotel, a fishing and sailing pier, a large pavilion, and a bathing beach, Venice soon became the attraction for both South California natives and visitors from the East, which Abbot Kinney had hoped for. It became the "Atlantic City" of the West.

Traveling entertainment groups were frequent visitors to Venice, and brought huge crowds with them. Boxing, aquatics, early barn-storming aviators, all made Venice one of their stopping points on their swing through the West. Later, such dance bands as that of Lawrence Welk, Benny Goodman, Ben Pollack and others were frequent visitors. Beauty contests were held annually.



Artists and sand-sculptors abound along the Pacific water-front in Venice.

Celebrities such as Jack Demsey, Charlie Chaplin, Harold Lloyd and other notables were used to bring crowds into town for special events.

Abbot Kinney, the founder, died of cancer in October of 1920, but his wife and son (Thorton Kinney) carried on the Kinney companies and the Kinney tradition. A miniature railroad was built to carry passengers between entertainment centers in the downtown area.

Venice had originally been a separate town, with its own government and post office. But with the continued growth of Los Angeles, the town of Venice was ultimately surrounded by Los Angeles suburbs. The residents, partially due to increasing town indebtedness, finally petitioned L.A. to join the larger community, still retaining their own post office and their reputation as an entertainment center. An auto race track, through the downtown area, now became another of the attractions. Several of the downtown streets are still identified as part of the "Raceway".

After Abbot Kinney's death there was a movement by the citizens of Venice to fill in the canals and convert them to city boulevards. This movement resulted in the abandonment of some of the older canals, but many are still being maintained and new gondolas are being imported from Italy to bolster the town's claim as the "Venice of America." For a number of years Lawrence Welk was invited to make his headquarters at the Aragon Ballroom on the Lick Pier in downtown Venice (1951), and his later national television broadcasts originated there.

Another interlude in the town's colorful history took place in the 1930's when oil was discovered near the Venice town center, known as the Venice-Del Rey Oil fields. For a few years, oil derricks reared their ugly heads all over the downtown area. The oil deposit gradually dwindled and by 1965 the City of Los Angeles moved to close the remaining



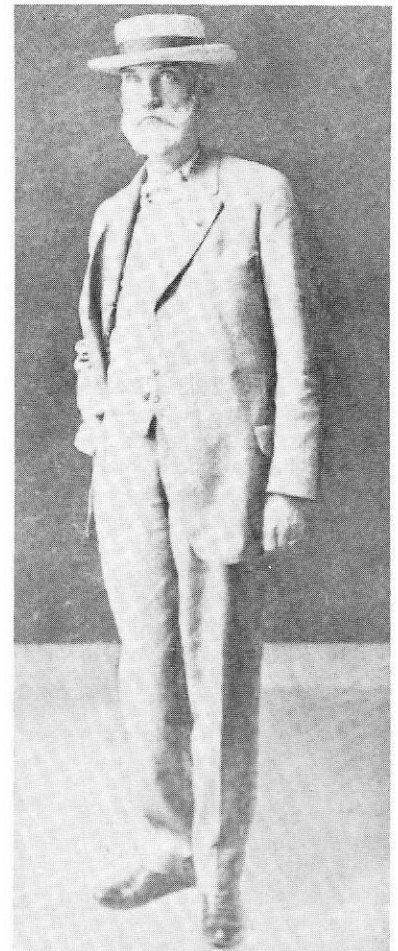
J. William Shank, of the San Francisco Museum of Modern Art (left) with Doug Collins of Paramount Pictures, Hollywood, on the towpath of a Venice Canal.

wells. In 1974, the last of the oil wells closed down, hastened by an explosion while it was being dismantled.

While the Depression of the 1930's hit the entertainment industry hard in Venice, one activity survived and became popular—BINGO. Also, gambling boats began to appear off the coast of southern California. In the late 1930's Attorney General Earl Warren launched a crusade against the gambling fleet off-shore from Venice, which finally prevailed after a pitch-battle between the authorities and the gambling boats in the 1940's.

Today, the Venice of America has subsided into a pretty little community, fully aware of its

colorful history and its name-tie to the equally colorful City of Venice, Italy.



Abbot Kinney (Courtesy Shishim family).



The Author on one of the many canal bridges in downtown Venice.

WHEN HORSES PULLED BOATS

By Alvin Harlow

INTRODUCTION

Most canal historians in the United States are familiar with Alvin F. Harlow's classic work of 1926 entitled "Old Towpaths". Living in the declining years of the Nineteenth Century Canal Era, and becoming personally fascinated by it, Harlow's first major literary work covered the American Canals, over a hundred-year period, with exceptional realism and clarity. This fine work, with its more than 400 pages of carefully-researched technical information, colorful anecdotes and full-page illustrations, has become the "Bible" of canal buffs throughout the country.

Few of us were aware, however, that Harlow had also published an abbreviated version of "Old Towpaths" as a grammar-school textbook in 1936, named "WHEN HORSES PULLED BOATS". This small book was evidently considered too unimportant to be mentioned by his biographers, or even by Harlow himself.

I obtained a copy of this book about 15 years ago. I was delighted with its simplicity and its clear-cut explanation of many badly neglected facets of the canal era. It was like suddenly opening a long-closed door on the past! I decided that I should make the text of this little book available to historians, young and old, throughout the country. With the cooperation of the original publishers, I have done so! (Included are many of Orson Lowell's sketches (from the book.)

