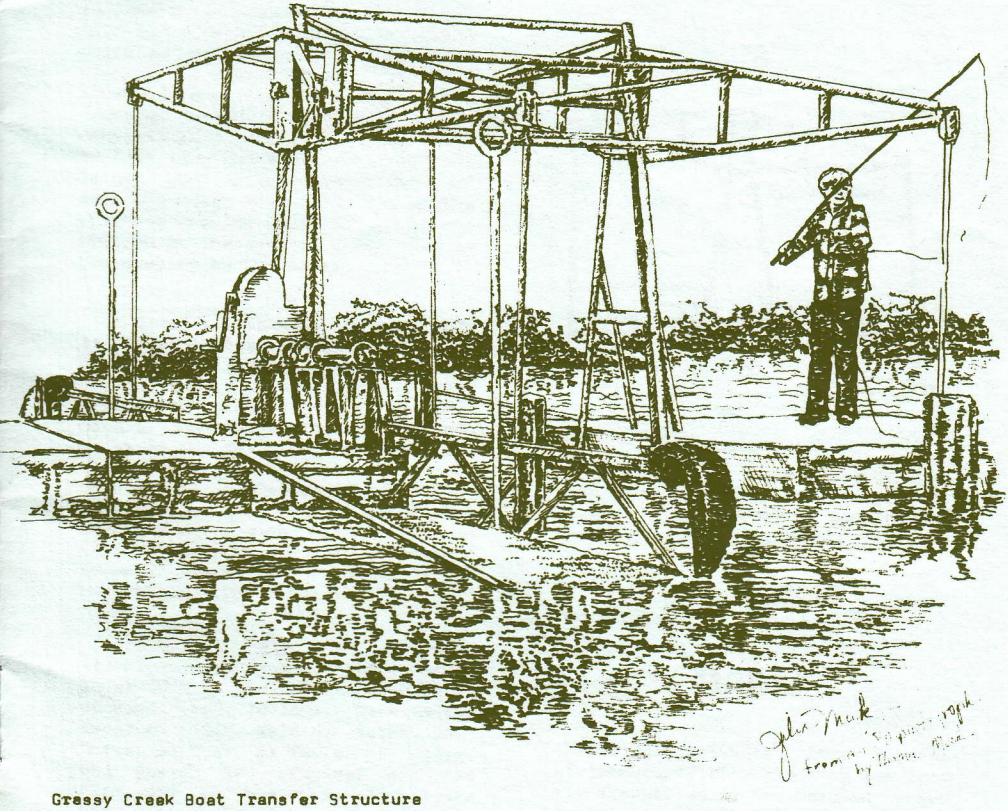
INDIANA WATERWAYS

Volume I, Issue 3, February, 1982



Grassy Creek Boat Transfer Structure

in Kosciusko County, Indiana (see story inside)

An Unusual Navigation Aid

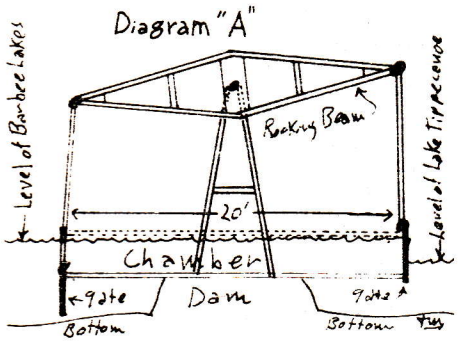
Thomas Meek

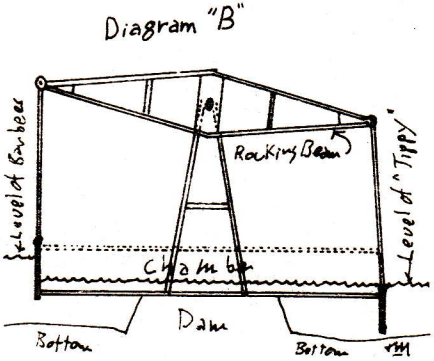
The type of lock which is most common to our experience is called a "pound lock" because it has gates at both ends of the chamber and the water is thus impounded while the lock is in operation. Another type of lock, less familiar to Americans, but at one time fairly common in parts of England is the "flash lock" which has but one gate which is normally closed, but which is opened just before the passage of the boat which is taken through in the "flash" of water boiling through the opening.

