AmericanCanals

Bulletin of the American Canal Society

www.AmericanCanals.org

Vol. XLVII No. 2 | Dedicated to Historic Canal Research, Preservation and Parks | Spring 2018

The Dartmouth Marine Railway Project

The Shubenacadie Canal was constructed across the Province of Nova Scotia from Dartmouth Cove on Halifax Harbour to Minas Basin on the Bay of Fundy by the merchant community of Halifax in an attempt to provide Halifax with a commercial hinterland as well as ease of transportation for the military. Construction was started in 1826 by the Shubenacadie Canal Co. which went bankrupt in 1831. A large number of Scottish and Irish stonemasons had immigrated to Nova Scotia to work on the project but were left stranded in the colony with few resources after the project had halted. Construction started again in 1854 under the Inland Navigation Company. The new company altered the original British stonework

Continued on page 8

In This Issue

Cradle flume house – Shubenacadie Canal Commission

American Canals

BULLETIN OF THE
AMERICAN CANAL SOCIETY

Managing Editor: Steve Dean
Contributing Editor: David G. Barber

www.americancanals.org

For memberships, subscriptions, change of address, and other business matters: c/o Charles W. Derr, 117 Main Street, Freemansburg, PA 18017; deruls@aol.com; 610-691-0956.

For CANAL CALENDAR items and news of local, state, and regional canal societies: c/o Steve Dean, PO Box 132, Saint Leonard MD 20685; 301-904-9068; 184.5_miles@comcast.net

The objectives of the American Canal Society are to encourage the preservation, restoration, interpretation, and use of the historical navigational canals of the Americas; to save threatened canals; and to provide an exchange of canal information. Manuscripts and other correspondence consistent with these objectives are welcome.

An annual subscription to ***American Canals*** is automatic with ACS member-ship. Regular Single Membership, $25; Dual Membership, $35; Sustaining (no change) $35; Patron, $50; Life Membership $500.00. Single copies, $3. Four issues per year. Printed in the United States of America. ISSN 0740-588X.

Other Publications: *The Best from American Canals; American Canal Guides,* William E. Trout III, editor and publisher

DEADLINE: Material for our next issue must be on the editor's desk no later than July 1, 2018. Send to Steve Dean, PO Box 132, Saint Leonard MD 20685, Editor, American Canals; 301-904-9068; 184.5_miles@comcast.net

Material submitted to ***AMERICAN CANALS*** for publication should be typed and double-spaced or sent by email in WORD format. You may send actual photographs (which will be scanned and returned), or digital versions may be emailed or sent on a CD.

Editorials, articles expressing opinions, and book reviews reflect the opinion of the writer/reviewer and not necessarily those of the editor or ACS board.

George Hume, #513–39 Parliament Street, Toronto, Ontario, Canada M5A 4R2; 416-214-9331, george.hume@rogers.com; Director.

David M. Johnson, 9211 Wadsworth Drive, Bethesda, MD 20817; 301-530-7473; dave9211@verizon.net; Director; Member, Canal Liaison Committee.

John M. Lamb, 1109 Garfield Street, Lockport, IL 60441; 815-838-7316, 815-478-2341 ex. 10; Director; Chair, Canal Engineering, Maintenance & Operations Committee.

Dan McCain, 3198 North 700 West, Delphi, IN 46923; 765-412-4308; dan.mccain@gmail.com; Director.

Michael Riley, 38 Green Street, Port Byron, NY 13140; 315-224-1716; mriley20@twcny.rr.com; Director.

Robert Schmidt, 5908 Chase Creek Court, Fort Wayne, IN 46804; 260-432-0279; indcanal@aol.com; Director; Chairman, Nominating Committee; Member, Canal Engineering, Maintenance & Operations Committee.

Roger Squires, 46 Elephant Lane, Rotherhithe, London SE16 4JD England; 020 7232 0987; rogersquires@btinternet.com; Director for the U.K.

William Trout III, Virginia Canals & Navigations Society, 3806 S. Amherst Hwy, Madison Heights, VA 24572; 252-301-1747; wetrout@mindspring.com; Director.

Larry Turner, 15091 Portage Street, Lot #34, Doylestown, OH 44230; 330-658-8344; towpathturner @aol.com. Director.

Terry K. Woods, 6939 Eastham Circle, Canton OH 44708; 330-832-4621; woodscanal@ssnet.com; Director; Chair, Parks Committee; Member, Canal Archaeology Committee, Canal Boat Committee, Canal Engineering, Maintenance & Operations Committee; woodscanalone@aol.com

Directors Emeritus:

William J. McKelvey, Jr., 103 Dogwood Drive, Berkeley Heights, NJ 07922; wjmckelvey@hotmail.com; 908-464-9335

Lance Metz, 37 N West St, Allentown, PA 18102-4218 lancemetz@icloud.com

Committees:

ACS Sales, Peter Walker, 24 Northview Terrace, Cedar Grove, NJ 07009 ptgwalker@gmail.com 973-744-2380 Chairman ACS Sales Committee

Canal Archaeology, Mark Newell, chair, Georgia Archaeological Institute, PO Box 984, Augusta, GA 30901

Canal Engineering, Maintenance, & Operations, Terry Woods, chair

Canal Parks, Terry K. Woods, chair

Historic American Canals Survey, David G. Barber, chair

American Canals Indexes Updated

Thanks to some hard work by David Barber, the index for *American Canals* is now updated to reflect the full 45 year history, from 1972 to 2016. Separate indexes allow searching by article, author and photographs. The indexes are available at the following link: www.americancanals.org/AC%20Indexes/AC_Indexes.htm

Additionally, past issues of *American Canals* through 2014 are now available. They can be found at: www.americancanals.org/AC_Issues/American_Canals.htm

American Canal Society Sales

The Society has the following items for sale:

Best from American Canals #2	published 1984	$4
Best from American Canals #5	published 1991	$4
Best from American Canals #6	published 1993	$5
Best from American Canals #7	published 1996	$5
Best from American Canals #8	published 1998	$6
American Canal Guide #1: West Coast	published 1974	$1
American Canal Guide #2: South, NC to FL	published 1975	$2
American Canal Guide #3: Lower MS & Gulf	published 1979	$3
American Canal Guide #4: WV, KY, Ohio River (Photocopy)	published 1988	$3
American Canal Guide #5: DE, MD, VA	published 1992	$3
20 year American Canals Index 1972-1992	published 1992	$3
Canal Boat Construction Index (12 pages)	published 1992	$2
Picture-Journey Along the Penn. Main Line Canal	published 1993	$10
ACS Burgee (blue on white cloth)		$15
ACS cloth sew on patch (2” x 3” red, white & blue)		$3

Special Offers – while stocks last

Back issues of American Canals - free to members – enquire for a list of available copies and mailing cost.