We invite all historians—*young and old*—to travel backwards, through the text of this book, to visit a world where life moved at a much more leisurely pace and was far less complicated than that of the "push-button" age in which we find ourselves.

Bill Shank

Chapter I

WHY MEN BUILT CANALS

Centuries ago, so long ago that none of us can tell when it came about, primitive men first learned that they could make boats. We don't know how or when they first learned this, for no history has been written of those early times. No one then knew how to write; in fact writing had not even been thought of.

We now suppose that those early savage men must have sat or stood on logs floating in the water, and that finally one of them said to his comrades, "Why not bind one or two of these logs together with vines? Then we will have a thing on which several of us can ride at the same time. Then we can cross this stream whenever we like."

And thus the first raft was made.

Later—it must have been centuries later—as their skill improved, the people learned how to make boats. Some of the earliest boats were just a light wooden framework, covered with the skins of animals, and were nearly round in shape.



A Dutch Canal

As time went on and people began trading and selling things to other people who lived at a distance, they began to haul goods in their boats. This growing trade made it necessary not only to make a boat in which a man could ride, but one large enough for him to carry freight in, too. Soon men saw that you could easily carry more in a boat than on a horse's back.

Sometimes there was no river or lake on which to travel when men wanted to go across country from one river to another. Some of the rivers, too, were shallow, and some of them full of rocks and rapids. For this reason men began to dig canals.

Canals are artificial rivers. Some of the first ones were dug in very dry countries, such as Egypt, Assyria and Babylonia, so long ago that the dates are uncertain. We do know that ten thousand years ago there were canals in Egypt. The first canals, we think, were irrigation ditches—channels through which water was brought to some dry farming region to water crops.

It was not long before men began to put little canoes and dugouts into these canals. Presently the wiser men of the country said "Why not make the canals larger? Then we can place larger boats on them, and haul ourselves and our friends and our goods on them wherever we wish."

Then they discovered that these canals might be dug straight across where there were no rivers, or where the rivers were shallow and rough. As canals began to be built, they were used for travelling and for commerce. Ancient Babylon had several of them extending from the city to other important

towns. One of these canals was seven hundred miles long. The Roman empire, which existed one thousand nine hundred years ago, built canals in Italy.

The Suez Canal cut through the Isthmus of Suez, which is the little neck of land connecting Africa and Asia, makes a waterway between the Mediterranean and the Red Sea. Ships travelling between England and India, China or Australia, now go through the Suez Canal, instead of having to go all the way around the big continent of Africa, as they once did.

We think of the Suez Canal as a modern work, because it was opened in 1869. But think of it—there was a canal across that isthmus three thousand years ago! People have always known that it would be convenient to have a channel between these two seas. A canal was completed across the Isthmus of Suez one thousand three hundred and eighty years before the birth of Christ. It remained open and in use for one thousand five hundred years, and then it was neglected and its channel became filled up.

Canals were easy to dig in the low, flat countries like Holland and Belgium, and some were built there while the Romans still ruled those countries. To this day, a large part of Holland's commerce is carried on through its canals. Some of the most interesting sights in Holland are to be seen where patient horses plod along beside these waterways, pulling all sorts of boats, big and little.

In the Middle Ages a great many canals were built in Belgium, Holland, France, Germany, and other countries of Europe.

Some of them are in use yet, though they are hundreds of years old. In China a great canal a thousand miles long was dug five hundred years ago. If you ever go to China, you will probably see it and its many queer-looking boats.

Chapter II ONE HUNDRED YEARS AGO

Before the United States became an independent nation in 1776, and for at least fifty years after that, there were no good roads in this country, and traveling was a dreadful task. There were not railroads until after 1830, and everybody had to ride about on horseback, or in carriages, wagons or stage-coaches drawn by horses. These vehicles would get stuck in the mud, time and again, and the travellers would have to get out and get their clothes and shoes dreadfully muddy. If two or three more horses could be found in the neighborhood, they would be borrowed and hitched on, to help pull the coach out of the mud. Sometimes this couldn't be done—the accident happened away out in the wilderness, where there were no houses, and no horses could be borrowed. Sometimes the travellers had to get out and walk, or wait until another carriage or wagon came along.

It was even harder to carry goods anywhere. Wagons were used wherever the roads were good enough. But some of the roads were poor and rough, and loaded wagons could not be taken over them. In many regions where very few people lived, there were no roads at all, only narrow trails through the forest. On these roads and trails, merchandise was carried on the backs of mules. Long caravans of mules, often a hundred or more in one train, were seen trudging through the forests and over the mountains with all sorts of goods tied on their backs.

Even before the United States became an independent nation, there were men who said that canals ought to be built. They knew about the canals in Europe. Some of them had traveled in Europe and had seen the canals there. They knew that two horses could draw a boat through still water loaded with a hundred tons of coal or stone or other things. Even on a good, level road, the same two horses could pull no more than one or two tons in a wagon, and if the road went uphill, they could not pull that much.

