AMERICAN CANALS

BULLETIN OF
THE AMERICAN CANAL SOCIETY

BULLETIN NUMBER 83 Editorial Address—968 Chapel Road, Monaca, PA 15061 **NOVEMBER 1992**

President's Message

Those of you who didn't get to this year's International Conference on Historic Canals at Harper's Ferry, missed a real treat. Many thanks go especially to Dave Johnson and the Chesapeake and Ohio Canal Association; and to Tom Hobbs, Gordon Gay, John and Dennis Frye and all of the other canal enthusiasts in the National Park Service who led us on five exciting field trips and participated in the proceedings. Bill Shank was there and has more about our adventures elsewhere in this issue. Once again, the annual conference was proof of the tremendous value of the world's historic canal resources for parks and recreation. We learned a lot from each other and bolstered our enthusiasm and confidence in canal parks and preservation. Now, how can we transfer this enthusiasm to local planners and politicians?

Next year, in 1993, the International Conference will be on the Shubenacadie Canal in Nova Scotia.

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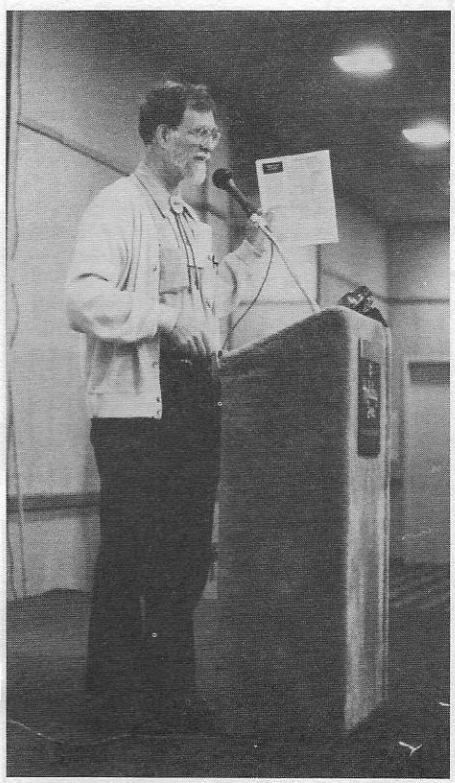

Bill Trout was "Em-Cee" at the Cumberland Banquet Tuesday evening.

INTERNATIONAL CANAL CONFERENCE AT HARPERS FERRY

The C and O Canal Aqueduct across the Conococheague Creek at Wiliamsport, Maryland. The upstream wall collapsed shortly before the canal was abandoned, and it was never rebuilt.

Eight-six canal buffs assembled at Harpers Ferry, West Virginia for the International Conference on Historic Canals, October 18-22, 1992. The five-day affair, held at the Cliffside Inn, was co-sponsored by the C. & O. Nat'l Historic Park (Sharpsburg, Md.) and the C. & O. Canal Association, (Glen Echo, Md.) Support was also provided by the American Canal Society and the Cuyahoga Valley Association. There was an "Early-Bird" visit to the town of Harpers Ferry and nearby C. & O. Canal Locks 33 and 34, on Sunday, followed by a reception with canal music by Edie Roudebush.

Monday morning sessions included history and development of the C. & O. Canal Park and problems involved in its maintenance. In the afternoon we visited the Paw Paw Tunnel, and several other points of interest at the west end of the C. & O. Canal. Dinner was provided at the Holiday Inn in Cumberland, with Bill Trout, President of the American Canal Society, as "Em-Cee" and Chris Brown of the National Park Service as speaker.

Tuesday morning the participants assembled at the Cliffside to hear about canal park developments along the C. & O.; the Virginia canals; and the Illinois and Michigan National Heritage Corridor. The afternoon field trip included visits to the ruins of the Canal Aqueduct and Lock

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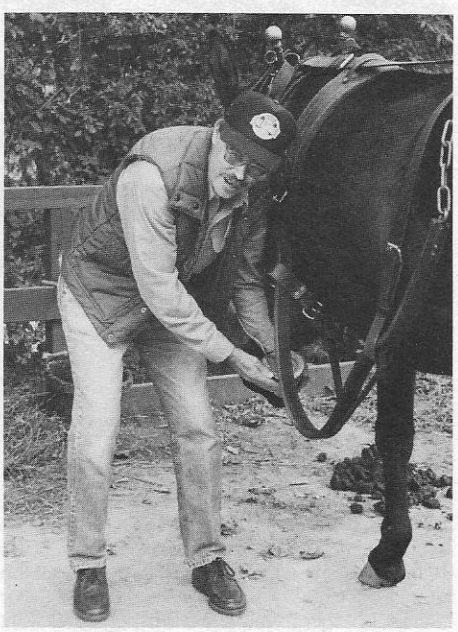

Charlie Derr demonstrates the procedure for putting new shoes on one of the mules at Great Falls.

American Canals

BULLETIN OF THE AMERICAN CANAL SOCIETY

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AMERICAN CANALS is issued quarterly by the American Canal Society, Inc. Objectives of the society are to encourage the preservation, restoration, interpretation, and use of the historic navigational canals of the Americas; to save threatened canals; and to provide an exchange of canal information.

Annual subscription to AMERICAN CANALS is automatic with A.C.S. membership. Send dues payment ($14 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.

President's Message

(Concluded from Page One)

This is a remarkable canal park with interesting locks, inclined planes, and very enthusiastic supporters who have for years been urging canal buffs to come visit. So set your sights on the Shubenacadie in '93!

Our Canal Parks Committee has taken on new life thanks to Elizabeth L. Hahn, who has agreed to chair the committee and also be our liaison on canal trails with the Rails to Trails Conservancy in Washington. Betsy is not only a recreation professional, but she is a member of the famous Hahn family, so she knows her canals! This is a very important ACS committee, with unlimited potential. Those interested in being part of this committee or working with it can write Betsy at 12715 St. Pauls Rd., Clear Spring, MD 21722.

Don't forget that several canal society indexes are now on computer disk, thanks to Bill Dzombak. I've been having a great time browsing through his indexes to the ACS, Indiana, Ohio, Pennsylvania and Virginia canal society periodicals.

Lastly, I'm pleased to report that James River Batteaux have made it into the big-time movies. When "The Broken Chain" appears on cable in 1993, watch the opening scene for four boats poled by canal buffs. It's set in "The Last of the Mohicans" country, but it was filmed on the lower James, in Virginia! Now all the film moguls will want batteaux and canal boats in their movies, won't they?

Have a happy holiday! Bill Trout

SOUTHERN CANALS

By Mark M. Newell
(Chairman, ACS Archaeological Committee)

The early contributions of southern canal technology may soon be coming to light as a result of projects completed and announced in South Carolina and Georgia. South Carolina has now opened its new $3 million museum devoted to the Old Santee Canal, Savannah, Georgia has announced a master development plan for the Old Savannah-Ogeechee Canal and Augusta, Georgia has announced a master development plan for the Augusta Canal.

The remains of the Old Santee Canal near Monck's Corner, S.C. were extensively excavated in 1988-89 by this author for the South Carolina Institute of Archaeology and Anthropology. The archaeological recoveries were so numerous that original plans for development of the area as a wildlife sanctuary were changed and a $3 million museum was planned around the discoveries. Exhibitry was designed by Museum Services of Gainsville, Fla. — the same company that produced exhibits for Disneyland and Universal Studios. The result is a "state of the art" presentation encompassed by a building featuring a three story tall glass wall overlooking a bluff above the canal. The town of Monck's Corner is some 30 miles from Charleston at Biggin Creek, a headwater of the Cooper River. This was the terminus of the canal which ran northwards for 23 miles to White Oak Bluff on the Santee River.

The canal was started in 1793 and completed by 1000 slaves and master craftsmen six years later. Early — and biased — historians claimed the canal was a failure since it made poor returns for its investors. They ignored the fact that it operated for over fifty years and was a great economic boon to upcountry planters and the Charleston business community.

The archaeological survey and excavation revealed the remains of a masonry tidelock, turning basin and three vessels. Perhaps the most exciting find — one of the vessels closely matched the dimensions of canal boats known to have been built by the canal company and local merchants. This holds out the possibility that the vessel may be an example of the earliest canal boats built in America. The remains of the vessel were left in a baulk of mud for temporary protection. It is hoped that the State's Department of Parks, Recreation and Tourism will permit excavation and study of the vessel before newly oxygenated water in the canal completes its decomposition.

In Savannah, Ga., the Chatham County Department of Recreation and Culture is planning to revitalize large sections of the 15 mile long Old Savannah-Ogeechee Canal. The canal, constructed in the early 19th century to bring Ogeechee river plantation cotton into Savannah, will be redeveloped as a nature trail for hikers, a biking trail and a canoe trail.

One or more of the locks may also be restored and an interpretive center may be built if funding allows.

"Several local groups have expressed an interest in funding a mile of the canal — this way we hope to be able to develop a large portion of the canal for different purposes," said Tom Golden, Head of the Department.

In Augusta, Ga. the Augusta Canal, built in 1845, is attracting attention following announcement of plans for a hydroelectric plant.

The ACS ENGINEERING DESIGN COMMITTEE has openings for a couple of additional members. All ACS members are welcome, though we are particularly interested in obtaining representatives from the canal systems of the states of Pennsylvania, Maryland, New Jersey, or perhaps one of the New England systems. Please send your applications to, . .

Terry K. Woods, Chairman
ACS Engineering Design Committee
6939 Eastham Circle
Canton, Ohio 44708

INTERNATIONAL CANAL CONFERENCE

The tour group visits Locks 45 and 46 by-passing Dam Number Five on the C and O canal.

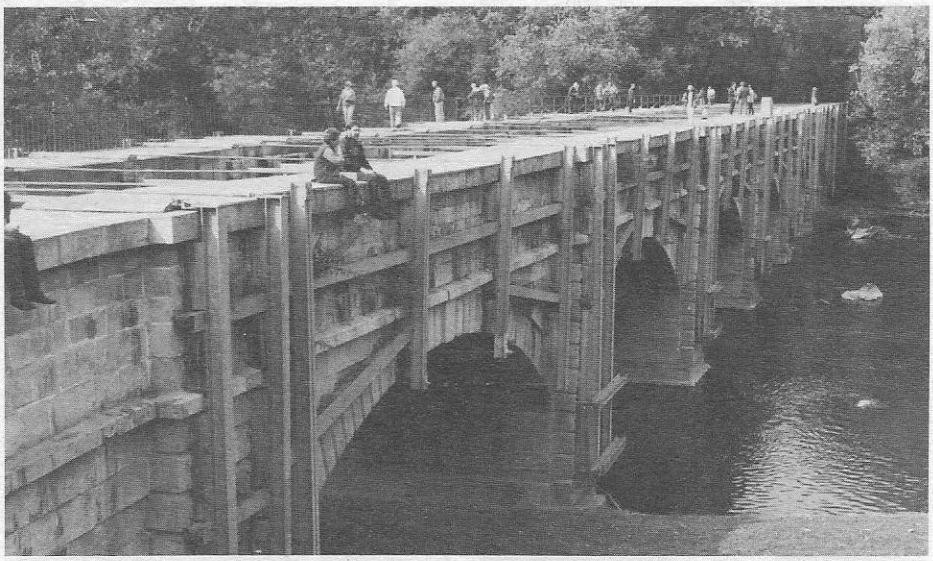
The International Canal Meeting attendees ride the canal boat at Great Falls, Maryland, back of mule power.