An ACS bumper sticker (“Support Your Local Canal” or “Restore Your Local Canal”) will be sent **free** with each order

Shipping and handling: Orders can also be sent by mail with a check payable to American Canal Society to 24 Northview Terrace, Cedar Grove, NJ 07009. **Include $3 postage for first item and $1 for each additional item** for Media Mail within USA. Enquire for other destinations and expedited delivery. Allow for your order to take up to 4 weeks to dispatch. Email Sales.AmericanCanals@gmail.com for further information.

2018 World Canals Conference

Every year, the World Canals Conference brings together hundreds of canal and waterway enthusiasts, professionals and academics from around the world. During the conference delegates exchange ideas about canal management and development including: the protection of historic features; technical developments; revitalization of canal systems and harbors; recreational opportunities; and the promotion and presentation of canal history. Ways of promoting tourism and invigorating rural economic development and urban renewal are explored.

Since its inception in 1988 the World Canals Conference has grown significantly and now welcomes waterway management agencies and professionals, users and enthusiasts from Asia, Africa, Europe and North America.

Conference delegates, official partners and sponsors will have a range of both formal and informal opportunities involving presentations, networking, exhibitions, educational tours and social programs to share and exchange experiences, technical solutions and learnings.

On September 10–12 2018, the World Canals Conference will take place in Athlone, Ireland. Themed Restore Regenerate Reimagine, the conference will showcase Ireland's many restoration and re-imagining projects in a three day event were delegates can update their knowledge of innovative waterways management experiences and techniques from all over the world.

Visit wccireland2018.com for conference information, including details about registration, events, accommodations, pre-conference tours and Athlone. Early registration ends on May 31.

Conference Program

Sunday 9th September 2018
2-8 pm – Registration
7 pm – Welcome Reception

Monday 10th September 2018
Morning – Opening Session
Morning Break
Plenary Session
Lunch
Afternoon – Breakout Session
Afternoon Break
Evening – Civic Reception & BBQ

Tuesday 11th September 2018
All Day – Technical
Evening – Free Evening

Wednesday 12th September 2018
Morning – Breakout Session
Morning Break
Lunch
Afternoon – Breakout Session
Afternoon Break
Closing Ceremony
Evening – Conference Dinner

Athlone – © deyveone – stock.adobe.com

Canal Comments – Low Bridges

By Terry K. Woods

Bridges were required for roads that had to cross a canal in Ohio. They were commonly designed to have a minimum clearance of 10 feet above nominal water-line and usually spanned the full width of the canal channel and towpath for a minimum width of 50 feet. A variety of truss, abutment, and pier designs and materials were employed. The simplest designs were timber king- or queen-post pony trusses on pole abutments with timber ramps at each end. Most, however, had earthen ramps and stone abutments and some used timber arch trusses. Some were iron through-trusses and several were covered bridges. Occasionally a road bridge crossed at the downstream end of a lock, where the lift of the lock provided more clearance and the walls provided abutments. In cities, however, where the road could not be conveniently ramped up, swing bridges were used.

Swing bridges were positioned at street level and could be rotated on a center pivot to allow canal boats to pass. These bridges, too, could take many forms – from large iron pony trusses that required a steam engine and operator to function, such as the one on 1st Street in Piqua, Ohio, on the Miami & Erie Canal, the hand-cranked one at Blakes Mills on the Ohio & Erie that also required an operator, or the manually swung bridge at Warsaw on the Walhonding Canal.

But the most fascinating swing bridges were the bump, or automatic, bridges that a boat would bump, or nudge aside, itself, as it traveled along, allowing the bridge to swing back into its original position after passing.

During the Fall of 2007, the Auglaize County, Ohio, engineer's department replaced a bridge on Steinecker Road (old Route 66) as it crossed the St. Mary's Feeder.[1] Upon removing the old bridge decking and structure, a concrete pillar and turn-table apparatus from a bump swing bridge was uncovered.

The St. Mary's Feeder supplied water from Grand Lake to fill the local section of the Miami & Erie Canal. The feeder was a navigable one allowing canal boat traffic between the lake and canal. The original bump bridge here was only a few feet above the surface of the canal. A canal boat would push open the bridge. The bridge structure would then pivot on a turntable mechanism on supporting rollers or wheels. The whole structure was counterbalanced to return to its original position after the boat had passed. Such bridges were often referred to as "automatic" bridges. When the bridge was in an "open" position, there was a 20-foot wide passage for the canal boat.

The turntable apparatus was removed from the concrete pillar and is currently on display at the Miami & Erie Canal Heritage Center in New Bremen.

Dave Newhardt, of Yellow Springs, Ohio, and former President of the Canal Society of Ohio, recently provided a description of that mechanism and an account of how it worked.

> "I've seen a true bump bridge pivot mechanism (now at the Locktender's House in New Bremen). There is also a second bump bridge mechanism that can be inspected, outside, near Hussey's restaurant in Port Jefferson on the Sidney Feeder.
>
> "The mechanisms are simple, and cool. The bridge is attached at its center (not necessarily the center of the canal, however, because of the length of the bridge) to the upright plates and turntable at the center of the pivot.
>
> "Underneath, there was a sloping ridge of iron that surrounds the center pivot. A wheel attached to the bottom of the center turntable would ride up the ridge, so as the boat pushed (bumped) one end of the bridge forward and around, the bridge rotated around the pivot, and the attached wheel was pushed up the slope created by the ridge of iron. An iron 'V' shaped point kept the bridge from turning too far."
>
> "Once the passing boat was no longer keeping the bridge in an open position, the bridge was free to move backward, and because the wheel had been pushed uphill on the sloping iron ridge, gravity caused the wheels attached to the turntable to run

back down the slope, returning it (and the attached bridge) to its original position. "On a drawing I have of a typical Bump Bridge in operation, there are two triangular supports on each side of the bridge with cabling stretched across their tops and anchored to the bridge ends. This gave longitudinal stability to the long bridge to keep it from sagging at the ends – same principal as the cabling on a steam river boat."