So people were thinking and talking about building canals. With canals they might travel and ship goods more easily and at less expense. They began planning routes for some of them. One was intended to connect Delaware Bay with Chesapeake Bay, so that a quick trip could be made between Philadelphia and Baltimore. Another was to be cut across the Cape Cod peninsula, in Massachusetts, so that boats passing between New York and Boston would not have to go around Cape Cod, which was a long and often very stormy journey. Another idea was to dig a canal from Lake Michigan, at the place where Chicago is now, down to the Illinois River, which runs into the Mississippi, and thus make a passage for boats between the Great Lakes and the Gulf



On a Chinese Canal

of Mexico.

All three of these canals were built many years afterward, and are in use today.

George Washington, when he was a young man, believed that the Potomac and the James Rivers ought to be connected with the Ohio River by canal, so that commerce could be carried on between the people along the Atlantic coast and the pioneers who were beginning to settle in the Ohio Valley. To carry out his ideas, two canals were begun several years later, but the builders did not have money enough to complete them.

Many years passed before any of the canals which were planned could be built. The United States was a new nation, and very poor. Taxes were low, and neither the state

governments nor the national government had much money to spend on public works, such as roads and canals. We had no millionaires; in fact, we had very few men whose fortune amounted to as much as a hundred thousand dollars. Therefore, it was hard to find anybody who had money to invest in building these things.

When the Middlesex Canal, connecting the city of Boston with the Merrimac River, was finally completed in 1803, it had cost more than \$500,000; and that was such a great sum that the men who invested their money in it could never make any profit. To any of our big companies today, or to our government, a half a million dollars does not seem a large amount.



A German Canal

Chapter III

HOW EARLY CANALS WERE BUILT

Try to imagine how much harder it was to build canals a century ago than it is today. When you see a great steam shovel lifting huge masses of earth, heaping up a truckload with only three or four shovelfuls, remember that the men who built our early canals had no such machines. Steam shovels had not been invented. Instead, hundreds of men with picks dug and loosened the soil, while other men with hand shovels threw it into wagons and teams of horses drew the wagons away to the place where the earth was dumped.

When they had cut a canal channel through solid rock they had no dynamite with which to blast it out. They had only ordinary gunpowder, much less powerful than dynamite. Most of us have seen men drilling holes in rock into which dynamite is later put for blasting. Nowadays, they do this with machine drills. A man simply holds the machine drill upright on the rock, while it makes a loud clatter—"B-r-r-r-r-r-r-r-r-r-r!" and clouds of finely powdered rock dust fly up from it as the sharp, steel edge of the drill strikes the rock hundreds of times a minute, rapidly wearing the hole deeper and deeper.

But a hundred years ago—even fifty years ago—when it was necessary to drill a hole in a rock, the workman took a long, heavy iron or steel bar, with its end sharpened to an edge, and lifted it and let it drop in the same spot. Each stroke of the drill on the rock

broke loose tiny particles, thus slowly wearing a hole. It took two days to drill a hole which a modern machine drill can do in an hour or less.

When the hole was drilled, those early canal builders would pour it nearly full of gunpowder. Then they would put the end of a long fuse into the powder, and plug the mouth of the hole nearly full of soft clay. A man would light the fuse, and the workmen would hurry to a safe distance, just as you do after you light the fuse of a big fire-cracker on the Fourth of July. Then "Bang!" and off would go a mass of rock.

Nowadays we run a wire into the hole full of dynamite, and explode it by electricity. The dynamite breaks off a great deal more rock than the gunpowder used to do.

Just think of the famous *Deep Cut*, on the Chesapeake and Delaware Canal, which connects the lower end of the Delaware Bay with the upper part of Chesapeake Bay. This cut, more than a mile long, was mostly through solid rock, and ninety feet deep at its deepest point. At the time it was made it was one of the greatest works of the kind in the world. At one time, twenty-five hundred men were at work on it. Even with that army of men, it took five years of patient drilling and blasting to finish the job. It was worth all its cost; for by going through that little canal, only twenty-one miles long, boats saved themselves a five hundred mile journey through those two big bays, around Cape Charles and into the Atlantic Ocean, where they were in danger of storms and shipwreck.

How were these canals kept filled with water? The engineers who planned them arranged to take water from the rivers, creeks and lakes along the course. For this purpose a channel called a *feeder* was dug from lakes or streams near the canal, and strong, heavy gates were placed in this channel so that the quantity of water which ran into the canal through it could be controlled.

For some canals the water had to be brought a long way. The Delaware and Raritan Canal, for example, ran across the state of New Jersey from the Delaware River at Bordentown, up through Trenton, and then across to the Raritan River at New Brunswick. From New Brunswick the boats passed into New York bay. This canal therefore was a water-way between New York and Philadelphia. Most of the water for the canal came from the Delaware River, far above Trenton, through a feeder twenty-two miles long. The feeder was nearly as large as the main canal.

Every now and then the builders of a canal would come to a river or creek which ran right across its course, and they would have to build an aqueduct on which to cross. Built of stone or wood, and placed on piers much like the piers of a bridge, the aqueduct was simply a watertight trough through which the waters of the canal flowed across the stream. There was a foot-bridge or path beside it on which the horses or mules could cross, just as they would on an ordinary bridge.

The aqueduct had to be very carefully made to keep the water from leaking out. This gave the canal builders much trouble. We had no cement in America when the first canals were built. Cement was being made in Europe, but it cost so much to bring it across the ocean that the canal builders could not afford it.