Members of the Park Service staff field questions on the operation and maintenance of the C and O Canal facilities.

(Concluded from Page One)

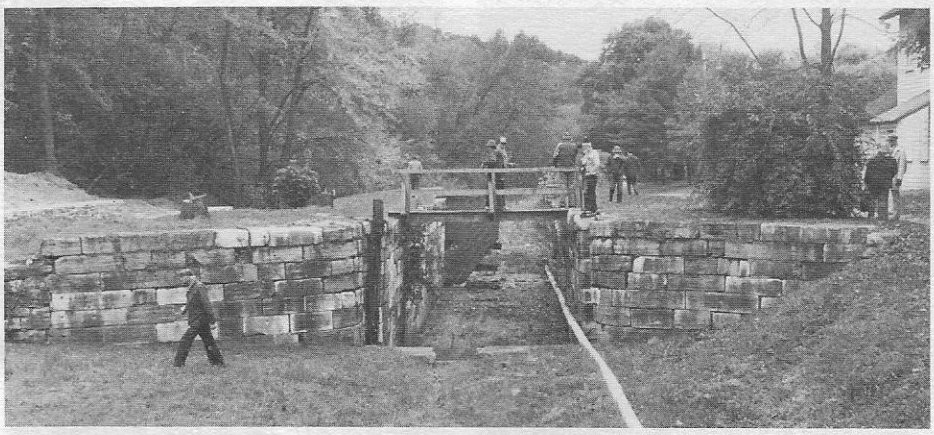
44 at Williamsport, Maryland, Dam #5 and Lock #45 and #46 (adjacent) as well as "Big Pool" and Fort Frederick, all west of Williamsport. Back at the Cliffside, the evening banquet was followed by a very popular "Show and Tell" program, chaired by John Frye, which lasted till almost midnight.

Wednesday morning the group heard an interesting discussion of the present day activities of the Ohio and Erie Canal Park by Rory Robinson of the National Park Service, followed by a talk titled "Canals in Canada" by John Bonser of the Canadian Park Service. Problems developing along the routes of the Indiana Canals were discussed by Robert Schmidt, President of the Canal Society of Indiana. We ate a box lunch that day at the Monocacy Aqueduct on the C. & O., followed by a tour of canal park facilities at Great Falls, Maryland and a canal boat ride back of mules. Dinner that evening was held at a near-by restaurant, where Tom Brock, Waterways Manager for the Stratford and Grand Union Canals of England, was the speaker.

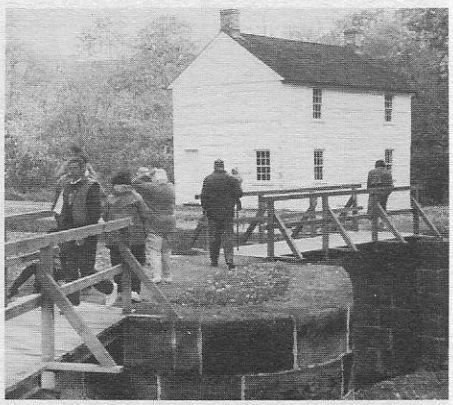


The Monocacy River Aqueduct on the C and O Canal. The masonry is in excellent condition and the Park Service is stabilizing the entire structure to keep it that way.

The meeting concluded Thursday morning with a tour of the Antietam Battlefield, (Sharpsburg, Maryland) led by John Frye. The weather was cool but pleasant for the entire five days, and everything was well organized and co-ordinated by Dave Johnson and his committee — a most worthwhile and enjoyable affair! (W.H.S.)



Lock Number 44 on the C and O Canal, east end of Williamsport, Maryland. This lock is being stabilized and the by-pass flume at the left is being rebuilt.



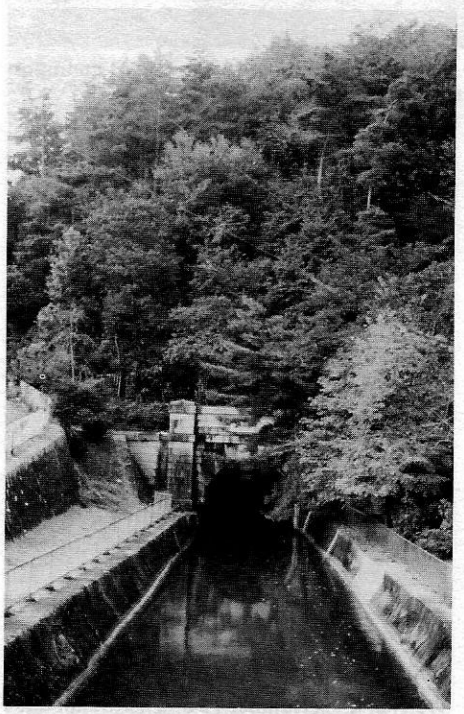
We visit Lock Number 75 and its rebuilt Lock House at North Branch near the west end of the C and O Canal.

JAPAN'S BIWA CANAL: ALL-PURPOSE WATER UTILIZATION

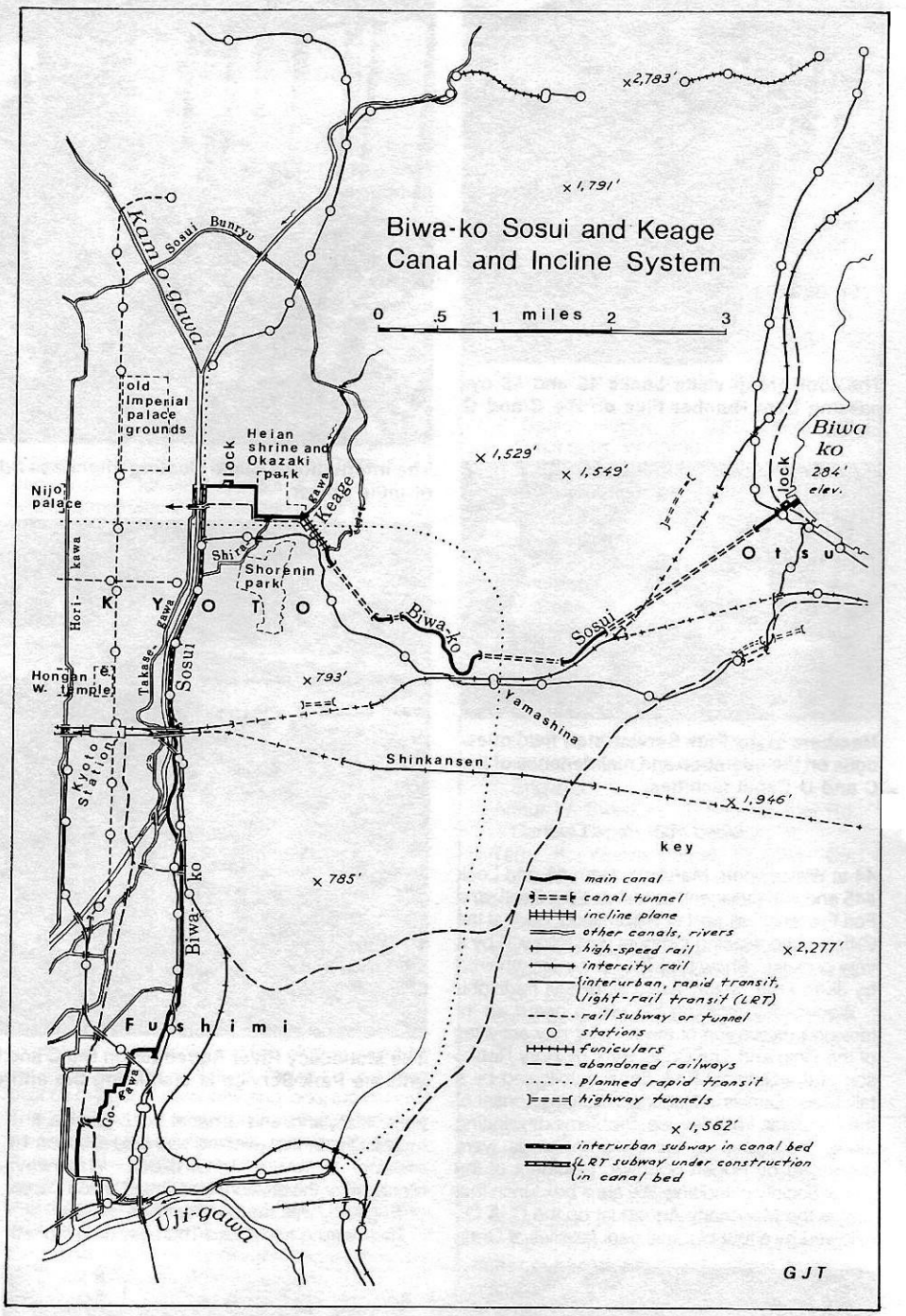
By Gordon J. Thompson (Edited by David Ross)

Several factors deterred navigation-canal development in Japan: the nation's late entry into the industrial era (Japan went right to work with railway development, having missed the canal-building era); topography typified by steep-sided mountains and short, rushing streams; and few shallowly-sloped inland river valleys. In addition, this island nation surrounded by navigable seas lacked incentive to develop inland canals. Water transportation was and still is more important in Japan than it is in most countries, but it is nearly all coastwise shipping. Nevertheless, a variety of canals did develop. In the coastal plains that accommodate the vast conurbations of Tokyo-Yokohama (the Kanto Plain) and Osaka-Kobe-Kyoto (the Kansai Plain), the Japanese widened and deepened streams and dug additional connecting links to create networks of sea-level waterways to bring goods from the shores into the cities. In a few inland locations, they canalized rivers by straightening, diking, and dredging. In the fortified cities, waterways were excavated to bring water to fill moats surrounding castles. For none of these were unique types of boats devised. To this day, man controls water through an extensive, comprehensive public works system of canals that channel water to rice paddies and to industries. These, still built anew or improved from time to time, often appear like North American canals, but navigation does not occur, and the bridges usually clear the water by less than a foot.

In only a few locations did the Japanese build the type of canal familiar to North Americans and Europeans to create cross-country waterways in directions not intended by nature. Remarkable among these is the 13.32-mile Lake Biwa Canal/Keage Incline facility near Kyoto. It is reminiscent of the C. & O. Canal, with its Paw Paw Tunnel, and the Morris Canal, with its inclined planes. No longer used for navigation, it continues in use and good repair for the other functions for which it was designed.