"There were a "bunch" of these bump bridges on the Miami & Erie Canal, including at least one in downtown Dayton. I think they were used particularly where it was flat and harder (and less desirable for wagons) to build a sloped approach, yet the traffic didn't justify the expense of a lift bridge (of which there were also quite a number on the M & E in later days)."

To round out this column, I've also provided a firsthand account of a bump bridge taken from an internet account of a book by Ralph May, the late, well-known canal historian of the Miami & Erie Canal.

Coming Round The Bend[2] "I was one of those fortunate lads to be brought up within a half block from a swinging bridge in New Bremen. There were three of these bridges in the town and one lift bridge, and the boats were still coming when I was a boy.

"Seeing a boat coming round the bend south of town, it was not long until a group of boys and girls would gather on the bridge, leaning over the railing and waiting for the boat and the mule team as it drew closer and closer until the bow would gently bump the bridge open, being guided to one side by a stretch of timber extending out into the water by the bridge. You see, the bridge had to be bumped from the one end in order to properly swing it round on its track midway to let the boat pass through, ..."

According to May, there were two other bridges of this type in New Bremen, one at First Street and one at Second Street. The bridge on Monroe Street was a lift bridge.

Notes:

1. *Canal Bump Bridge Remnant Recovered*, – *Tow-path Times*, Neal Brady, Winter, 2007.

2. From the book *Ralph May Remembers* – www.new-bremen.com/community-life/new-bremen-history/ralph-may-remembers

While not a bump bridge, the center pier of a pivot swing bridge is shown in this view from the C&O Canal at Carderock, Md.

Pivot bridge center pier detail – Photos by Steve Dean

Dartmouth Marine Railway Project – Continued from page 1

lock designs to use more inexpensive North American stone and wooden construction. The new design included two Marine Railways that transported loaded barges in large timber cradles on steel rails up steep inclines in lieu of a number of locks. Steam boats and barges began to use the canal in 1856 and the entire system was completed by 1861. The canal enjoyed a few years of healthy traffic especially during the Waverley gold rushes of the 1860s. However, the canal company showed little profit and ceased operation in 1871, primarily due to the onset of the railway but also due to the many problems relating to frigid winters which damaged the locks linking the freshwater lakes.

The Shubenacadie Canal Commission's (SCC) mandate includes the stabilization, preservation and restoration work to the locks and associated features including the dams, head ponds and channels. The former Dartmouth Marine Railway consisted of a large boat cradle hauled with a long along steel rails from Halifax Harbour to Sullivan's Pond via a long cable. The cable and winding drum was operated by a series of shafts and gears connected to a water turbine. The turbine was powered by water flowing from Sullivan's pond in an elevated timber flume.

In the mid 1900s, SCC volunteers developed an interest in the former Marine Railway, sparked following an inspection of the in-ground turbine chamber and the timber framing of the Flume House. In the late 1800s, the Flume House structure was enveloped by the expansion of the Starr Manufacturing Complex. In 2009 the Starr Plant was demolished, including the Flume House structure.

Construction of the cradle flume house – Shubenacadie Canal Commission

A detailed archaeological investigation of the Marine Railway and Starr Manufacturing site followed. HRM retained consultants to produce master plans for the site. SCC was responsible for the historical interpretations throughout the studies. SCC's research activities included documenting layouts and details of similar Marine Railways located on the Morris Canal in New Jersey, USA.

Results of the planning and research activities led to HRM approving funding and providing project management for the reproduction of the key aspects of the Marine Railway, including a full size replica of the boat cradle, the inclined plane and Flume House/Turbine Chamber. SCC developed the details and funded the production of the steel turbine, cable winding drum and associated gears and shafts within the Flume House. Reproductions of additional historical items relating to the turbine and cable drum operation are yet to be addressed, including the brake wheel, shafts and pillow blocks, flume plug valve and associated operation infrastructure.

The reproduction of the Marine Railway is part of the creation of a municipal Canal Greenway Park. SCC commissioned a study to produce an overall Interpretive Master Plan for the historical components of the project.

– Shubenacadie Canal Commission

Cradle flume house – Shubenacadie Canal Commission

Shubenacadie Canal Marine Railway
Engineering, Ingenuity and Craftsmanship

The Shubenacadie Canal Commission (SCC) is involved in the research, design and construction of reproductions of the Dartmouth Inclined Plane / Marine Railway, part of the Shubenacadie Canal in Nova Scotia that connects Halifax Harbour to the waters of the Bay of Fundy. The project is designed to reconstruct key elements of the inclined plane, located at the Halifax Harbour end of the canal. The inclined plane transported vessels between the harbour and Sullivan's Pond, a distance of 1300 feet with an increase in elevation of 65 feet.

The Shubenacadie Canal Waterway connects seven lakes with the Shubenacadie River over a distance of 72 miles. Nine locks and two inclined plane systems (Dartmouth and Porto Bello) were required to make the waterway navigable.

The two inclined planes constructed on the Shubenacadie Canal were among the first in British North America and were patterned after those in use on the Morris Canal in New Jersey. The first attempt to overcome the heights of land in Dartmouth and Porto Bello was carried out between 1826 and 1831. In Dartmouth the canal initially involved the use of six locks, sections of which remain buried on the site. In 1860 and 1861 an inclined plane system was constructed to replace the lock system. The turbine chamber/flume house was constructed using the two walls of the former Lock 3 as the east and west walls of the underground turbine chamber.

The SCC, in cooperation with the Halifax Regional Municipality, is presently reconstructing the key elements of the Dartmouth Inclined Plane. In 2015, a life-size reproduction of the boat cradle was completed and is on the site. In 2016, the turbine chamber was rehabilitated and the flume house constructed using the same specifications as the original. The timber structure was built using 8 x 8 inch and 8 x 12 inch timber with mortise and tenon joints throughout. The flume house also included a partial reconstruction of the elevated water flume. In 2017, the SCC plans on having reproductions of the steel turbine, cable drum, and associated shafts and gears installed in the flume house. The project is expected to be completed by the end of 2017 with a grand opening planned for the spring of 2018.

Literally thousands of hours were spent by volunteer members of the SCC in determining just how the original systems worked and how they could be fabricated. Our local community college provided great support with detailing/drafting as well as fabrication of the steel turbine. The folks at the Morris Canal have been extremely supportive and without their assistance it would have very difficult to undertake this work.