About 1820, while the Erie Canal was being built, cement rock was discovered near it, between the cities of Utica and Syracuse. A factory was set up there, and cement was made and used on canal works after that. A little later, while other canals were being built, the same kind of rock was found near the Hudson, the Lehigh, and the Potomac Rivers. There are big cement factories in those very places today.

The first tunnels ever dug in the United States were made for canals. They were short cuts through hills, made to save the canal from going a long, long way around the hill. The very first tunnel built in this country was on the Schuylkill Canal, which ran along the side of the Schuylkill River, from Philadelphia up to Pottsville, in Pennsylvania. This tunnel was completed in 1821.

At that time there were as yet no railroads, and many people in America did not know what a tunnel was. A man wrote a letter to a newspaper, asking what was meant by a "tunnel." The editor of the paper did not know. He printed the man's letter in his paper, and under it he said, "Perhaps some other reader can tell us."

The second tunnel dug in America was near Lebanon, Pennsylvania. The Union Canal, which ran from the Schuylkill River to the Susquehanna River, passed through it.

There were two other canal tunnels, one on the Chesapeake and Ohio Canal in Maryland being the longest—nearly a mile in length.

When a boat was going through a tunnel, it carried a lighted headlight and the men on the boat carried lanterns, just as if it were night.

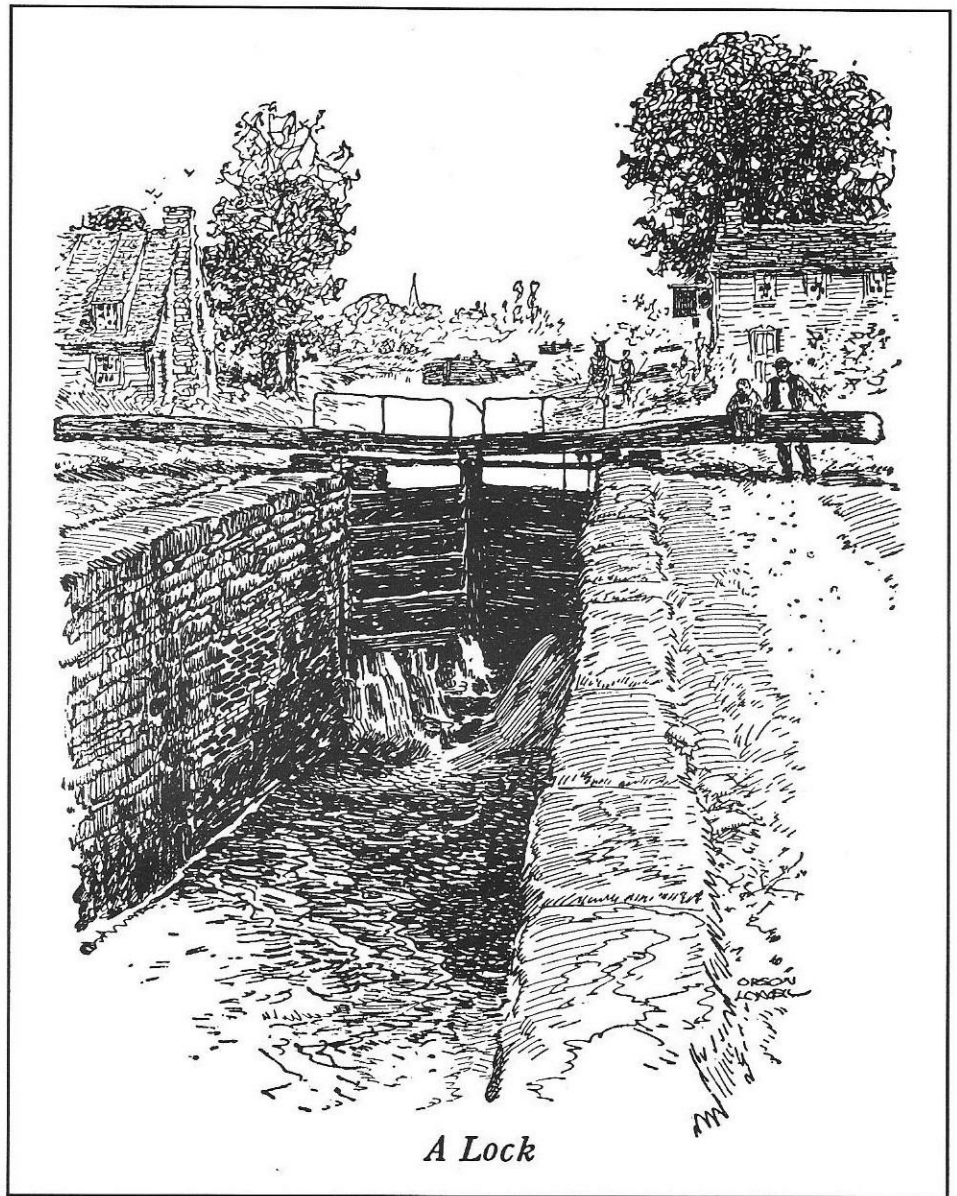
Chapter IV SOME EARLY CANALS

Some of the first canals were short ones, dug around a waterfall or a rapid. They formed a sort of detour by which boats going up or down the river could pass out of the stream and around the rough places in smooth water. This done, the canal would bring them back into the river again.