Looking west from the pedestrian bridge to the east portal of the third tunnel.



The Setting

According to tradition, nature created Biwa-ko (ko = lake), Japan's largest lake, with a mighty thrust of the earth's thin mantle when Mount Fuji erupted in June of 286 B.C. The size of Lake Geneva in Switzerland, 265-square-mile Lake Biwa drains a basin surrounded by mountains. With a surface elevation of 284 feet above sea level, it ranges as deep as 318 feet. Uji-gawa (gawa = river) drains the lake, dropping south, southwest, and northwest over an indirect course passing south of the city of Kyoto on its way to the Inland Sea at Osaka. A tributary river, the Kamo-gawa, enters Biwa River beyond Kyoto after passing through the heart of the city.

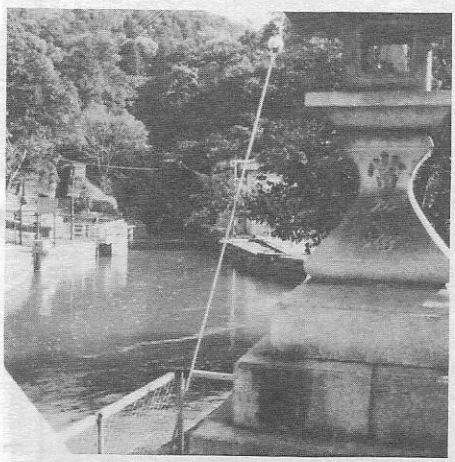
The lake's basin slices the volcanic spine of Japan's home islands. Forming a natural barrier across the large island of Honshu, for centuries it served as the frontier between civilization and wilderness occupied only by the aboriginal Ainu. This vast water supply lies tantalizingly close to Kyoto, but separated from it by the Hiei Sanchi Highlands — high ridges containing many peaks. Nature carved a narrow path through which the Uji River flows. This defile, indirect and containing canyons and waterfalls, is not conducive to transportation.

Kyoto, an old city, served as capital of feudal Japan from A.D. 794 to 1868. A cultural and religious center with no heavy industry, Kyoto was spared from bombing during World War II

because of its palaces, shrines, temples, art, and other antiquities. The light industry that exists is devoted to textiles, ceramics, and lacquerware, and is largely carried out in homes or very small establishments. After the Japanese established Tokyo as the new capital, commerce between the two cities began to grow, with the well-trampled path taking on great importance as a national road—the Tokai-do (Tokai = east seacoast; do = road) — that now lends its name to the populous coastal conurbation between Tokyo's Kanto region and Osaka's Kansai region. Samurai warriors, other travelers, and later ox carts journeying the Tokai-do found their way over the Hiei range through a steep course and the Otani Pass—a low point of about 574 feet elevation, second only to the Uji River's gorge. Otani was undoubtedly an ancient outlet for the lake. Over time, the city of Otsu grew as a stopping place on this national highway at the outlet of Lake Biwa into the Uji River.

After 15 years of construction, in 1879 an early railroad pierced the barrier over an indirect route making partial use of the valley of the tributary Yamashina River, but resorting to steep gradients, heavy cutting, and the pioneer Osakayama Tunnel, now a historic landmark. This formed a vital link in the Tokaido Hon-sen mainland railroad from Tokyo through Yokohama, Nagoya, Kyoto, and Osaka, to Kobe.

The entrance to the Lake Biwa Canal, looking east from a street bridge in Otsu. Lake Biwa is in the background. The guard lock shown is apparently no longer in use; the bridge abutment is from an abandoned railroad.



The west portal of the third tunnel. Gates to the reservoir and water treatment plant are shown at right.

The Biwa/Keage Project

In 1881 (14th year of the era of progressive Emperor Meiji), Kitagaki Kokudo, then Governor of Kyoto prefecture, asked a university engineering student to plan an energy-efficient transportation/power/irrigation project, taking water from Lake Biwa. Construction began in 1885, and the 1,500,000-yen project took five years to complete. The facility was rebuilt in 1912 to double the amount of electric power generated and to provide drinking water to Kyoto. Properly the Biwa Sosui (sosui = canal), on maps the project also has been called Biwa Canal, Otsu Canal, and Biwa Drainage. It seems best known, however, by the name of the inclined plane, called Keage. The student, Saburo Tanabe, ingeniously provided an efficient means of transportation, an all-weather, high-altitude supply of water for irrigation, a reliable flow of water for Kyoto's industrial and household needs, and a source of energy for conversion to electric power. The project consists of a 5.24-mile lake-level canal, a 0.35-mile inclined plane, a 1.12-mile Kyoto city-level canal, and a 6.61-mile canal alongside the Kamo River—13.32 miles in all from the Lake Biwa shore in Otsu to the Uji River in Kyoto's Fushimi ward.

This project, which put water to use in all its essential ways, was completed in 1890. The Kyoto municipal government owns the canal and incline, and leased the navigation rights to private entrepreneurs.

Lake-level Canal

Mr. Tanabe took advantage of the natural contours to hold level to the extent possible with minor excavation across the Yamashina valley in the middle of the mountains, but had to pierce four intermediate ridges with tunnels bored through rock. Reckoning from the east, the tunnels extend respectively 8,038, 2,067, 328, and 2,854 feet in length, accumulating to 2½ miles underground. The canal is approximately 28½ feet wide at the water line, and its banks are paved with close-fitting stones to thwart erosion, while bridges are of masonry. This canal drops eleven feet over its entire length—on an average 0.04 percent gradient—to assure rapid flow at the volumes wanted. Ever conscious of the environment, the Japanese lined the canal with cherry and maple trees that have become favorite haunts for fireflies. Where the lake-level canal reaches the heights above the city, the project provided a large reservoir and water treatment plant for the public water supply, and a hydroelectric power plant. The canal ends at an inclined plane.

Wooden pointed-prow barges (small by U.S. standards) carried cargo and passengers, floating with the canal's current, passing through the tunnels (like Paw Paw Tunnel on the Chesapeake & Ohio Canal in Maryland), and riding the incline (as on New Jersey's Morris Canal). The westward boat trip with the current consumed one hour. The reverse trip, city-to-lake, required poling of the boats, and took two and one-half hours. Although what could be regarded as a towpath follows the

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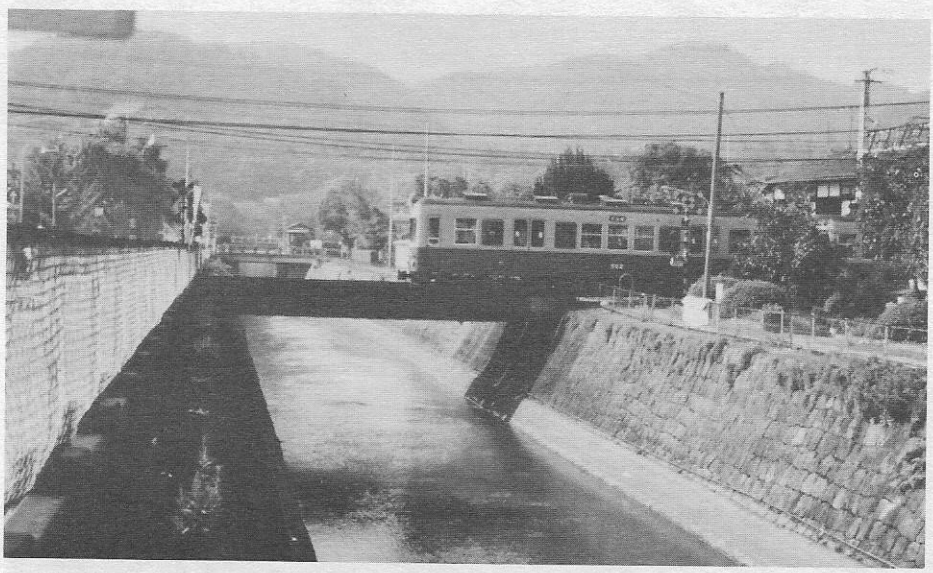
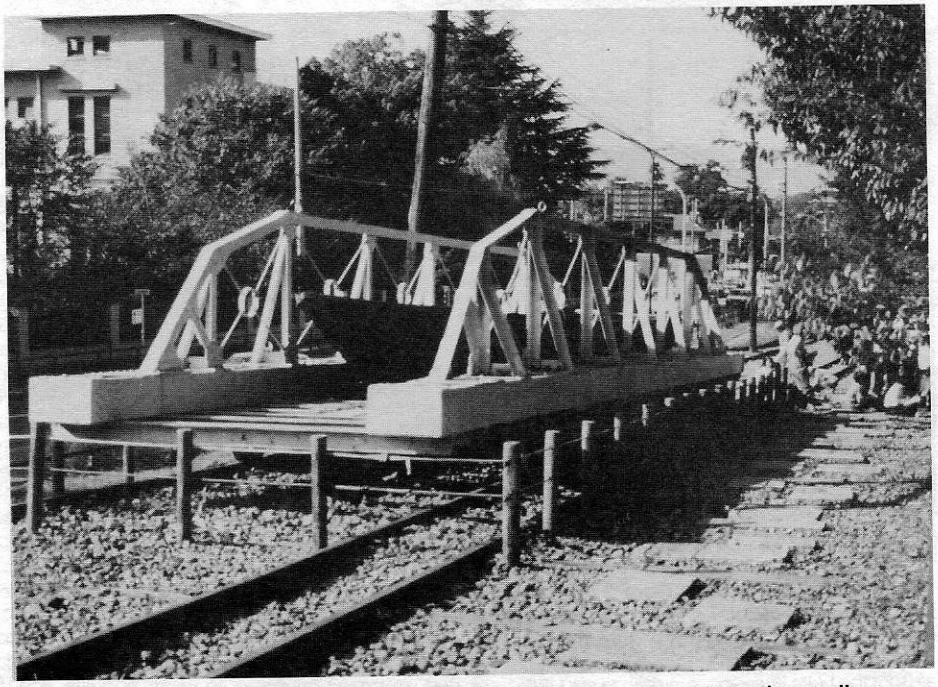


Looking west from the vantage point used for the previous photograph, showing the light-rail transit train crossing to the Midera station. The first mountain barrier is in the background. Regulator gates can be seen beyond the second bridge.

JAPAN'S BIWA CANAL



Looking down the Keage Incline, showing the bridge-type trusses on the cradle car.

(Continued from Page Five)

open canal, it does not continue through the tunnels, and manpower was more abundant than the animal power—as evidenced by wide use of man-powered "rickshaws" and man-powered railways throughout Japan in those days. Dim electric lights lit the tunnels, and the boatmen carried torches.

At the top of the incline is one of Japan's oldest and best-known hotels, the Miyako Hotel—now in the Westin chain—which commands a fine panoramic view of Kyoto, and which uses some of the water to irrigate its gardens. At other places along the canal, water is drawn off to flood rice paddies on terraced hillsides.