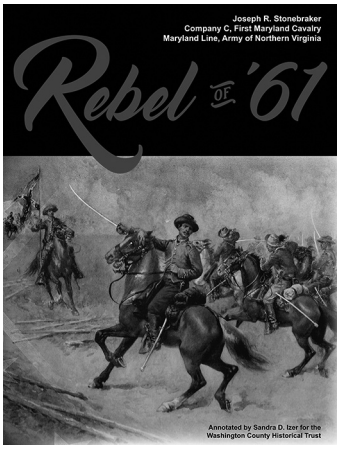
Of note: the Shubenacadie Canal Marine Railway project received international recognition at the 2016 World Canals Conference in Inverness, Scotland.

– Shubenacadie Canal Commission

Construction of the flume house – Shubenacadie Canal Commission

Antietam Canal Company

The following is an excerpt from *Rebel of '61*: Joseph R. Stonebraker, Company C, First Maryland Cavalry, Maryland Line, Army of Northern Virginia, annotated and edited by Sandra D. Izer. Washington County Historical Trust, 2016. For more information about the book, or to order a copy, see washingtoncountyhistoricaltrust.org/publications/rebel-of-61/



FUNKSTOWN

In the heart of this valley, nestling in the bend of the Antietam Creek, is the picturesque village of Funkstown, which in its early history, was known as Jerusalem Town.[1]

On the opposite side of the creek, ascending from its banks, is a timber covered ridge, fragrant with memories of the past. It was here in April, 1755, that General Braddock cut an opening in the timber through which his soldiers passed on their way to Fort Duquesne, and disaster.[2] In July, 1863, the same woods sheltered from the noon day's heat, Lee's weary, ragged, but defiant Rebels, on their retreat to the Potomac, after their defeat at Gettysburg. And a few days later, General Meade with his legions, occupied and entrenched a portion of this same ridge, while facing General Lee's army.

When in 1776 Washington County was divided from Frederick, Funk, the founder of Funkstown, conceived the idea of making it the county seat. He informed the founder of Hagerstown of his intentions, and while he planned to extend the town, west beyond the creek, selecting a beautiful site on the crest of Braddock's ridge, overlooking the ancient village of Jerusalem, for the Court House, Hager mounted his horse, rode to Annapolis and secured the prize for his own.[3]

In 1790, John Henry Schäfer located in the town,[4] built a grist mill,[5] and became the president of the Antietam Woolen Manufacturing Company.[6] He eventually became the owner of the enterprise, which he greatly enlarged, and in 1829, was making ingrain carpets. A few years later he made further additions, and brought from London an Englishman who put up a loom to weave Brussels carpets. He wove a number of rugs, some of the patterns—the Rose of England, and the Thistle of Scotland—were much admired.

They had a roll of Brussels carpet on the loom when the factory took fire and was destroyed in 1834—being a total loss as the insurance policy had expired a week before, and through carelessness had not been renewed.[7]

Daily about the mill were seen long lines of Conestoga wagons, drawn by six and eight horses, some unloading wheat, while others were loading flour which they carried to Baltimore and Washington markets. Railroads were unknown, and stage coaches had not yet reached that point, as Mrs. Schafer in her coach and four drove to Baltimore—a two day's journey.

ANTIETAM CANAL COMPANY

Schäfer's energy and enterprise greatly stimulated the citizens, and it became a thriving town. About 1808 a charter was secured from the State for the Antietam Canal Company, who proposed to make the creek navigable to the Potomac River, by means of slack water.[8]

In 1812 the company built two locks, and connected the two dams by digging a canal some eight hundred feet long. The boat which was about one hundred feet long, gondola shape, sharp at both ends, without deck, was loaded with one hundred and twenty-five barrels of flour, passed safely through the canal and into the lock, but was wrecked while passing into the lower dam, and the cargo became a complete loss.

This accident so discouraged the company that the project was abandoned and Schäfer afterwards uti-

lized the canal by building a saw and cement mill over the locks.

Finally Schäfer erected a large barn on Funk's Court House site, and planted an orchard on the slope below. Instead of the noisy advocate, trying to persuade twelve well meaning men, to render an unjust verdict against their neighbor, the low of the cattle in the yard, and the sound of the flail on the floor was heard.

Here, too, lived Ira Hill, the Yankee pedagogue, who, during his idle hours, wandered along the streams and through the forests, looking for relics of the Aborigines. While here he wrote "Antiquities of America Explained," in which he proves to his own satisfaction, that the American Indians descended from the Jews and Tyrians.[9]

RACE OF MILLERS

For three generations the Schäfers were millers and dealt in grain, and today where ever you find a gristmill that was built, owned or operated by one of the name, close by you will find the ruins of a distillery. The only exception being John Henry, who was a temperance man, as the following story clearly demonstrates.

There were so many mills on the Antietam Creek that they dammed up the water on each other, causing no end of disputes, and in very many cases, the courts were called upon to settle the question just how far one man could back the water on his neighbor's wheel.

Antietam Woolen Mill – Illustration from A Rebel of '61

John Henry had one of these protracted suits, and after the court had decided the question, the officials were present to direct where the hole should be drilled, in the rock above the dam, at the edge of the water, into which an iron pin was driven, as a water mark.[10]

After the pin had been set, a two gallon jug of whisky that some one had provided, was brought forward to celebrate the event. Of course Schäfer was expected to lead off with the first "swig." He took the jug, and held it high above his head, and let it drop on the pin with a crash, then politely tipped his hat, and bid the disappointed and muttering crowd good day.

NOTES:

1. In 1762, Jacob Funk (1725-1794) increased his original 1753 land patent of 50 acres called Good Luck with a massive 2,000+ acre addition aptly named Addition to Good Luck. The addition included the 160± acres within a horseshoe bend along the Antietam Creek. Within this horseshoe he laid out a 177-lot town he called Jerusalem, designating a lot each for a church and cemetery. On 1 Jun 1768, he sold the first lot in the town to Henry Snider. Twenty-three years later in Aug of 1791, Funk sold the remaining 50 unsold lots to Henry Shafer and moved to Jefferson County, Ky. where he died in 1794. Jerusalem was incorporated as a municipality in 1840 under the name Funkstown. Maryland Archives Maryland land patents YS8/220:GS1/140, BC18/435:BC19/634, WCLR L-237, L-386, and G-192, Vol. 592, 61.