Then longer canals were built. One ran from the Santee River to Charleston, in South Carolina. It was built so that boats coming down the river with grain, fruits and vegetables would not have to go out into the sea to reach Charleston, which was their best market.

The Middlesex Canal in Massachusetts was used in the same way. When people in new Hampshire wished to send their lumber, granite and farm products to Boston, they had to go down the Merrimac River and out into the ocean to reach the city. Otherwise they must unload the freight just before it reached the ocean and haul it twenty-five miles to Boston by wagon. After the Middlesex Canal was built, boats coming down the Merrimac just turned into the canal at Lowell and went straight on to Boston.

Then still greater and longer canals were planned. The Erie Canal, although it was not quite the longest, was the busiest, and most profitable of them all. It ran from Lake Erie at Buffalo to the Hudson River near Albany. Boats starting from Lake Erie could go all the way down to New York by the Hudson River.



A Lock



The Steersman

This canal was three hundred and sixty-four miles long. Work on it was begun in 1817, and it was completed in 1825. When we remember that it was all done without the help of the great machinery which modern builders have for digging and moving earth and rock, we must admit that to build the Erie Canal in eight years was doing very well.

The State of New York built several branches to the Erie Canal. One of these ran from the Hudson River to Lake Champlain. On it boats might go from New York City right up to Canada. Another branch ran from Syracuse to Oswego, on Lake Ontario. Other branches ran out into parts of the state which did not have any good way of sending their products to the cities.

The State of Pennsylvania also built a great system of canals. Its principal route crossed the state from Philadelphia to Pittsburgh, and there were several branches running out from it.

Many of Pennsylvania's most important canals were built to carry anthracite or hard coal. This coal was discovered in northeastern Pennsylvania about the year 1800. That small region is the only place in America



An Old English Lock

where this kind of coal is found. When it was first discovered, there were no towns in that mountainous country; it was nearly all a wilderness.

At first, people did not believe that the hard coal would burn; they called it stone coal. When they had learned how to use it, it became very popular, and several canals were built for the purpose of carrying it to the cities. One of these, the Delaware and Hudson Canal, ran from Honesdale in Pennsylvania to the Hudson River. Through this canal, New York City first received its anthracite coal.

Several other canals were built out from the hard coal region. One ran alongside the Schuylkill River, down to Philadelphia. Another followed the banks of the Lehigh and Delaware Rivers to Philadelphia. Another ran from Elmira, New York, along the banks of the Susquehanna River, all the way to Chesapeake Bay. Two canals were built across New Jersey, from the Delaware River to New York harbor. These two helped to bring New York's supply of anthracite coal from Pennsylvania.

A great many canals, like the ones we are talking about, ran close beside the banks of rivers. It was easier to build them there than to cut through rocky hills. Of course, the canal would have to be higher than the river; sometimes much higher. Often it was like a notch or shelf cut into the hillside above the river, and held up on the side next to the river by banks of earth which were sometimes high and steep.

In Ohio, two long canals were built. One of these ran from Toledo, on Lake Erie, to Cincinnati, on the Ohio River; the other, from

Cleveland, on Lake Erie, to Portsmouth, on the Ohio River. There were some shorter canals connecting with these.

Indiana built a long canal running from Lake Erie through the cities of Fort Wayne and Terre Haute down to Evansville, on the Ohio River. In Illinois, they built the canal which a French explorer, Louis Joliet, had first thought of, a hundred and fifty years before, from Lake Michigan to the Illinois River.

Chapter V

WHAT ARE CANAL BOATS LIKE?

The first canal boats were intended mostly for the hauling of freight, though they did carry a few passengers. A little later "packet boats" were built, which carried nothing but passengers.

The canal boats were clumsy-looking things. Those which carried freight were like our barges nowadays. At the front end they were a little rounded, so that they would not be too hard to pull through the water. They never had sharp, slender prows, for that would have been a waste of space in the hull. The boatmen needed all the space in the boats that they could get.

The boats were pulled by horses or mules. These walked along a broad path called the towpath, at the edge of the water. They were attached to the boat by a rope, called the tow-rope, which was at least two hundred feet long, and sometimes two hundred and fifty feet. They were hitched in tandem style—that is, they walked one behind the other; and one of the boat's crew—very often a boy—walked behind them with a whip, to see that they kept moving.

Two or three horses were used to pull the

largest and heaviest boats. It seems remarkable that two horses could draw a boat containing a hundred tons or more of cargo, in addition to the weight of the boat itself, but this is true. They had to strain and pull hard for a moment or two until they got the boat moving, but after it was started, they worked no harder than if they were pulling a loaded wagon. Now and then one would see a smaller boat pulled by only one horse.

We have been calling them horses all the time, but there were far more mules than horses working on the canals. The canal men said that mules lived longer and could pull more weight than a horse.

Each boat had a captain. The captain might also be the owner of the boat. Then there was a crew to do the work. There might be only one man in the crew beside the captain, but on the larger and busier freight boats there might be as many as five. One of these was the steersman and another the driver. The others were deck hands, who helped load or unload cargo and did various other chores. The steersman stood at the stern of the boat and kept it in the middle of the canal by means of the rudder, which he moved by a long handle.