Also atop the incline, the project detoured water into a sluice that went by a small ditch and short tunnels to a small reservoir, then gradually dropped down the hillside contours. This Sosui-Bunryu (branch canal) leveled and intercepted the Shira-gawa, the Takano-gawa (a major branch of the Kamo River), and the Kamo River, then turned due south as the Horikawa Canal alongside Kyoto's oldest streetcar line to the Kyoto railroad station. This brought water to Nijo-jo Castle and Nichi-Hogan-ji gardens. It continued south essentially as a drainage ditch to the Kamo River. This stonewall-lined branch canal was not navigable and, in fact, drops over several small cascades.

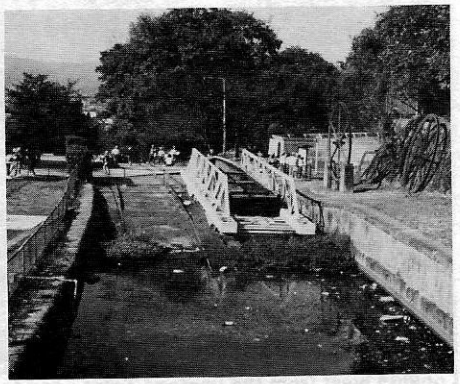
Keage Incline

From the end of the lake-level canal, an inclined plane employed counterbalanced cradles to haul empty boats up and let full ones down to the city level. The Japanese language contains no precise equivalent of "incline;" keage means "kick-up." However, in more recent times, English has been adopted for such terms, but altered to fit Japanese phonetics—hence inkurain for "incline." Keage survives, as the name of the Kyoto neighborhood near the incline and of the nearby light-rail transit station.

The double-track incline is laid with rails spiked to 8-foot, 3.7-inch gauge. The cradle wheels have double flanges, like pulleys. The incline descends 118 feet in a length of 1,820 feet on a gradient of 6.48 percent; all of its mechanism was underground and was probably water powered in keeping with the efficiency objective. In any event, gravity did most of the work, inasmuch as boats loaded with lumber, coal, farm products, and fish for the city went down and empty ones went up. The large-diameter wheels on which the cable turned are on display at the top of the incline. The incline cars are equipped with a pair of railroad trucks set to the broad gauge. For strength, the designers built the cradle car bodies like truss bridges. The excess water runs down a chute alongside the incline and, at the foot of the incline, joins runoff from the power plant in a boat basin.

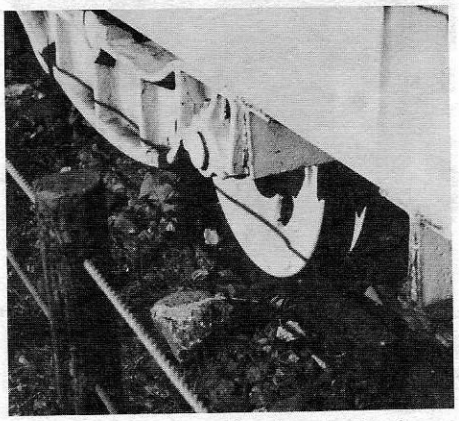
City-level Canal

Below the incline, the Lake Biwa water flows into a network of shallow canals. Boats could unload their cargo at docks, or continue to most Kyoto neighborhoods. The water also flows into or is pumped up to level-controlled moats that surround castles, palaces, shrines, temples, royal gardens, and public parks, as well as furnishing water for their pools and ponds.



The top of the Keage Incline, showing a typical canal boat in the cradle.

At approximately 155 feel elevation, the Lake Biwa Canal continues west, north, and west again 1.12 miles to the Kamo River. Part of this section forms the perimeter of Okazaki Park and Zoo, the Art Museum, the Traditional Industry Museum, and the ornamental grounds of the Heian Jingu shrine (itself built at the same time as the canal, taking advantage of the new water supply). The first quarter of this alignment incorporated the Shira River, and the remnant of this river was canalized as a branch to the Kamo River. Just before the juncture with the Kamo River on the main canal, a lock contends with the varying rates of flow of the river. The builders dammed the river here to form a pool. On the other side of the river, the smaller Takase-gawa Canal followed the river's right bank, bringing water to Kyoto's hotel and retail district. City merchants dipped water from sluices with long-handled wooden cups to sprinkle on the pavement as a means to hold dust down in front of their shops; other residents similarly dipped water for their vegetable and flowers gardens. Like the Hori-kawa Canal, this canal was not navigable. South of the railroad station, the Takase-gawa Canal crossed the Kamo River on an aqueduct, and had its water supply recharged from the Lake Biwa Canal, then carried water south to industries in Kyoto's Fushimi ward, famous for distilling fine sake. More recent channeling of the Kamo River for flood control removed the aqueduct. Between the lock and the Kamo River, the Lake Biwa Canal turned southward alongside the river.



Truck of cradle car, showing double-flange (pulley-type) wheels.

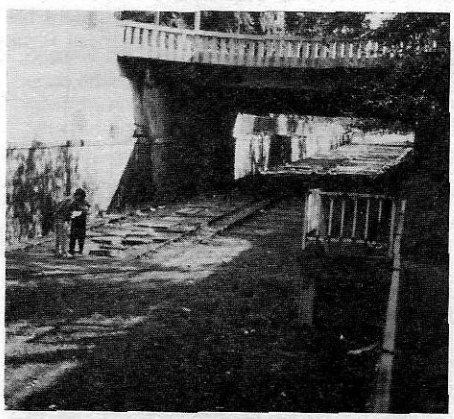
Kamo-gawa Section Canal

Proceeding south parallel to the Kamo River along its left bank, the Lake Biwa Canal continued to carry a large volume of moving water. Like the Delaware & Raritan feeder canal bringing water to Trenton, the canal brought an abundant water supply to power or cool industrial equipment in Fushimi ward, where the canal divided to reach as many sites as possible. This working water went through small sluices predominantly to assist in the manufacture of cloth, and into the Kamo River where its flow was vital to the silk industry, which washed bolts in the river and dried them on the stone-paved banks. With its last strength, the water from Lake Biwa powered an electricity generating station before reaching a canalized diversion of the Uji River at Fushimi port. The last, zigzagged section of the canal carrying Lake Biwa's water is named Go-gawa (simply, "man-made river"). Until modern sewer systems were installed, the fast-flowing water also carried sewage away.

Further Transportation Development

A streetcar line climbed the slope alongside the incline to reach the Miyako Hotel about 1895, making the incline redundant for passenger use. After the university student's project had served for a bit more than a decade, its contribution to transportation became less direct. An interurban trolley line surmounted the topographic barrier in 1912, running alongside and occasionally in the middle of the Tokai-do pavement, but using a short tunnel at the summit to gain advantage over the road. The Lake Biwa Canal project supplied the electricity to run the trolley cars. Subsequently, in 1921, the Japanese National Railway relocated its Tokaido main line eastward from Kyoto on a direct route to Otsu through a pair of tunnels—the Higashiyama tunnel and the Second Osakayama Tunnel—with a new station between at Yamashina. Funicular railways have climbed both flanks of 2,783-foot Mount Hiei since 1925 (from Yase-yuen) and 1927 (from Keburu Sakamoto). Boating of goods and people on the canal diminished and eventually vanished.

Still later, the Shinkansen (what we call the "bullet train") penetrated the mountain barrier through its longer, lower Higashiyama and Otowayama tunnels. Then, the Meishin (or Nagoya-Kobe) Expressway joined the other

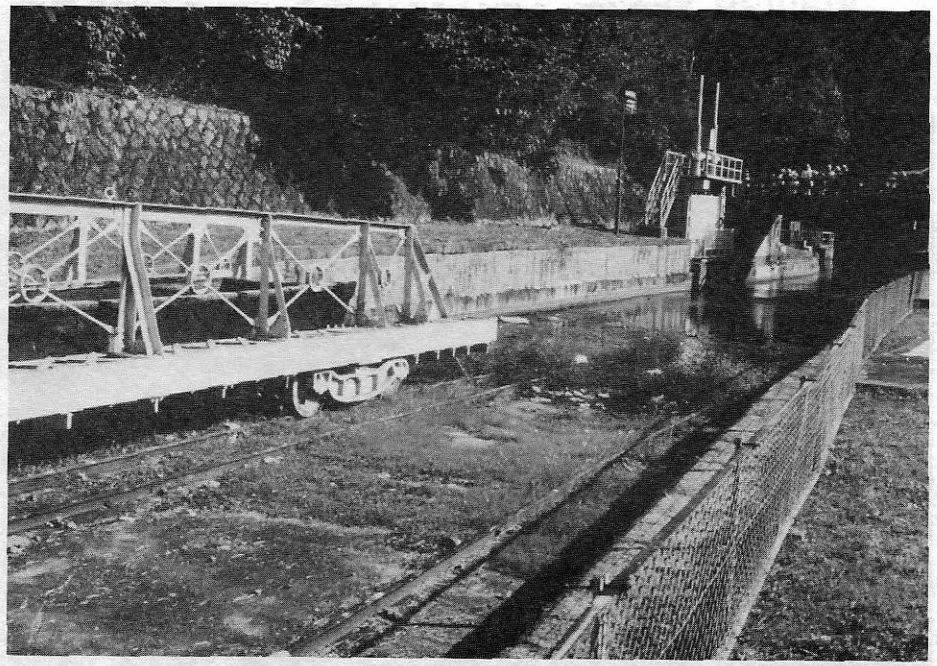


Looking up the Keage Incline from just above the city-level canal. Tracks at the bottom have been covered with fill for the convenience of hikers.

transportation arteries through this narrow corridor. Also, to put the energy of the lake's water to further use, a hydraulic tunnel was bored from the Uji River's source to the river at Uji, where it drives a modern power plant. The river is dammed in the gorge to drive an additional power plant. More recently, in 1974, the Japanese National Railway completed the Kosei-sen railroad (and its own tunnel), skirting the west short of Lake Biwa, and most recently, a lesser highway with tunnel was built in the same vicinity. Through this busy Otsu-Kyoto passage flows much of Japan's commerce.

The canal continues in all its intended uses except carrying cargo and passengers. The municipality maintains the canal property in park-like condition. The incline remains in place, with a wooden boat in each of the two cradles, although the cable has been removed. While it is doubtful that the designers envisioned recreational use initially, it occurs in the simple forms of picnicking on the canal banks and incline grounds, hiking along the berm, swimming, and fishing.

Although the streetcar line was replaced by buses, the interurban trolley line has evolved as a modern light-rail transit line, a branch of which crosses the canal at Midera near the intake from Lake Biwa. The Keihan Tetsudo (Kyoto-Osaka



The Keage Incline, showing the gates for the power plant intake. The railings on the cradle car have evidently been rebuilt.