On Grassy Creek, which connects the Barbee Chain of lakes with Lake Tippecanoe in Kosciusko County, Indiana, is a most unusual structure which is neither of the above, but seems to be a third type. As illustrated in the diagrams, the Boat Transfer Structure, as it is called, consists of a chamber which is about 20 feet long and about two feet deep. It has vertically sliding gates at each end which are connected by the overhead rocking beam. Motion is controlled by the central crank seen in the drawing on the cover.

In order to descend, the structure is placed in the position shown in Diagram "A". The boat is pushed into the chamber and the device cranked around to the position shown in diagram "B". The boat is then able to continue on its way. As might be imagined, there is a rush of water through the chamber while the mechanism is being changed, but since the boats are all under twenty feet in length, and the maximum difference in water levels is only about 1½ ft. this causes little trouble.

The Barbee Lakes Boat Transfer Structure was designed and built in about 1962 by the Amick Welding Works of Huntington, Indiana. Jack Amick, owner of Amick Welding Works, informs us that as far as he knows, the design was original with his firm, and is the only one of its kind. It was built to replace a set of rollers which had formerly been used to transfer boats over the dam, and which had proved to be unsatisfactory. The present structure seems to perform its function admirably, and its fresh appearance belies its age of twenty years.





Our thanks to the Indiana Department of Natural Resources and to the Amick Welding Works of Huntington for their kind assistance.

Oops!

Our apologies to Henry Blommel of Connersville, whose name was grossly misspelled in the December issue. In addition to learning how to spell his name, we have found that Mr. Blommel is an accomplished author as well as a local historian. Henry has consented to write an article for INDIANA WATERWAYS and we are looking forward to it.

A Note of Thanks

Julia Meek

Our special thanks to the following readers who have sent donations to INDIANA WATERWAYS:

Mr.& Mrs. Don Lieberum
B.W.Morant
Mr. & Mrs. Mark Polloni
Milford Anness
Mr.& Mrs. Tom Stuart
Mr. & Mrs. Ben Meek

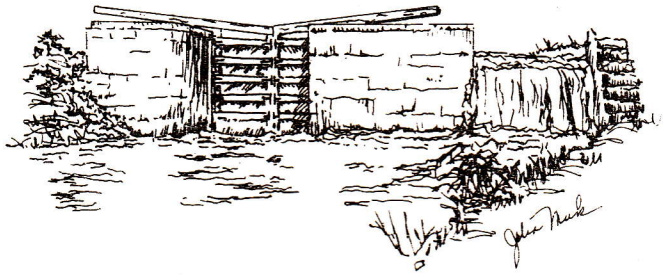
These donations enable us to publish twelve page issues occasionally, as we did this month, and to supplement our line drawings and diagrams with photographs in the future.

Thanks, also, to Beth McEntee for volunteering her time (and tongue) in getting our original mailings out.

Belated thanks and congratulations on a job well done to the Hoosiers who played integral parts in the Canal Society of Ohio's Fall tour of the Whitewater Canal:

Harry Smith
Lowell Sasser
Fred Bunzendahl
Paul Baudendistel
Milford Anness
Walter Johnson
Don Dunaway
Ralph May
Henry Blommel

These folks donated time, trouble and enthusiasm in every area of the tour from local history talks and tours, to showing lock ruins on their private property, to actually giving us our canal boat ride. Their hospitality was wonderful, and helped make the tour a great success.



LOCK #24 (Millville Lock) on the Whitewater Canal

The Wabash & Erie Canal: Begun 150 Years Ago

Thomas Meek

An act of Congress of March 2, 1827 granted "every alternate section of land, equal to five miles in width", on both sides of the canal line, to the State of Indiana in order to allow the state to finance the construction of the canal through sales of the land. As a condition of the grant, the State was required to begin construction within five years, or before March 2, 1832.

Accordingly, the Commissioners of the Wabash & Erie Canal, according to the Cass County Times of March 2, 1832, "met at Fort Wayne on the 22d ult. for the purpose of carrying into effect the requisition of the late law...; whereupon the Commissioners appointed the anniversary of the birth of the Father of his country, as the day on which the first excavation should be made on said canal..."