Captains often employed boys as drivers, because they did not have to pay boys as high wages as they did men. James A. Garfield, who became President of the United States, was a driver for a boat on the canals in Ohio when he was only sixteen years old.

On the larger boats, there was also a cook—for the crew lived on the boat. They ate their meals and slept in very small rooms built in either the bow or the stern. The cook was sometimes a man, sometimes a woman.

On some canals the boats did not run at night. Late in the evening they would tie up to the bank, starting again next morning at dawn. On busy canals such as the Erie, many boats kept going during the night, just as railroad trains do. On such boats, there were two drivers, two steersmen, and two cooks, so that one group could work while the other slept. Canal boatmen worked twelve or more hours a day, and made no complaint about it.

"WHEN HORSES PULLED BOATS" ALSO AVAILABLE IN BOOK FORM

Alvin Harlow's 1936 canal book *"WHEN HORSES PULLED BOATS"* is also available in book form. A 72-page book, with full-color cover, and a special Canal Bibliography, the publication includes all of Orson Lowell's original drawings, supplemented by additional drawings by Philip Hoffmann. Large type makes it easy reading for children and adults alike. The price, postage included, is \$7.00 from American Canal and Transportation Center, 809 Rathton Road, York, Pa 17403.

Chapter VI THE LOCKS

Why do we say "upstream" and "downstream" about a canal? Because the water in the canals does not stand still. Canals are built so that there is a very, very slow current. It is so slow that if you drop a stick into the water you can scarcely tell which way it is moving. In most canals the water does not move as much as a quarter of a mile in an hour. The current must not be strong, else the horses can not pull loaded boats against it. Yet there must be a little current, in order to make the locks work properly.

What is a lock? It is the device by which a canal is able to go down a steep hill into a valley without having any waterfalls or any swift current in it. No one knows who invented the lock, although some have thought that it was invented in Italy a little more than four centuries ago. We now find that the Chinese were using locks on their Grand Canal five hundred years ago, and it may be that they were the first who thought of this clever piece of machinery.

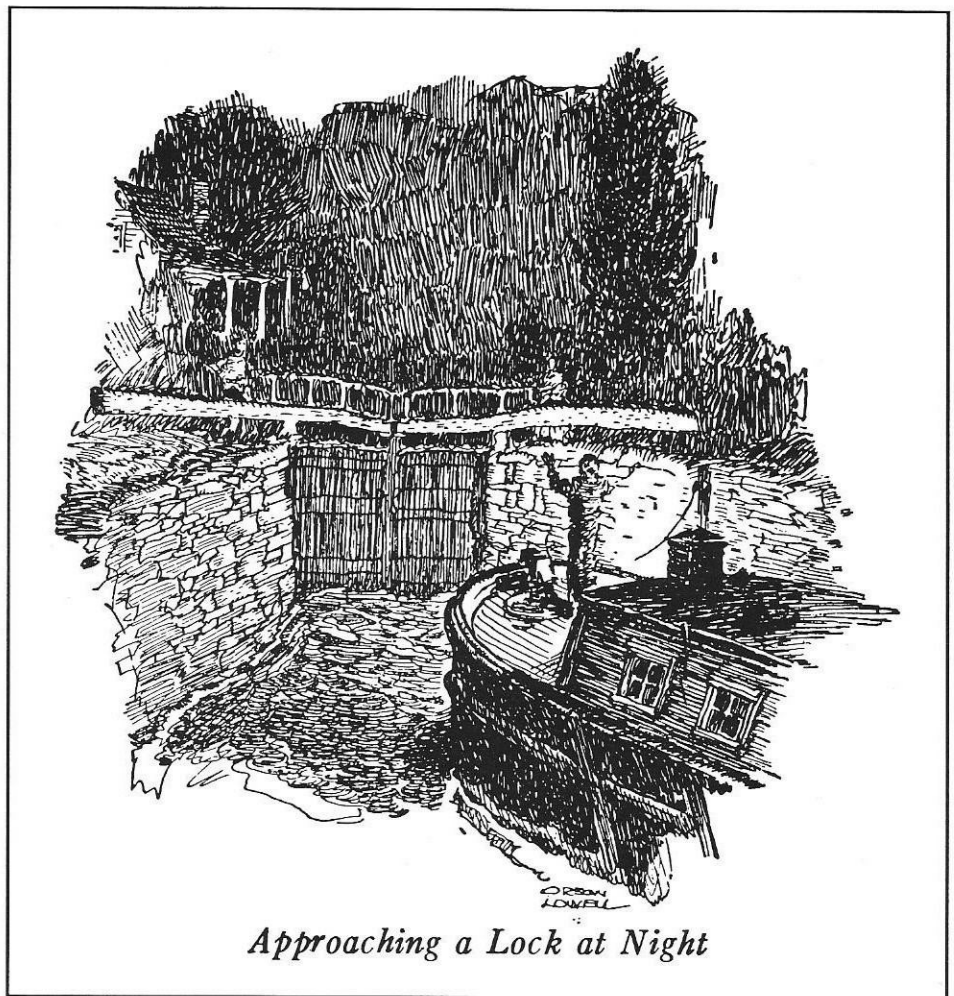
Perhaps some of us have seen a canal lock. It is an enclosure through which the canal flows. Nowadays it is built of concrete; but on our early canals, its side-walls were usually brick or stone. The space in the lock was just a little larger than the largest boats. The lock is closed at each end by a pair of heavy gates, which on our old canals, were made of wood. These gates are like double doors, turning on hinges and meeting in the middle of the passage. When they are closed, they stop the water from flowing.