Electric Railway) usurped much of the southward continuation of the canal along the left bank of the Kamo River for a relocation of its interurban line from Osaka off the canal berm into a subway south of Sanjo, much as was done with the bed of the Morris Canal through Newark and the Erie Canal through Rochester. A joint railway company is currently constructing a subway in the canal remnant north of Sanjo to bring the Keifuku light-rail transit lines from the north to the heart of the city. Kyoto's fifth subway line, under construction, will also pass through the intermountain area traversed by the Lake Biwa Canal.

Meanwhile, an unending procession of school children examines the Lake Biwa Canal and Keage Incline for inspiration. The young people observe a 101-year-old successful public works project demonstrating how man and nature can coöperate.

Clever Mr. Tanabe deployed Lake Biwa water in every imaginable way. Governor Kokudo must have been pleased.

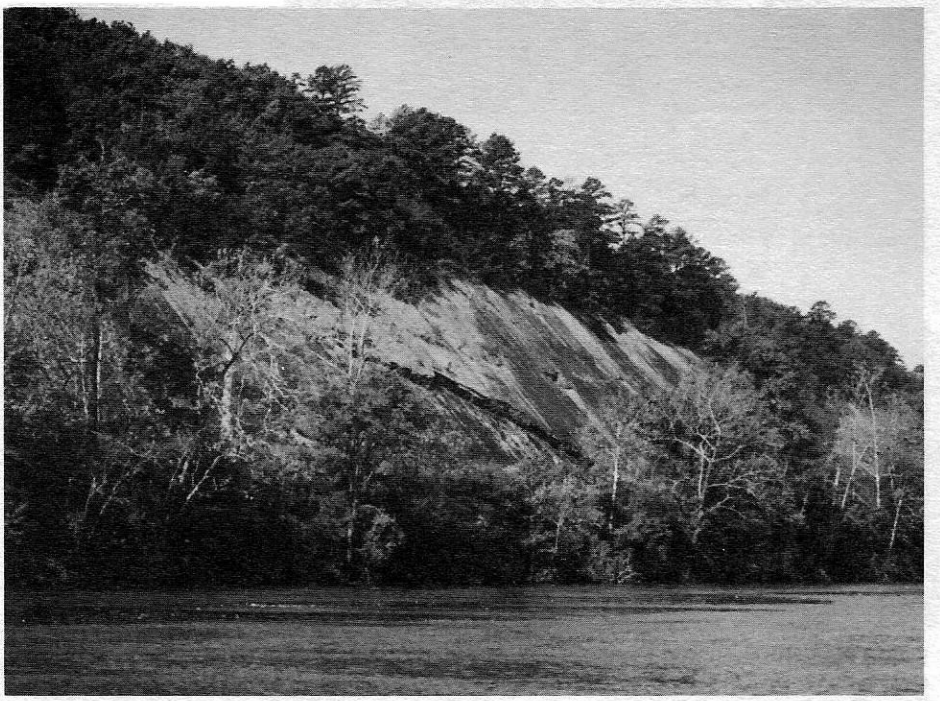
(Gordon J. Thompson, 32 Highgate Avenue, Buffalo, NY 14214, is an Urban Transportation Planner and Consultant.)

Those interested in doing further research on the Biwako Canal are referred to the Canal Society of New Jersey's *TOWPATH POST*, Summer 1974 (whole issue), written and illustrated by Bill Trout which describes the canal as it was nearly 20 years ago. The bibliography includes a list of books on the canal in Bill Trout's library, which need to be translated from Japanese! (For further information, contact Bill Trout at 35 Towana Road, Richmond, Virginia 23226.)

A pedestrian bridge over the Lake Biwa Canal at Misaragi in Yamashina, now a precinct of Kyoto.

THE ARKANSAS TRAVELER AFLOAT

By David F. Ross

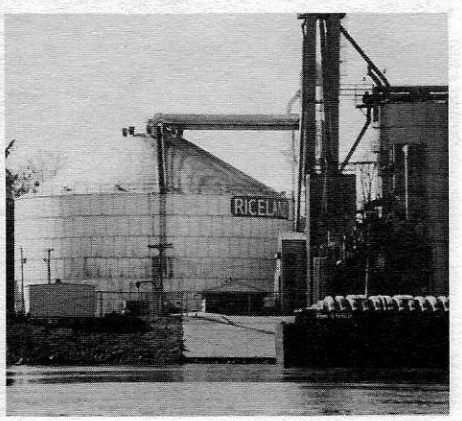


Above Little Rock, Ozark mountain scenery takes over.

The political dimension of American waterway development is frequently commemorated in the naming (and renaming) of locks and dams. Just in the recent past, for example, such nonpolitically designated structures as Aliceville L&D (on the Tenn-Tom), Warrior L&D (on the Black Warrior), L&D 26 (on the Mississippi) and Gallipolis L&D (on the Ohio) have been renamed to honor politicians from their respective areas. There is probably no other agency of the executive branch which has been as successful as the Corps of Engineers in developing a symbiotic relationship with Congress, and the large number of Corps-built-and-administered facilities named to honor politicians is an apt expression of this intimacy. The waterways themselves, however, have largely remained outwardly aloof from the political influence. Wags may have made reference to "Clinton's Ditch," but it was officially the Erie Canal, and that precedent of employing geographically informative rather than personally honorary names for waterways has been followed almost without exception, from the Ohio and Erie, through the Panama, down to the Tennessee-Tombigbee. Even the St. Marys canal is named for the river, not for the lady.

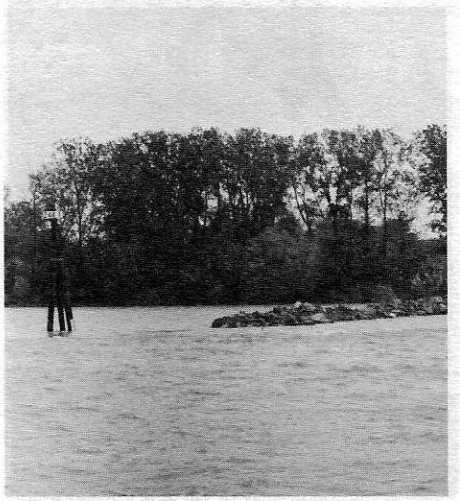
Within the Corps of Engineers, technology, economics, and politics are so tightly interwoven that it is usually impossible to identify any particular action or recommendation as uniquely an expression of one or another. In those rare instances, however, where the Corps and Congress part company, with Congress voting to fund the construction of a waterway over an adverse recommendation from the Corps, we may be sure that the waterway in question is peculiarly political in nature. Even such waterways, however, tend to remain nomenclaturally chaste. An outstanding example is the canalized Upper Mississippi, which by rights should be the Herbert Hoover Waterway, but is not. The one exception to this rule is the McClellan-Kerr Arkansas River Navigation System, commonly but improperly and inaccurately known to boaters as the Arkansas River. (Publisher's Note: In view of the attention focused on Little Rock in the recent presidential election, would it be fair to rename this system: "The NEW Clinton's Ditch"??)

The Arkansas River was navigated by steamboats as early as 1820, with navigation reaching as far as Little Rock by 1822, and Fort Gibson, near the present site of Muskogee, Oklahoma, by 1827. Eventually, at least one steamboat (the snagboat *Wichita*) reached as far as 65 miles above Tulsa. Navigation was difficult and dangerous, however, because of shallow water except during seasonal floods, shifting channels due to heavy siltation, and snags. As elsewhere, river traffic declined rapidly as soon as a more reliable alternative became available through the expansion of the railway system. Catastrophic flooding, especially in 1833, 1844, 1876, 1877, 1912, 1927, and 1943, kept alive interest in river improvement on the Arkansas, but support for improvements which included navigational development was difficult to muster. Such as it was, it came mainly from industrial development promoters in the new state of Oklahoma (admitted to the Union in 1907), who conceived of cheap river transport as a locational attraction, and from farming interests in Arkansas, who perceived themselves as victims of a railroad monopoly.



Agricultural commodities constitute the principal freight carried on the Arkansas.

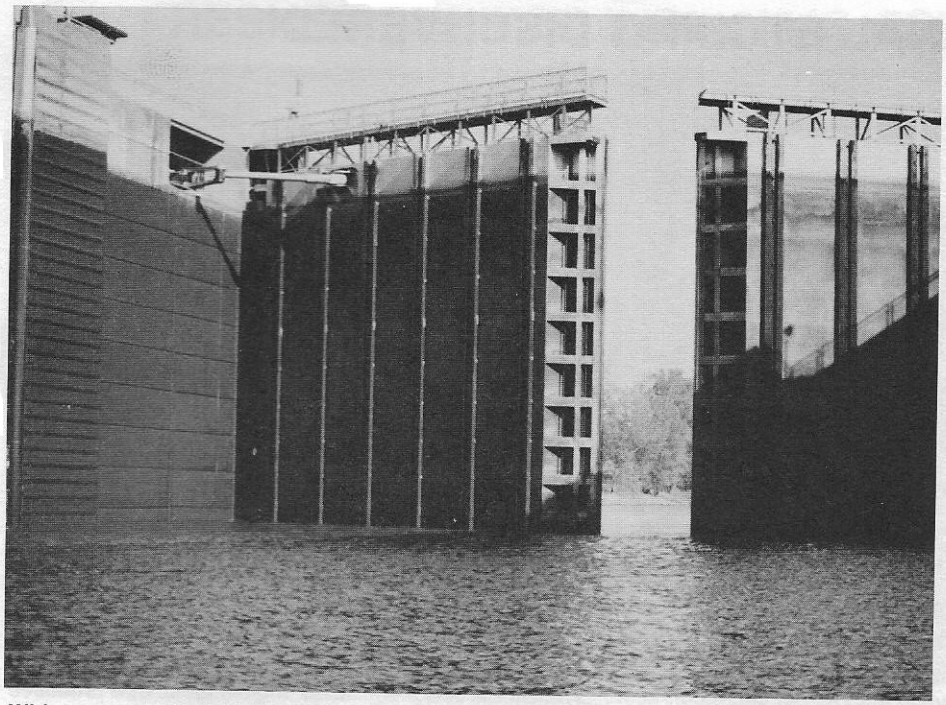
In 1928, the Corps was directed by Congress to undertake a study of the feasibility of bringing the Arkansas River under control. The study, completed in 1935, concluded that the annual operating costs of navigational improvements would exceed the benefits in freight cost savings by a ratio of almost 2 to 1. A second survey was begun in 1939 and completed in 1945. This span of years is significant because it brackets not only the 1943 flood but also the 1942 elections of Robert S. Kerr as Governor of Oklahoma and John L. McClellan as Senator from Arkansas. When the completed survey was forwarded to Congress in 1945, it carried a mixed endorsement from the Board of Engineers for Rivers and Harbors. The Board recommended that its flood-control proposals be effected immediately but that its navigational proposals be deferred indefinitely. Although the estimated cost-to-benefit ratio was considerably more favorable than that of the earlier study, it was still greater than 1. On this occasion, however, Congress voted to overrule the Board, and in 1946, President Truman signed into law a bill authorizing construction of the Arkansas River Navigation System.