(continued on page 12)

Four Types of Locks Used on the Wabash & Erie Canal

Thomas Meek

Generally, when we think of a canal lock, a specific image comes to mind: A massive stone-lined chamber sunk in the earth with huge wooden gates at each end. The cut stone lock of this type was the most common and most desirable form of lock construction used on America's nineteenth century canal network. Stone is strong and very durable, although it requires a great deal of skill to shape and place the stones, and considerable foresight to design a watertight chamber. Stone could be worked and utilized well by the fairly low level of technology available in Indiana of the 1830's. As may be deduced, lock construction required high quality stone, capable not only of being cut and worked to an unusual degree of precision, but able to withstand the constant damp and yearly freezing to which the locks were subject.

At the time in which the Wabash & Erie Canal was being planned, part of the task of the surveyors was to determine the locations of suitable outcrops of building stone. Not only lock chambers, but culverts, waste-wiers, bridge and aqueduct abutments and piers were to be constructed of cut stone. Most of the line surveyed contained promising outcrops of limestone.

In those areas lacking usable building stone, the structures were to be first constructed of timber and would be rebuilt in durable stone when the transportation became available to the stone-bearing regions.

Construction was begun on Feb.22, 1832 near Fort Wayne in Allen County, a county which does not contain a single natural outcropping of bedrock, usable or not. The Feeder Dam on the St. Joseph River, seven miles North of Fort Wayne, was constructed largely of timber. The culverts which carried small streams under the canal were likewise built of wood. Flood gates, aqueduct piers, abutments and locks were all built of timber, with plans to rebuild them in fine, durable cut stone as soon as such stone became available.[1]

Construction of the canal went on past Huntington and Wabash, but by the end of 1836, it was apparant that things were not proceeding according to expectations. In December of that year, William B. Mitchell, a Civil Engineer employed by the State wrote:

[2]**"It was expected that the Board would have the satisfaction in their report of this year's operations, of announcing the extension of navigation westwardly to LaFountain's Creek, a distance from Huntington of thirty-five miles; but this has been prevented solely by extraordainary difficulties in procuring stone suitable for the locks. It is greatly to be regretted that the Wabash valley, abounding as it does with cliffs and quarries of lime stone, should afford so little that will answer for the important mechanical structures appertaining to the canal. This peculiarity in the stone formation of that region has been the source of much dissapointment and delay in the prosecution of the work. Many quarries which appeared favorable on the face, have terminated after being opened, in an ill-shapen mass which could not be quarried, while others which furnished stone of suitable size and shape, were of necessity condemned for the want of sufficient hardness and durability to withstand the operations of the frost. In consequence of this uncertainty in the character of the materials, changes of plan have frequently become necessary after the locks have been placed under contract."**

The seriousness of this lack of stone suitable for cut-stone locks is perhaps best shown by the fact that when the canal was completed to Evansville in 1854, of 73 locks of the Wabash & Erie in the State of Indiana, only fourteen were built of cut stone.[3] Even these few were not very satisfactory. In his 1847 report, Chief Engineer Jesse L. Williams describes lock #12 near Lagro: "These stone are not sufficiently durable to answer in a situation so exposed as the face of the lock, and are beginning to fail under the action of the weather." Lock #13, also near Lagro, is said to be the same. Locks #14 and #15: "...stone are beginning to decay." Of Lock #16

in the town of Wabash: "...9 feet lift, of cut stone. The stone of which this lock is built are very imperfect, and wholly unfit for lock masonry." Williams continues to complain of poor-quality stone all down the upper Wabash valley. When at last he could get good stone from the Georgetown Quarry west of Logansport for use on Lock #27, alas: "The stone are durable, but the workmanship very imperfect." It must have been disheartening for poor Jesse Williams. These "permanent" structures, upon which he had built much of his reputation as an engineer, and which were already showing signs of early ruin, were all less than ten years old.

When building stone of only fair quality was obtainable, there was a workable alternative. The "combined" lock had walls built of such stone as was available and lined with watertight planking. These structures were apparently adequate, although they required the occasional renewal of the wooden components. Nonetheless, there were only six of these locks constructed on the entire Wabash & Erie Canal and only one of them survives; Lock #28 near Lockport in Carroll County. In the Southeastern part of the state, where the stone was somewhat better, several of these locks may still be seen along the Whitewater Canal.

In regions where usable building stone could not be obtained, there were two choices: The "Timber Crib plan" of lock construction was the most common, accounting for 39 or over half of 73 locks in Indiana on the Wabash & Erie.[4] In his 1847 report, Jesse Williams describes five locks at and near Huntington: "They were built upon the wooden crib plan —the cribs filled with earth, gravel and stone, and faced with two inch plank."