2. Stonebraker is erroneously assuming General Braddock's forces came through Funkstown in 1755 on his way to the disastrous Battle of Monongahela during the French & Indian War. Colonel Thomas Dunbar, leading one of General Braddock supply trains, crossed through Washington County along the old Keedysville Road south of Funkstown, then on the Conococheague Road to the supply depots at Williamsport, Md., before heading west.

3. Washington County was created from Frederick County by resolve of the Maryland Constitutional Convention of 1776. According to T. J. C. Williams in *History of Washington County, Maryland from the Earliest Settlements to the Present Time*, (Philadelphia, Pa, 1906), both Jonathan Hager of Elizabeth-Town [Hagerstown], and Jacob Funk of Jerusalem [Funkstown] desired their settlement be declared the county seat. Williams asserts that Hager rode to Annapolis and convinced the Maryland Assembly to select Elizabeth-Town, yet there is no record of Hager appearing before the Maryland Convention in the fall of 1776.

4. On 5 May 1790, Henry Shafer (1766-1855) Stonebraker's maternal great-grand uncle, purchased lot 165 for £150, today 35 W. Baltimore Street, Funkstown, Md. The large purchase price indicates significant improvements on the property at the time of the sale. Today the 18th century

stone home is known as the Jacob Funk home, and Funk is logically credited as the builder. WCLR G-91.

5. In addition to Jacob Funk's stone home, that same day Henry Shafer also purchased from Funk 92 acres called Establishment. The parcel began at "a stone standing in the edge of the mill dam," with the majority of the land on the west side of the Antietam Creek and only a small part in the town of Jerusalem. The large purchase price would indicate Shafer purchased a completed functioning mill. WCLR G-92.

6. In 1813, thirteen businessmen from Washington County formed the Antietam Woolen Manufacturing Company. After 1816, the business continued under the ownership of only Henry Shafer and Gerard Stonebraker, operating as the Antietam Woolen Factory. The company papers are archived at the Hagley Museum and Library in Wilmington, DE. Additionally see: Bahr, Betsy, The Antietam Woolen Manufacturing Company: A Case Study in American Industrial Beginnings. Working Papers from the Regional Economic History Research Center, 4 (no. 4, 1981), 27-46. Powell, Barbara M. and Michael A., *Mid-Maryland History: Conflict, Growth and Change* (The History Press, Charleston, S.C., 2008), 105-111.

7. From the *Hagerstown Mail*, 26 Dec 1834: Destructive Fire—On Sunday evening last, between 8 and 9 o'clock, an extensive fire was discovered to be raging in the direction of Funks-town. . . which proved to be the Woollen Factory of Messrs. George & Henry I. Shafer, in Funks-town. . . The Factory and all its contents (excepting the books, a few manufactured articles, and a small quantity of wool) were consumed. . .The value of the property destroyed is estimated at from $15,000 to $25,000, the whole of which loss falls upon the enterprising proprietors—there being no insurance.

8. After the opening of the bypass canal around Great Falls in the Potomac River near Georgetown in 1802, the Potomac Company board began to plan for the expansion of the Potomac River navigation system by planning lateral canals that would feed commerce to the Potomac River. Five waterways were considered: the Shenandoah River, the Conococheague Creek, the Monocacy River, the Seneca, and the Antietam Creek. At thirty-eight-miles long and relatively unobstructed by falls or rapids, the Antietam was viewed as a "highly promising avenue for shipping the produce of this fertile country to the Potomac River navigation."

The Maryland Assembly passed legislation in 1811 authorizing the Potomac Company to condemn lands along the Monocacy, Conococheague, and Antietam for the purpose of "making canals and locks in improving the navigation on such branches." Local farmers and millers organized and loaned the Potomac Company $20,000 plus interest to complete the task. The loan would be repaid from tolls once the project was completed. Work began on locks in the Antietam in January of 1812. Belatedly, in April of 1812, an engineer surveyed the Antietam and estimated the project would cost in excess of $90,000 to complete. The investors defaulted on their promised funds, and by March 1814 the project was shut down. Reportedly, Henry Shafer's lock at his mill at Funkstown was the only lock on the Antietam Creek to be completed. Kapsch, Robert J. The Potomac Canal, George Washington and the Waterway West (W.Va. University Press, 2007), 162-171. Maryland State Archives, Session Laws 1811, Vol. 614:239. Guzy, Dan, *Navigation on the Upper Potomac River and its Tributaries* (Chesapeake & Ohio Canal Association, 2008).

9. Born in Connecticut, Ira Hill (1783-1838) was a teacher in Funkstown in his last years. In his *Antiquities of America Explained*, Hill asserted that the American Indian tribes were descended from the Hebrew or the ten lost tribes. In his first book, *An Abstract of a New Theory of the Formation of the Earth*, Hill presents an equally astounding view of the formation of the earth and a memorable theory that the Dighton Rock of Berkley, Mass., bore inscriptions from an expedition sent to the New World by King Solomon. In 1824, Hill proposed Congress build a ten-acre, three-dimensional garden map of the world adjacent to the U.S. Capitol building. *Antiquities of America Explained*, (W. D. Dell, Hagerstown, Md., 1831). *An Abstract of a New Theory of the Formation of the Earth* (N. G. Maxwell, Baltimore, Md., 1823). Ira Hill's Memorial and Remarks to Congress. (United States, 1824).

10. In 1813, Henry Shafer (1766-1855) won his suit against Christian Boerstler (1748-1833) for damming the waters in the Antietam Creek. In addition to monetary compensation, two commissioners marked with a pin the highest level Boerstler was allowed to dam his water. Boerstler was instructed to never "raise or cause to be raised the water in his said Dam higher or above a particular mark made upon a rock by the said Henry Shäfer and cut in by Frisby Tilghman and Daniel Boerstler…" WCLR YY-555.

Accompanied by the Past *By Karen Gray*

History is the witness that testifies to the passing of time; it illumines reality, vitalizes memory, provides guidance in daily life, and brings us tidings of antiquity. **Marcus Tullius Cicero (106–43 BCE), *Pro Publio Sestio***

Canal Engineering from Dam 3 to Harpers Ferry

Note: See the "Accompanied by the Past" column in the September 2013 Along the Towpath *for the history of the C&O Canal's relationship to Harpers Ferry. The article is available at www.candocanal.org/atp/atp.html*

From the point of view of the physical canal, the roughly 2 ½ miles from the Dam 3 area (Mile 62.44) down to Harpers Ferry (Mile 60.23) has a special place in the hearts of those with an interest in the canal's engineering and masonry structures.