Rock jetties are a common feature of the Arkansas. Sometimes submerged, they can be hazardous to the unwary.

As many advocates of civil works projects have learned to their sorrow, however, congressional authorization is a long way from the end of the struggle. Rather than meat on the table, it is only a hunting license: the real feast does not begin until Congress appropriates funds. In the case of the Arkansas, that took another 11 years. In the meantime, in 1948 Kerr joined McClellan in the Senate, and went on to become Chairman of the Public Works Subcommittee for Flood Control and Rivers and Harbors. The political waters that would eventually result in a nine-foot channel were slowly but implacably rising to a crest. Construction began in 1957, and at the end of 1970, the waterway was an operational reality.

At $1.2 billion, the McClellan-Kerr Arkansas River Navigation System was the most expensive project ever undertaken by the Corps of Engineers until it lost this honor to the $2 billion Tennessee-Tombigbee Waterway, completed in 1985. As an economist, I am aware that the results of



With a normal lift of 54 feet, Dardanelle Lock is the highest, and backs up the largest lake.

cost/benefit analyses depend overwhelmingly upon arbitrary assumptions, which in turn depend upon the nature of the result desired by the analyst. I therefore refrain from venturing an opinion as to whether the taxpayers were well or poorly served by those stewards of the public purse who acknowledged the leadership of Robert Kerr and John McClellen. Whether it honors or disgraces their memories, the cost has been sunk and the waterway is there. As the voting public, we need to worry about future river development projects; as the boating public, our mission is to cruise what we have.

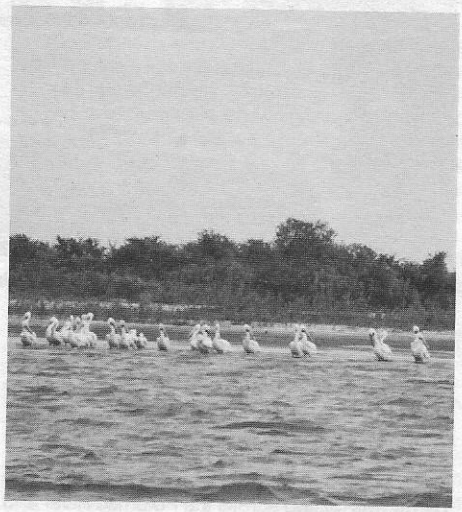
The waterway begins at Mississippi River mile 598.1, the mouth of the White River. It follows the White for 10 miles to the Arkansas Post Canal, which spans the 9 miles from the White to the Arkansas River. It then follows the Arkansas for 376 miles to its confluence with the Verdigris River, which accounts for the last navigable 50 miles, ending at Catoosa, Oklahoma, which serves as the Port of Tulsa. Along these 445 miles are 17 locks and dams, an unusual concentration for a modern waterway. This is no doubt a partial explanation for the high cost of construction. Another is the extraordinary number of jetties, wing dams, and similar structures needed to control the estimated 100 million tons of silt that descends the waterway each year, constantly striving to outwit the Corps and foil the navigation interests by depositing instant sandbars across channels. The structures accomplish their purpose admirably, but constitute a hazard to recreational boaters accustomed to venturing outside of buoyed 9-foot channels. They are well marked and avoidable if care if exercised; between them can often be found placid harbors with sandy bottoms and beaches.

Pine Bluff, Little Rock, Russellville, Ft. Smith/Van Buren, Muskogee, and Tulsa are the principal urban concentrations along the waterway. Boaters requiring supplies or longing for the bright lights and fast living of the city can go ashore at marinas in the vicinity of the first three and get to town by cab. The Goose Harbor Marina in Van Buren is right in town, within walking distance of all attractions. No access for boaters exists at Muskogee or Tulsa, and the so-called Visitors' Center maintained by the Corps of Engineers adjacent to the lock at Russellville provides no dockage for boaters.

In the vicinity of Little Rock, the scenery changes from Mississippi Delta to Ozark Mountain. Above Russellville, the river becomes a chain of lakes, of which the largest are Lake Dardanelle in Arkansas and Kerr Lake in Oklahoma. The uppermost 50 miles, where the waterway follows a straightened version of the Verdigris River, is the narrowest and arguably the least scenically alluring.

Fuel is available at convenient intervals until you reach the upper end of the waterway. Applegate Cove Marina, at the lower end of Kerr Lake, is the last refueling opportunity. From there to the head of navigation and back is 210 miles, so be sure of your cruising range before you venture much further.

(The author, David F. Ross, is Chairman of the ACS Navigable Canals Committee.



Great flocks of white pelicans make their summer home on the Arkansas.

BOOK REVIEW

Russell Bourne: "Floating West", (New York, N.Y.; W.W. Norton Co., 1992.)

Reviewed by Denver Walton

The story of New York's Erie Canal and its contemporary waterways has seldom been told in a manner as readable as in "Floating West". The author is never boring and sometimes surprising as he details the towpath canal era.

Although the main theme of the book deals with Clinton's ditch and its successors, Mr. Bourne reviews some of the early canal attempts in the U.S., some successful, some not. We learn of Elkanah Watson, who toured Europe's canals, viewing the various means of lifting boats and who was determined to create a passageway westward to the Great Lakes.

Mr. Bourne touches on the plate tectonics that created the various mountain ranges and left us with the handy Mohawk Valley, which enabled the Erie Canal to by-pass the Appalachian barrier.

To prepare the reader for the actual construction of the Erie Canal, the author takes us back to the Revolutionary War days and reviews the Mohawk Valley conflicts with the Iroquois and the British Army.

Several sections in the book provide us with excellent photographs, diagrams and maps, many of them not printed before.

Eventually we came to Clinton, who, more than anyone else, encouraged New York State to build the canal. The antipathy of Martin Van Buren is revealed, but he finally threw his weight behind the canal and the bill was passed in 1817.

We learn much of the building of the canal and what life was like along the waterways, such as the "humiliation" of having to lie down on the roof of the boat while passing a "low bridge" to the unbelievably uncomfortable sleeping arrangements.

Competitive parallel canals were built but none ever made money like the Erie. The Appalachians were the main barrier, and the Portage Railroad, Pennsylvania's solution to the mountain, was a constant problem. One of the most successful canals was the Chesapeake and Ohio, but it never made it across the mountain despite plans for a four-mile tunnel to connect with Pittsburgh.

The canals that remain today, especially the New York State Barge Canal, are largely used by recreational boats.

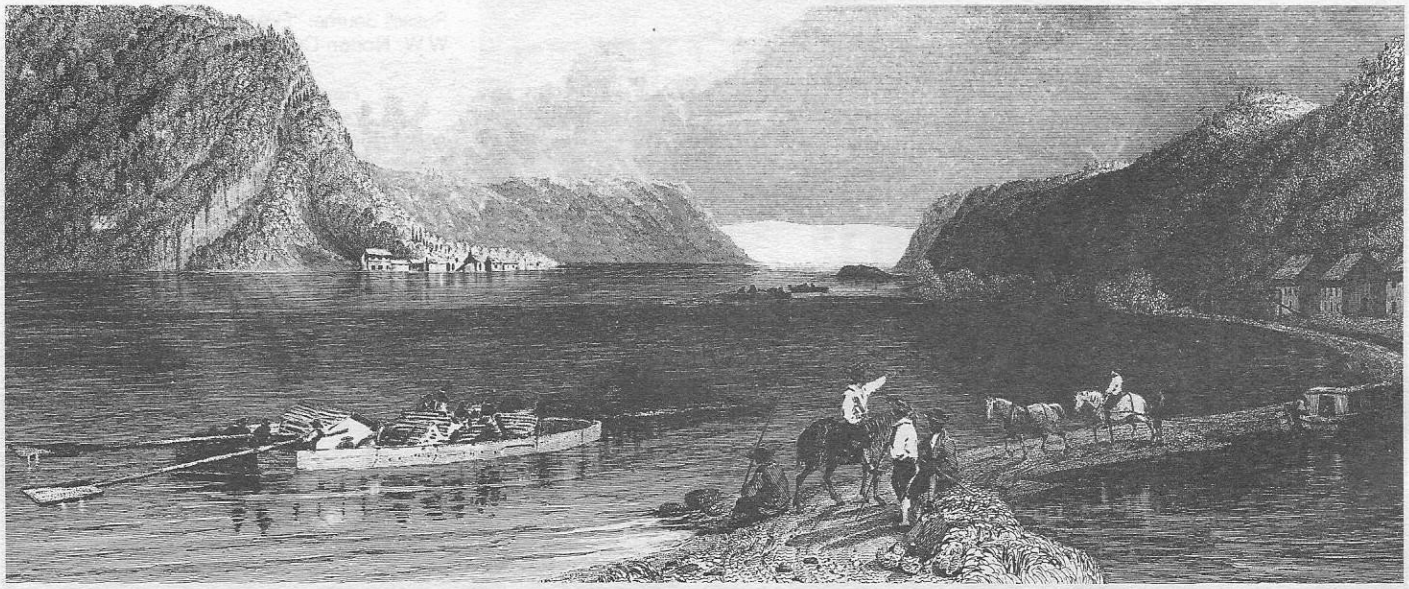
In conclusion, the author states that "By rediscovering the evocative magic of canals and the mythical people who created them and worked along them, Americans have an opportunity to reclaim a vital connection with the water-land of their birth". This is certainly true in "Floating West", for beginners and experienced canal buffs as well.

"Floating West" costs $24.95 and may be ordered through the publisher, W.W. Norton & Company, Inc., 500 Fifth Avenue. New York, N.Y. 10110. (Shipping costs not known.)

Chicago, Nov. 2, 1992: The Canal Corridor Association announced today that a part of the Water Resources Development Act of 1992 will provide a funding mechanism for capital improvements to the Illinois and Michigan Canal National Heritage Corridor, thanks to Congressman Bill Lipinski.

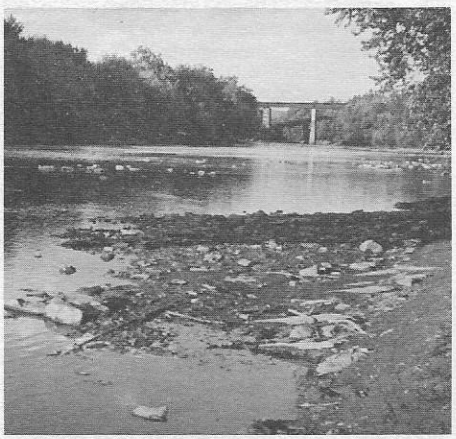
Canal Corridor Association President Jerry Adelmann said, "For years we have sought to secure federal dollars to match the local commitment to preserving and revitalizing the heritage of our region."