One of these pairs of gates, usually the upper pair—that is, at the end of the lock which was upstream—must always be kept closed; for the surface of the water in the canal above the lock might be six or eight or ten feet higher than the surface of the water below the lock.

Let us suppose that a boat is going upstream. The lower gates of the lock are open, and the boat is pulled into the lock. Then the lower gates are closed and the upper gates are partly opened, so that water flows into the lock—but not too fast—and fills it. As the water rises, the boat rises with it. Within two or three minutes, the water inside the lock is on a level with the water in the canal on the upstream side of the lock. The upper gates are now opened wide, the boat passes into the canal and goes on upstream.

But suppose the boat is going downstream. It stops near the lock. The lower lock gates are closed, and the upper ones partly opened. Water quickly fills the lock, and the boat passed into it. The upper gates are then closed again and little shutters in the lower gates are opened. The water now passes slowly out, and the boat is seen going down until it is on a level with the water below the lock. Then the lower gates are opened, and the boat passes out.

When the horses pull the boat into the lock, the steersman has to pilot it very carefully, especially if it happens to be one of the biggest boats; for sometimes the space in



Approaching a Lock at Night

the lock is only a few inches wider than the boat.

The man who opened and closed the lock gates was called the lock-tender. He always lived in a house close by, and on some of the more busy canals, he had a hard job. Usually he had a garden in which he raised his own vegetables; he would have fruit trees, a cow, some hogs and chickens. Thus he and his family produced nearly all of their own food, and he had to buy from the store only a few such things as flour, salt, sugar, and coffee.

On most of the canals each boat carried a horn or a conch-shell on which the captain or the steersman would blow long blasts as they came near a lock. The lock-tender might be hoeing his potatoes or feeding his hogs when the boat came along, and it was necessary to warn him. Sometimes when he was too busy, his wife or one of his children would go out and move the gates.

On the earliest canals, the lock gates had long poles or levers attached to them, by which they were opened and closed; but before many canals had been built in America, a windlass was invented which worked much better. The lock-tender just turned a crank, and long chains ran from the windlass to the gates, to pull them open or shut.

In hilly country, where there were many locks, canal travel was very slow. The Chemung Canal, which ran from Seneca Lake to Elmira, New York, was twenty-three

miles long and had forty-nine locks on it—more than two locks in every mile. To travel on that canal was just going through one lock after another. There were other short canals were almost as bad.

On a few canals there were so many boats and the business was so heavy that the lock-tender did not have much time to cultivate a garden. He often had to work at the lock from twelve to sixteen hours a day.

On these busy canals there were nearly always traffic jams at the locks. There might be dozens of boats above and below, each waiting for its turn to pass through. Sometimes the jam would extend for a mile or more in each direction.

On the canals where the boats did not run all night, there were always many boats tied up overnight near the locks, waiting to get through. The lock-tender must begin work at dawn—which, in midsummer, was before four o'clock in the morning—to put the boats through the lock as fast as possible. At seven o'clock he stopped for an hour to eat his breakfast, and boats had to wait. At eight o'clock he began again, and worked until noon. Then he took an hour off for what we call lunch nowadays, but which they called dinner then. Then he worked again until six o'clock in the evening, at which time he took another hour off to eat his supper. At seven o'clock he began "locking" boats through again, and kept it up until nine or ten that night. That was an ordinary day's work!

WHEN HORSES PULLED BOATS

The Erie Canal was very busy and the boats did not stop even at meal times. Every lock-tender had a helper, who worked the locks while the tender was eating his meals. On the Erie and other canals where the boats ran all night, there were two sets of lock-tenders, one for daytime, and the other for night.

(To be concluded in the next issue.)

ALVIN FAY HARLOW¹ (1875-1963)