This stretch follows the river closely and includes seven locks (two of which are not lift locks), a dam, guard wall, and—in operating days—two mule cross-over bridges. Additionally, it has the ruins of our only largely-intact drydock, and one of the largest bypass flumes on the canal.

The structures in the Dam 3 area demonstrate especially well the ways in which the engineers protected the canal from ordinary high water episodes. This is a serious challenge at the dams where the inlet must be at river level and, in fact, the river end must be recessed into the pool behind the dam at least 6 feet—the standard depth for canal boats. These were places, therefore, where even moderately high water could easily damage the canal without protective structures.

At Dam 3 one can see the three structures typically used to meet this challenge:

- A high guard wall along the river that would hold back the typical high water events in the pool behind the dam.
- A special kind of lock, the river end of which necessarily constitutes a breach in the guard wall and that therefore had a guard gate as high as the guard wall and thus significantly higher than the lock and its downstream gate.
- Two lift locks (in this case numbers Locks 35 and 36) above where the inlet channel feeds into the main stem of the canal. These serve to raise the canal above the river-level inlet.

Hikers today bypass Lock 35 and the canal's upstream side of the inlet confluence with the canal, by leaving the towpath at Lock 36 and following the trail on top of the guard wall. It curves around to the river, crosses the inlet lock's river end where its guard gate once was, and then continues along the guard wall beside the inlet channel to the towpath.

If the dam were intact, one could clearly see that the river on the downstream side of the dam was lower than the surface of the river pool behind the dam. After all, the dams were built to create a reliable pool of water and avoid the fluctuations and frequently shallow characteristics of the upper Potomac's natural riverbed. However, as Dam 3 was a low, rubble stone dam, the difference there was not great. Interestingly, the dam did not extend straight across the river, but made a sharp bend mid-river to angle off toward the head-gate of the Armory Canal along the West Virginia shore.

The canal upstream of Lock 36 lies beyond the protection of the guard wall that encircles Lock 35 and a low area between it and the canal that includes the ruins of a brick lockhouse. However, above Lock 36 the canal benefits from the 16 feet elevation change that Locks 35 and 36 provide.

Because all seven of the C&O Canal's dam locations are so important and the engineering at them complex, comparing these locations helps one appreciate the nuances of how the engineers used the dams, guard walls, and lift locks to meet the challenges at each site.

For example, the situation at Dam 6 is closest to what one finds here, although here the inlet channel is on a line at a 90-degree angle to the canal while the inlet

channel at Dam 6 parallels the canal for one-tenth of a mile. Both, however, have an inlet lock at the river end of their inlet channel, although at Dam 6 it is located beside and below Lock 55. At both, the inlet feeds into the canal at the foot of the first of two lift locks—Lock 54 at Dam 6 where both Locks 54 and 55 have a 7.8 foot lift for a combined elevation increase of 15.6 feet.

Dams 1 and 2 and their associated structures are similar to each other in having open inlets at the river end and inlet locks at the canal end. There, guard walls are less obvious and the second of the lift locks are a distance above the first that are located immediately beside the inlet lock.

Dams 4 and 5 and their associated structures are similar due to the slackwater stretches above each and the fact that the two lift locks in each case are located at the upper end of the river navigation sections. The inlet locks (numbered with their dam) are located at the foot of a slackwater section that is the head of the section of canal below them. Thus, there are no inlet channels.

It's a valid source of argument as to whether the canal's inlet locks should be called inlet or guard locks. Hahn and Davies follow the original sources in using the latter term. (It must be noted, however, that the original engineers were extremely casual in their use of terminology for canal structures and often mis-named them.) I prefer "inlet" because their primary purpose is to provide water to the main stem of the canal. The extent to which they are located in a guard wall, and thus require a guard gate, is variable with the design of the dam-related structures.

Using the term "inlet lock" also avoids confusion with the canal's two guard gates that are often erroneously termed guard locks. Those gates pass the canal through guard walls located above Lock 16 in the Great Falls area where the wall forces floodwaters back into the Mather Gorge; and, at Dam 4, where it extends the high level of the top of the Maryland abutment to the nearby hillside. These gates are clearly single gates the full height of their guard wall and are not locks. (Note that they are also different in design and purpose from short stop gates in the canal prism.)

Lock 35 and the drydock beside it are a short distance from. The only other drydock, remnants of which can be seen, is located in the bushes alongside the bypass flume at Lock 47 at Four Locks. Boats would have been floated into these drydocks from the pools above them and would settle down on the beams after the gate behind them was closed and a drain at the downstream end opened to allow the water escape.

The dry dock at Lock 35 – Photos by Steve Dean

In the operating days of the canal, a bridge would have carried tow animals and people high enough over the inlet channel that boats coming and going to and from the inlet lock and river could pass underneath. It is clear that boats capable of navigating the river above the dam used this inlet lock into the trusteeship era (1890–1938). For example, we can document its use by stone-carrying boats owned by the quarries upstream in Virginia that would cross the river and enter the canal here.

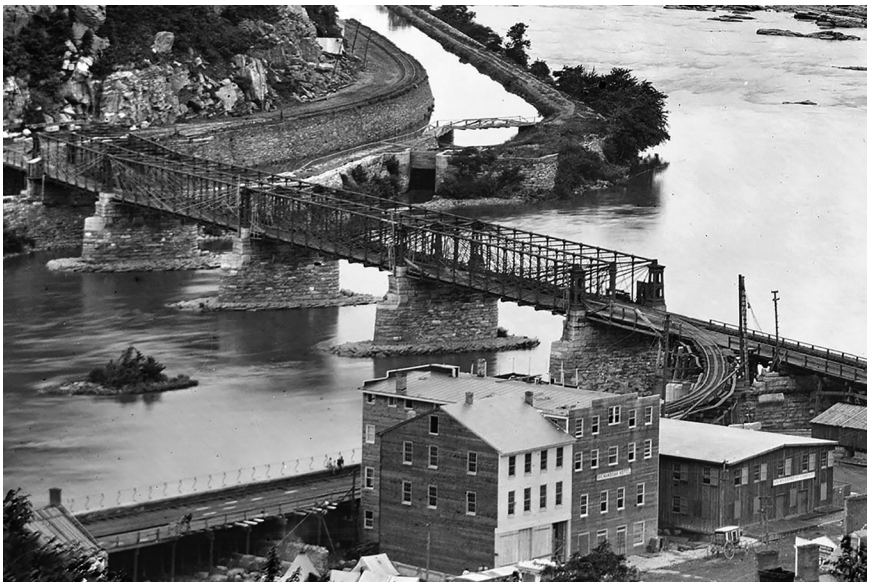
It should be noted that the C&O Canal Company neither constructed nor owned Dam 3 (also known as the Government Dam). It was built by the federal government to serve the Armory Canal across the river. That canal followed the south side of the Potomac for 1.1 miles from its head-gate at the end of the dam down

to the armory at Harpers Ferry. After the armory's destruction in the Civil War, the dam and Armory Canal served a wood pulp mill (1888–1925) and a power plant (1899–1991) located on the upstream end of the Armory property. It is unclear to what extent the C&OCC attempted to maintain the dam in the periods when its owners did not do so.