RARE CANAL ETCHING DISCOVERED



The above print from a steel engraving by William H. Bartlett was obtained recently from Hardy Kruger of Colchester, Vermont. The original caption for the picture reads: "View on the Susquehannah, at Liverpool, 1842." William Bartlett is the same English artist who produced the famous drawing of the Flight of Locks at Lockport, New York, on the Erie Canal. He came to America to sketch American scenes in 1836. I recognized this view immediately as having been made by Bartlett on the Susquehanna Division of the Pennsylvania Canals at my ancestral home of Liverpool, Pa. It shows arks and rafts on the river, as well as a canal packet boat approaching town from downstream. Liverpool was the home of my Great-Great-Grandfather, Michael Shank, who built the first canal boats north of Harrisburg (Bill Shank).

LOST CORNER, VIRGINIA, AND THE C&O CANAL.



Photo, made by W.R. Smith in 1941, of the remaining keel and ribs of canal barge just below the C. & O. Aqueduct across the Monocacy River.

In the summer of 1941, when the Monocacy River was low from a drought, Walker R. Smith delivered some sacks of grain apportioned from the Smith family grist mill in Doubs, Maryland, to Harry Talbott. Talbott met Smith at the C&O Canal aqueduct where the Monocacy River empties into the Potomac River.

While wheeling the sacks of grain across the aqueduct, Smith was distracted by the remains of a barge on the eastern bank of the Monocacy River just below the aqueduct. A lifelong photographer, Smith snapped a photograph of the barge's skeleton and immediately questioned Talbott, who was at that time in his eighties, of its origin.

Talbott had lived along the canal all of his life and described the activity of this particular barge. He stated that the barge began from the Virginia side of the Potomac River at a small community called Lost Corner in Loudoun County, Virginia. Lost Corner was surrounded by farms.

Sacks of grain were loaded onto the barge. The barge was floated across the Potomac River and skillfully maneuvered into the mouth of the Monocacy River.

While the barge was anchored to the eastern shore of the Monocacy River just above the aqueduct, the men of the barge shouldered the sacks of grain up the river bank and unloaded their stock into the grain house along the canal. This was obviously a strenuous task. Carried by the canal barges, the grain made its way to Georgetown to be manufactured into flour.

THE GHOST OF THE SANDY & BEAVER

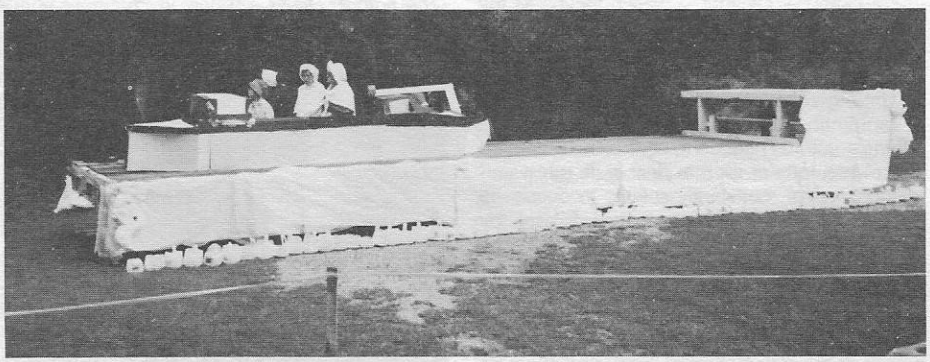
"Your Annual Date with a Ghost" is a pageant presented each Autumn by the Sandy and Beaver Canal Association and the East Liverpool (OH) Historical Society. The pageant is presented at Sprucevale, a ghost town in the Little Beaver Creek valley, once a minor "boomtown" on the S and B Canal.

Five local legends are portrayed, including the story of Gretchen Gill, daughter of Edward Gill, a canal engineer, who died during the construction of the canal and was entombed briefly in Lock 43 of the S and B.

The pageant concludes with the legend of "Jake, the Lockkeeper" who died while fulfilling his profession and whose ghost may be seen carrying his lantern at certain times of the year.

The Sandy and Beaver Canal was completed in 1848 to connect the Ohio River at Glasgow, PA, with the Ohio and Erie Canal at Bolivar, OH. Its engineering works included an aqueduct over the Tuscarawas River, two tunnels at the summit level, and 90 locks, many of which, on the Eastern Division, are very well preserved. The canal operated for only a few years, much to the dismay of the local farmers who invested in it.

The S and B Canal Association is a relatively new group and has 63 family members. Information may be obtained from Thomas Miller, Treasurer, RD 2, Box 111, Georgetown, PA 15043. DLW



The Sandy and Beaver Canal Society presents the legend of Jake the lockkeeper. Sandy and Beaver Lock #42 is in the left background.

FRESHET STRIKES INDIANA'S CENTRAL CANAL

by Robert F. Schmidt

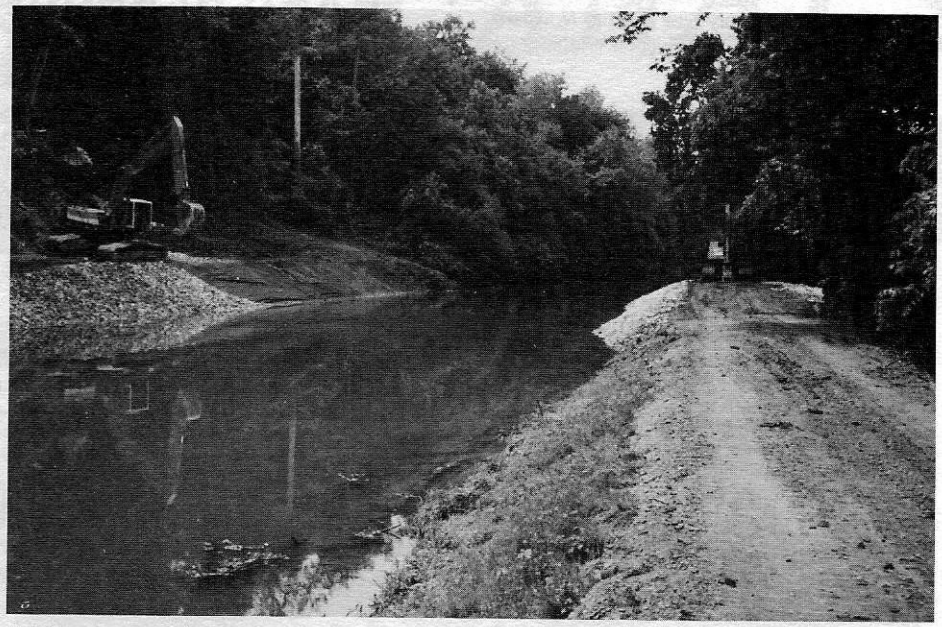
Indiana's canal past came rushing to the present when on June 19, Hoosiers in Indianapolis discovered that the Central Canal was an essential part of their daily lives. A late spring freshet accompanied with heavy winds and rain caused a break in the old canal. As residents watched, water rose to the top of the banks and then suddenly began to fall as 100 feet of towpath washed into the nearby White River. The high winds toppled large trees rooted in the bank of the canal. Once breached, water rushed from the canal into the nearby river. Workers tried to get the lock gates of the feeder at Broad Ripple tightly closed but these gates had been in the open position for 70 years and offered some resistance. Finally the feeder shutoff was secured leaving groups of large fish splashing in pools of water as the canal flow became a trickle. Not to lose this opportunity to catch "the big one", zealous Indy fishermen quickly jumped into the canal with nets and spears. To quell the fray, local radio stations announced that the city would not be responsible for any illness caused by "lingering diseases" that might lurk in the mud of a hundred years.

Residents soon learned that 70% of the water supply of the capitol city comes from the old Central Canal. As water pressure dropped, crews from the utility company rushed to the site near Butler University to repair the break. If a washout like this had occurred in the 1800's, it would have taken weeks of manual effort to repair the towpath but in 1992 the work was completed in three days. Coffer dams were created, vertical steel I-beams were set into the bank and truck loads of dirt and rock were quickly brought to the site. In the 1830's canals were made leakproof by the use of puddle, a special clay that was stomped into a hard layer by oxen. In 1992 workers used a rubber liner to seal the bottom of the canal.

The Central Canal was begun in 1836. It was part of the Mammoth Improvement Bill of that year, authorizing the borrowing of $10 million to fund canals, railroads, and roads throughout the Hoosier state. As the name central implies, this canal was to connect the interior regions of the state with the Wabash & Erie Canal, the major work then well underway in northern Indiana, and the Whitewater Canal also begun in 1836 in southeastern Indiana. The Central Canal was to pass through Indianapolis and terminate on the Ohio River at Evansville.

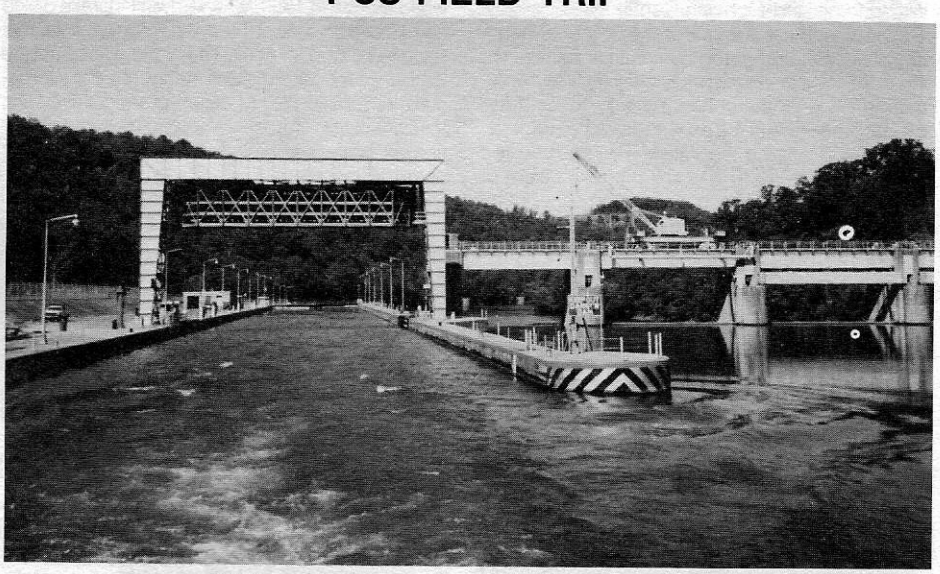
Out of political necessity, construction began near the capitol. A feeder dam was built at Broad Ripple, site of a wide shallow rapids on the White River. Work progressed along the river valley through Indianapolis and south to Waverly (Port Royal). By 1839 twenty-four miles were watered and work was in progress for eighty miles from Anderson to Martinsville. The Panic of 1837 led to depression by 1839. The state of Indiana was unable to service the debt and went into bankruptcy. Work on the Central Canal ceased.