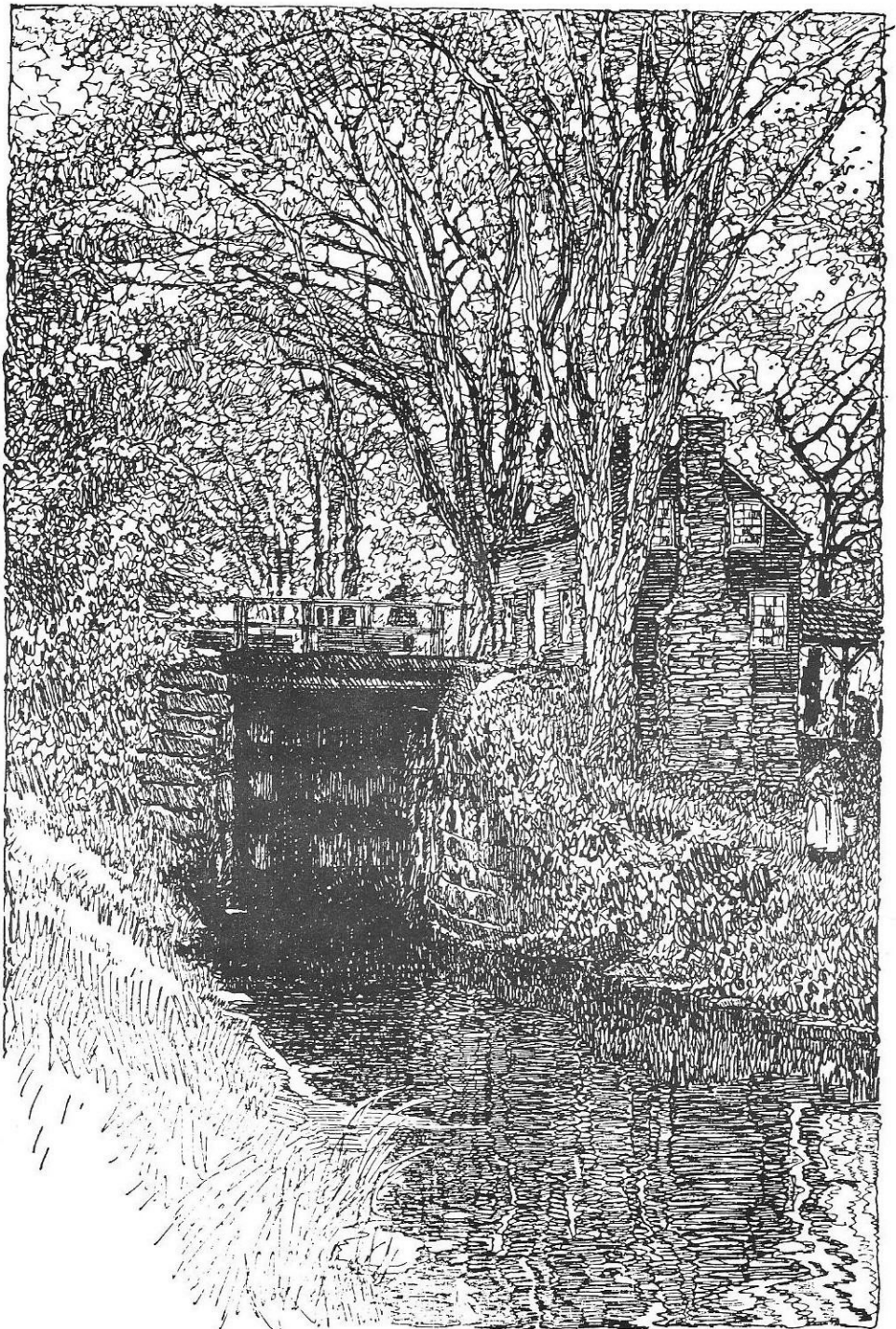
Alvin Harlow was born March 10, 1875 in Sedalia, Missouri. His parents were John Edwin Harlow and Ann Elizabeth (Hawkins) Harlow. He was graduated from Franklin College in Indiana in 1899 with a Bachelor of Philosophy degree. Later (1929) he acquired a Doctor of Letters degree. He married Dora Shockley, June 10, 1909.

From 1908 to 1913 he was Secretary, Treasurer and Director of the Grand View Coal and Timber Corporation of Tennessee. He then spent nearly a decade as an advertising specialist and business-magazine writer. His work during this period included the production of an educational motion picture illustrating life in the Southern Appalachian Mountains. He produced his first major book: "Old Towpaths, The Story of the American Canal Era" in 1926.

During the ensuing twenty-five years he produced a steady stream of historical and fictional books, including such titles as: "Clowning Through Life" (with Edwin Foy); "Old Post Bags"; "Murders Not Quite Solved"; "Paper Chase"; "Old Bowery Days"; "Schoolmaster of Yesterday" (with Millard F. Kennedy); "Weep No More My Lady"; "Bret Hart of the Old West"; "Theodore Roosevelt—Strenuous American"; "Steelways of New England"; "The Serene Cincinnatians"; "The Ringlings"; and "Young Telegraphers of the Civil War".

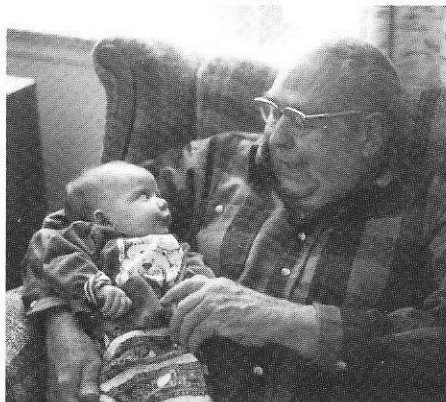
Harlow was a regular contributor to such magazines as Saturday Evening Post, American Mercury, Century, Collier's, and New Yorker. He also wrote various sections of the Book of Knowledge, the Book of Science, the Atlas of American History, and numerous encyclopedias. He died in New York City, November 17th, 1963.

W.H.S.



The Lock-Keeper's House

FOURTH-GENERATION "CANAL BUFF"?



Your Publisher entertains his *great* grand-daughter, Julie Elizabeth Raber of Sarasota, Florida, born July 18, 1996, shortly after his own eighty-first birthday. Another canal buff?

Incidentally, Your Publisher, after 100 issues of "AMERICAN CANALS" AND 25 YEARS, will soon be looking for another - Editor and Publisher to take over this job, permanently!

Any volunteers??