A new masonry dam intended to replace the rubble stone Dam 3 (remnants of which can still be seen immediately below the inlet lock at Mile 62.2) was under construction when the Civil War broke out. Work on it was never resumed by later owners and users of the Armory Canal.

Not much is known about the area of Dam 3 and its associated structures. The fact that boats using the river above Dam 3 could come and go through the inlet lock, that there is a dry dock here, and that there is a canal extending down to Harpers Ferry across the river all suggest that at times this area might have been used by traffic on both canals and the river.

The three-quarters of a mile between Lift Locks 35 and 34 (the latter at Mile 61.57) is quite isolated due to the Elk Ridge cliffs on the berm side. That ridge is actually a continuation of the Blue Ridge on the West Virginia side of the river, from which it is separated by the first of the Potomac's dramatic double water gaps. (The second is between Virginia's Short Hill and Maryland's South Mountain.) There are class II rapids in this gap known as the Needles, and several long islands that hide major Potomac channels on the river's south side.



View of the river lock from above Harpers Ferry, 1865 – Courtesy Shorpy.com www.shorpy.com/node/3436

At Mile 61.61 a stream flows directly into the canal, there being no room for a culvert that would carry it under the canal. Generally, the engineers used culverts to avoid watercourses emptying into the canal where they would deposit any silt, soil and debris that they carried.

Today at Mile 61.68 there is a bridge over a break in the towpath, and it is unclear if there was ever an overflow or waste weir in the area. One would seem likely, as anywhere that a natural, uncontrolled watercourse entered the canal it was usually necessary to provide for excess water from it to escape. A particularly interesting example of such is seen at Polly Pond above Dam 6 that holds water from Long Hollow at Mile 134.23, and Resley Run at Mile 134.25. A 22 ft. long spillway carries off the excess water here. A similar but smaller situation exists near the foot of Tunnel Hollow at Mile 154.24, where an unusually complex waste weir provided for the outflow of excess water from a stream flowing into a pool on berm.

Lift Lock 34 is located directly below the point where Maryland's historic Harpers Ferry Road drops down to the river. Here, as all along the Potomac in this region, the bed of the river is significantly recessed below the average elevation of the countryside to its north and south. As a consequence, roads approaching the river drop down steeply as they near it, and the Harpers Ferry Road is a good example of this phenomenon.

Lift Lock 33 at Mile 60.7 has been significantly rebuilt or repaired several times, likely because of its vulnerability to floods since it is located opposite the confluence of the Shenandoah and Potomac Rivers. The

canal upstream was wide for some distance and served as a basin where boats could tie up on the berm. It is likely that it also served as a water-holding basin that would help maintain the level of the canal below the lock when the river lock downstream at Mile 60.62, was filled. The large and elaborate masonry bypass culvert here would have allowed for a substantial release of water from the pool above the lock if needed.

Although little of the river lock remains except for a small amount of the stone at the canal end, this lock would have been very deep as it was, in effect, a vertical elevator from the bottom of the river pool to the surface level of the canal prism at the top. Because the current towpath is lower than it was in historic times, and the river end is missing, it is hard to appreciate (or precisely calculate) the depth of this lock.

We also know that this lock was not constructed for the large canal boats. This created a problem for Union forces after the combined road and railroad bridge across the Potomac at Harpers Ferry was destroyed on Sept. 18, 1862. On Feb. 8, 1863, when General McClellan planned to use the river lock to lower canal boats to the river for use as pontoons for a "permanent" bridge across the Potomac, he learned "that the lock was too small to permit the passage of [canal] boats, it having been built for a class of boats running on the Shenandoah Canal, and too narrow by some four or six inches for the canal boats." (See Snyder, Timothy R. *Trembling in the Balance: The Chesapeake and Ohio Canal During the Civil War*, Blue Mustang Press, 2011, p. 107.) Also note that the so-called "Shenandoah Canal" was in actuality a river navigation system with bypass canals around rapids and mill dams.

Having been built for the shallower draft river boats, there might have been less than 6 feet of water in the lock when set for opening or closing the river gates. To avoid gates as high as the lock's depth at the canal end, it seems certain that those gates were on top of a breast wall (like the upstream gates in the first 25 C&O Canal lift locks). The alternative full-length gates in front of the breast wall would have been extremely heavy and difficult to manage as well as requiring a longer chamber to include the gates. When located on the breast wall, gates need only have been about 8 feet high, allowing for the 6 feet depth of the water in the canal and a couple extra feet above that.

Contrarily, the gates at the river end would seem to have necessarily spanned the entire height of the lock from its bottom in the river to a level somewhat higher than the surface water level of the canal above. Fortunately there is a photo that shows the river end of the lock, revealing a most unusual gate design at the river end: a wall of heavy planks is in place across the upper part of the area for the gate and miter gates are below it, the top of which appear to be flush with the bottom plank (likely forming an effective seal). The means by which the gates were opened and closed would have had to extend from the top of the lock down the plank wall to the gates below. Obviously also, the wall was high enough to allow boats to pass under it.