The canal was never used for commercial transportation and eventually the ownership passed into the hands of the city utility. Today there remains 8.8 miles of a romantic waterway passing through the city where bikers, joggers and hikers can enjoy a beautiful park winding along the old canal. Downtown, a portion of the canal has become a focal point for redevelopment of a riverwalk. Historic and modern buildings line the route as the city plans a complete revitalization with museums, parks and office buildings. It is ironic that the Central Canal, never used for transportation has become the only remaining canal in the state with a commercial function.



Utility crews work on canal banks to stabilize the repairs made at the site of the towpath break. (June 1992)

PCS FIELD TRIP



Hildebrand lock and dam on the Monongahela River.

The Pennsylvania Canal Society picked a fine day for their Fall field trip on the Monongahela River in West Virginia. October 3, 1992 dawned bright and beautiful in Morgantown, WV and members of the PCS and guests boarded the "Gateway River Belle" for a 10AM departure. The Morgantown dock is at mile 101 on the Mon River (starting from the "Point" in Pittsburgh). Immediately above the city is the 17 foot lift Morgantown Lock and Dam. The River Belle had to wait 15 or 20 minutes while a towboat with three barges of coal locked down.

Once through the lock (at mile 102) the boat traveled very swiftly up the river. There wasn't much sign of industry, just a few non-working coal tipples. Mostly, the scenery was green trees with an occasional riverside village.

At mile 108 we came to the Hildebrand Lock and Dam, with a 21 foot lift. We locked through unimpeded and continued south on the Mon. At mile 115.4, the 22 foot lift Opekiska Lock and Dam was our next hurdle.

We entered the chamber, watched the lower gates close, then waited for the lock to fill up. Exiting the lock, we proceeded south (upstream) to about mile 121 where we turned around just above the Monongahela Railway bridge. At this point we were just 8 miles below the source of the Mon, where it is formed by the Tygart and West Fork rivers. We retraced our course back to Morgantown and departed the boat, just in time to get snarled in the traffic from the West Virginia football game.

The Friday night program was a talk by Francis Robb, a historian from the National Park Service, entitled "Forgotten Territory — Historic Transportation in SW Pennsylvania". On Saturday night, after a delicious steak dinner, we heard Dr. John K. Folmar, a history professor from California Univ. of PA speak on "Flatboats and Keelboats in Western Penna., 1780 to 1810." All in all it was a fine weekend and Tour Chairman David Wright should be commended for putting together a great affair. DLW

BOOK REVIEW

Terry K. Woods, *Twenty Five Miles to Nowhere,* 2nd ed. (Coshocton, Ohio: Roscoe Village Foundation, 1991).

Reviewed by Lorle Porter

Jack Giech writes that Terry Woods knows more about the Walhonding Canal—"That unfortunately truncated venture"—"than anyone else alive today." That knowledge, and Woods' lifelong love affair with canal lore, shows in this revised edition of *Twenty Five Miles to Nowhere.* The slim volume is packed with every conceivable piece of information ferreted out in several decades of studying this "boondock-nourishing feeder canal" of the Ohio-and-Erie system.

Woods is an engineer, and his description of the building of the canal manages to enlighten an amateur without insulting experts. Along with the fascinating nuts and bolts of the engineering of the canal, Woods captures the flavor of the canal-building era, but he is especially intrigued by the impatience of those left out of the boom of the 1830s. Intense lobbying produced Ohio's "first state road"—29 miles from Millersburg to Port Washington in 1833. More elaborate plans to connect the outland included plans for many feeder lines. In 1836, the state Board of Public Works authorized several major projects including the Walhonding and Mohican Canal.

Work on this canal from Roscoe up the Walhonding River was hampered by financial panics, rising costs, and an increasingly wary legislature. Attempts by local merchants partially to fund the canal collapsed with the expansion of the railroads. The Milan Canal, a legislative darling, received funding and by 1839 was shipping wheat out of the Walhonding region on lakegoing schooners. Enthusiasm for the Walhonding Canal—such as it ever was—crumbled.

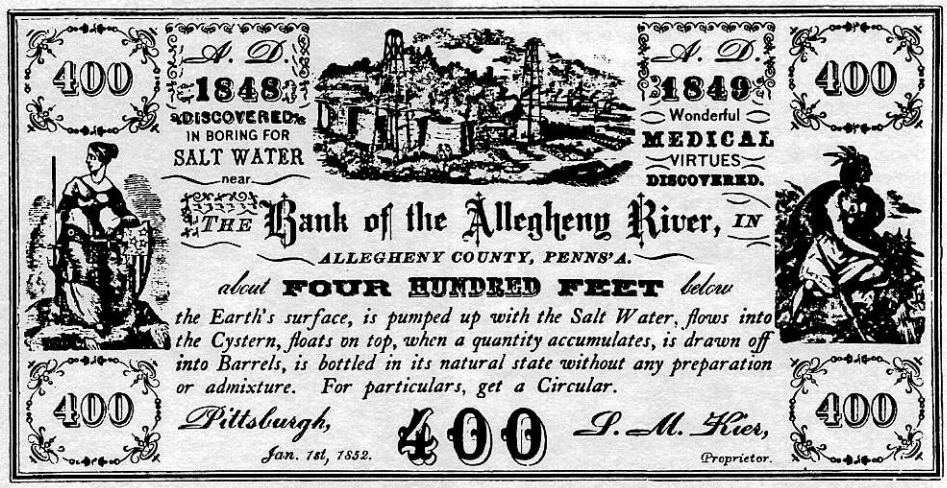
A major problem with the canal was its legal description: the 1836 authorization called for a canal from Roscoe "upstream as far as the Board of Public Works deems necessary." "Upstream" was a distance of twenty miles to the forks of the Kokosing and Walhonding—and no major town. Millersburg was up one branch forty miles and Mount Vernon up the other forty-one miles. The canal ended in a slackwater pool 1.2 miles from Rochester and 1 mile from Cavallo—both barren villages. Boatmen had to pole across the slackwater to either "port." Woods finds no evidence of even a bridge to connect Knox County customers with the canal.

Completed, the canal did little business. Subject to one of the wildest of Ohio rivers, it was frequently closed for repairs. "The best built canal in the state" was an economic embarrassment. The Toledo, Walhonding Valley and Ohio Railroad, built in 1893 connecting Coshocton and Loudonville, illegally ran up many of the towpaths—to the considerable joy of merchants, who cared little for the canal. Soon after, the $600,000 state investment was appraised at $9,110.40 and sold off in small parcels to farmers, except for eight miles of feeder used to supply water leases in Roscoe Basin.

Historians are used to discussing the glory days of the canals, but the Walhonding did not even enjoy those. Woods raises interesting questions of why. Efficient competition from the Milan Canal? Lack of entrepreneurial spirit in the valley? (I believe that a link with the aggressive business community of Mount Vernon would have produced an entirely different history.) He also fits the story of the canal into Ohio history very well, adding interesting tidbits such as the failed attempt to carve out a new county, with Walhonding as the seat, in 1847. I only wish he had used footnotes in his work, as readers may want to follow up some of the arguments he advances.

Twenty Five Miles to Nowhere can be purchased from the Roscoe Village Foundation, 381 Hill St., Coshocton, Ohio 43812, for $3.95 plus $1.50 shipping and 24¢ tax for Ohio residents.

AMERICAN PETROLEUM INDUSTRY BORN IN PENNSYLVANIA CANAL



A whimsical advertisement for petroleum as medicine.

By William Dzombak

It is generally recognized that the use of petroleum in America, and then throughout the world, began in 1859, when Edwin L. Drake drilled an exploratory well at Titusville, Pennsylvania, that released a gusher of oil. The world was changed by that event. Drake's well inaugurated the large-scale production of petroleum products used first for illumination (kerosene lamps), next for lubrication of steam engines, and later as fuel for automobiles.

The petroleum products needed for these purposes were supplied by an oil industry that was launched by Drake's well, but there would not have been a Drake well, to probe for oil, if there had not already existed a recognition of the potential uses of petroleum. It is not generally known that the useful properties of petroleum were first demonstrated in a consequential way by a dramatic event that occured in 1845 on the Pennsylvania Main Line Canal at Tarentum, near Pittsburgh.

On that momentous day, some boys playing near the canal happened to toss a piece of burning wood into the water in the canal. To their surprise, the canal burst into flames! A section of canal at least one-half mile long was brilliantly ablaze, under dense clouds of smoke! Everyone who witnessed the event was astonished to see fire on the water—the discovery that petroleum would burn, and give off light and heat.

Everyone realized, immediately, why the canal was burning: the surface of the canal was covered with petroleum discarded into the canal from nearby salt wells. Brine obtained from the wells was accompanied by a dark fluid, foul smelling, that contaminated the salt produced by evaporation of the brine. To obtain pure salt, brine from the wells was first pumped into a vat, where the nuisance "rock oil" floated to the surface and then spilled over the rim of the vat and trickled away, ending up in the canal adjacent to the saltworks. The firebrand thrown by the boys had ignited the oil floating on the canal.

Before the great canal fire at Tarentum, few people had ever heard of petroleum. Soon after, people were using "rock oil" lamps to illuminate their homes and barns. Oil-burning lamps were soon attached to the caps worn by coal miners as they dug fuel for the furnace fires that heated evaporating pans at the saltworks located along the canal. The canal fire delivered light into dark homes, and granted people a later bedtime, for "rock oil" was given away free, while lard for lamps and tallow for candles were both too expensive to be used merely for reading or other leisure pursuits after a day's work was done. The people of Tarentum, who were thus profoundly affected by the introduction of petroleum into their lives, memorialized the epoch-making fire and thereafter compared living conditions "before the canal fire" with those "after the canal fire."

Within a few years, oil-burning lamps were being marketed by Samuel M. Kier, who operated one of the wells and saltworks near Tarentum. Kier also promoted the medicinal value of petroleum, taken internally or applied externally, and shipped bottles of "Kier's Rock Oil" as far as the gold fields of California. Samuel Kier's principal source of income, however, was the canal business, for he was one of the chief owners of the Mechanic's Line of canal boats, which operated between Pittsburgh and Philadelphia, with a branch-line operation to tidewater at Havre de Grace, Maryland. Kier was also the first person to refine petroleum by distillation, in an effort to remove offensive odors from the product that was to be burned in lamps or sold as medicine. Kier's pioneer work on petroleum refining was performed near his canal office in Pittsburgh.

The connection of the Pennsylvania canal with the birth of the petroleum industry is thus a double link: a serendipitous canal fire resulting from the leakage of "rock oil" from a saltworks brine well operated by Samuel Kier, owner of a line of canal boats. It is worth noting, also, that the first oil well, at Titusville, was drilled by "Uncle Billy" Smith, a salt-well driller recruited by Colonel Drake from the saltworks at Tarentum soon after the canal fire directed the attention of the world to the valuable properties of petroleum.