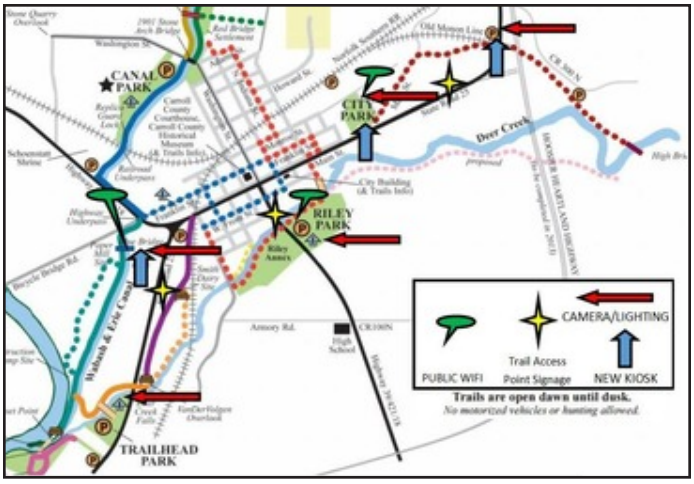
Some of the same design features on this river lock may have been used on the river lock opposite Shepherdstown at Mile 72.65. However, in the case of the river locks at Mile 30.64 (just one-fifth mile below Edwards Ferry), the engineers had enough space between the canal and the river to use a two-chambered staircase lock (i.e., two locks sharing a common gate) to overcome the vertical distance between the river and canal levels.

It was clearly assumed that the river boats using the lock would have been headed downstream toward tidewater, as is apparent for the orientation of the lock at an angle to the canal that would release boats in the downstream direction and receive boats coming up the canal to it. Additionally, the bridge over the opening to the river lock seemed to span a wider area than that of the lock itself, suggesting that there was a space to allow a boat to leave the lock while one waited to enter.

Harpers Ferry was expected to be a major transshipment point between the canal and the fertile Shenandoah Valley. Unfortunately, the canal company was never able to purchase or lease land for a wharf on the Point at Harpers Ferry. If they had, Harpers Ferry's place in C&O Canal history might have been much greater than it was.

Spring Ushers In Trail Security Enhancements on the Wabash and Erie Canal

– Wabash & Erie Canal Association



Five public entrance sites for Delphi Historic Trails will be equipped with video cameras, recorders, trail safety information and an overall trail system map to provide greater users' security. Funds were raised last year that are now vested with both the Canal Association and the City of Delphi to implement these trail security measures.

Trail enthusiasts seek information at historical sites along the trails. Kiosks and many permanent posters are located along Delphi Historical Trails.

This twenty-five year old kiosk at Trailhead Park will be replaced with a new more secure metal kiosk at the five public entrance sites shown on the trail map above.

Camera recording equipment will be housed in a safe lockable box for review by officials. Some of these sites are inside buildings however in remote locations the lockable box will be inside the secure kiosk structures.

In addition, tenth-mile marking posts will soon be installed to identify where you are on the trails. Coded with routed trail names and distance from the beginning of each trail a hiker needing emergency assistance will be able to call 9-1-1 and relate the identification on the post so EMS or Police can respond.

Delphi Body Works owner/manager Dick Bradshaw (left) is working with his Plant Manager Jim Johnston review the steel materials selected that will be welded to make a strong outdoor lockable facility Inside will be the camera recording equipment and a video screen kept safe under lock and key.

Inside Bradshaw's factory the construction and welding of the frame begins. The three sided base will ultimately set in concrete and the eye level 36 by 48 inch panels will be fitted with colorful inserts containing safety and trail information. One panel will be hinged and lockable with access to the recording equipment box in the middle.

Back in Canal Park the Monday-Wednesday-Friday volunteers begin work building the frame of a kiosk roof. Made stout with treated pine struts radiating from a central six sided frame their assembly work begins.

CANALENDER

June 2-3, 2018: Delaware & Lehigh National Heritage Corridor 30th Anniversary celebration. Hugh Moore Park, Easton. 30th Anniversary celebration on June 2. Bike to Brunch event on June 3. For further event information visit www.delawareandlehigh.org/dl-30/

June 23, 2018: Canal Day event at Waterloo Village, Canal Society of New Jersey. 525 Waterloo Road, Stanhope, N.J. For further event information visit www.canalsocietynj.org/events/.

June 24, 2018: 36th Annual Canal Day – Lock 60 at Schuylkill Canal Park. 400 Towpath Rd., Mont Clare, Pa. For further event information visit schuylkillcanal.org/ or call 610-917-8030.

July 7-8, 2018: Wabash and Erie Canal Days. Noon - 4:00 p.m. each day. 1030 W Washington St., Delphi, In. For further event information visit www.wabashanderiecanal.org/.

July 14, 2018: Mini-Tour, Clark, Penn. Shenango River Lake. For further event information visit www.canalsocietyohio.org/shenango-reservoir-tour.html.

Sept. 10-12, 2018: World Canals Conference 2018, Athlone, Ireland. Journey to Athlone Co. Westmeath in the heart of Ireland and at the heart of the Irish Inland Waterways network. See article and schedule on page 5 of this newsletter. For further event information visit www.wccireland2018.com/

Oct. 5-7, 2018: Canal Society of Indiana 2018 Fall Tour, Piqua, Ohio. Miami & Erie Canal. For further event information visit indcanal.org/canalander/.

Oct. 14-16, 2018: New York State Canal Conference: Hilton Garden Inn, Staten Island, N.Y. Visit newyorkcanals.org for more information.

Oct. 19-21, 2018: Joint Fall Tour 2018 hosted by the Canal Society of Ohio and the Pennsylvania Canal Society: Portage Lakes area. For further event information visit www.canalsocietyohio.org/october-joint-fall-tour.html

Sept., 2019: World Canals Conference 2019, Yangzhou, China: Dates and details to be determined.

Sept. 2020: World Canals Conference 2020, Leipzig, Germany: Dates and details to be determined.

American Canal Society Annual Directors Meeting

The ACS directors meeting will be held 3 – 5 p.m. on Friday, October 19th in Akron, Ohio. This will be in conjunction with joint fall tour weekend on October 19-21 hosted by the Canal Society of Ohio and the Pennsylvania Canal Society. The meeting hotel is the Holiday Inn Express Akron South, 898 Arlington Ridge East, Akron, OH 44312. Phone 330-644-5600. For individual rooms for Friday and Saturday night the CSO rate is $101.00 per night. Be sure to mention the Canal Society of Ohio when making reservations. Further info on the weekend will be forthcoming later.

David Barber has served as the ACS President for the past sixteen years. He has decided to step down as the president effective with the October meeting. He will continue as a director, the ACS webmaster, and chair of the Canal Index Committee. ACS officers are elected by the Directors at the annual meeting. Please email any thoughts or nominations for the next president to Bob Schmidt at indcanal@aol.com