In a report of 1852,[5] Engineer William J. Ball gives a more detailed description of the crib-type lock:

"Lock No.43, of 8 1/2 feet lift, situate four miles south of Terre Haute, is built of timber on the crib plan. The foundation timbers, 12 inches thick, are laid six inches apart on an average. Fifteen and a half feet in length, measuring from the upper end, and 31 feet in length measuring from the lower end, are of timbers 36 feet long. Three sticks in the chamber are of the same height, the remainder being 18 feet long.

"The cribs are 10 feet wide from out to out, the front and back walls being connected by round ties dovetailed at both ends. On each side there are six posts and braces, placed against the back wall to prevent the cribs from settling inwards. The second stick from the bottom of the back wall projects inwards 2 inches, on to which the posts are notched and prevented from rising. Back of the back wall there are two courses of round timber connected with the back wall by round ties, more effectuall to prevent settling inwards. Within the chamber and about the upper gates, the foundation is covered with two courses of 2 inch oak plank, the sides with one course.—Foundation planking secured with wrought spikes 3/8 inch square and 10 inches long, sides with 6 inch cut spikes."

We have attempted to show what such a construction might have looked like in Drawing #2.

The remaining 14 locks were constructed on what was called the "Timber Frame Plan". The best description is again by Engineer Ball in his 1852 Report:

"Just below the Sugarcreek Aqueduct, Lock No.38 of 6 feet lift, is introduced. This is built upon the frame plan, consisting of a double set of bents, one resting upon the top of the other, and secured by iron rods 1 1/8 inches diameter, placed immediately back of the front posts, and extending first from the foundation timber to the cap of lower bent, and then from said cap to the cross tie, connecting the front and back coping timbers of the lock. The foundation consists of timbers from 37 to 47 feet long, 12 inches thick, placed about six inches apart, covered with two courses of 2 inch plank. The posts of the lower bents are framed into the foundation timbers."

From the preceding rather sparse description, Drawing #3 has been prepared. (As mentioned in the "Note About the Drawings" there is considerable room for error. Probably the most difficult problem was in the "double set of bents, one resting upon the top of the other.." We were unable to find a precise definition of the term "bent". It seems to be a rather general term describing a framework designed to resist lateral as well as vertical forces. Although such a structure might take a variety of forms, the fact that "front and back coping timbers" are mentioned seems to indicate that the "bents" were rectangular, thus the 'X'-type frames. The number of frames required per side is not known. We have guessed at a spacing

of about six feet. Otherwise, we have tried to produce a drawing which conforms to the general form of the other types of locks and "makes sense", while fitting the parameters of the description.

If any readers know of existing photographs or drawings of the Timber Frame or Timber Crib locks, we would be very grateful to learn of them. These unusual lock types are an interesting subject and we will publish any material which is made available to us.)

We do not know, at present, how many of these wooden locks may have been re-built in stone according to plan, but as yet we have found no evidence that any of them were. The receipts from the tolls were too small and repairs on the canal were too expensive. The Canal Commissioners seem to have used all the money available (and a little more) just to keep the waterway in operation. The only wooden structure on which we have any positive evidence of having been re-built in stone is the "Silver Creek Arch" in Huntington County which was re-built in stone by Charles Foster of Huntington in 1862. [6]

A drawing and detailed discussion of the cut-stone type of lock construction has not been included, partially because of space and time limitations and also because the subject has been amply discussed by others. Readers are referred to the following current publications:

EARLY LOCK CONSTRUCTION by Frank W. Trevorrow published in Towpaths Vol.XVI,No.4, 1978 detailled and illustrated with photos & diagrams. Send $1.50 to:
Canal Society of Ohio
550 Copely Road
Akron, Ohio 44320

I&M CANAL LOCKS by J.M.Lamb fine discussion of the locks used on the Illinois & Michigan Canal. Illustrated with many original dwgs. and plans of details like ironwork, etc. Published by
Illinois Canal Society
1109 Garfield Ave.
Lockport, Illinois 60441
Price: $2.00

. . . — . . .

NOTES:

[1] REPORT OF THE CANAL COMMISSIONERS 1835-State of Indiana Documentary Journal-Indianapolis 1835

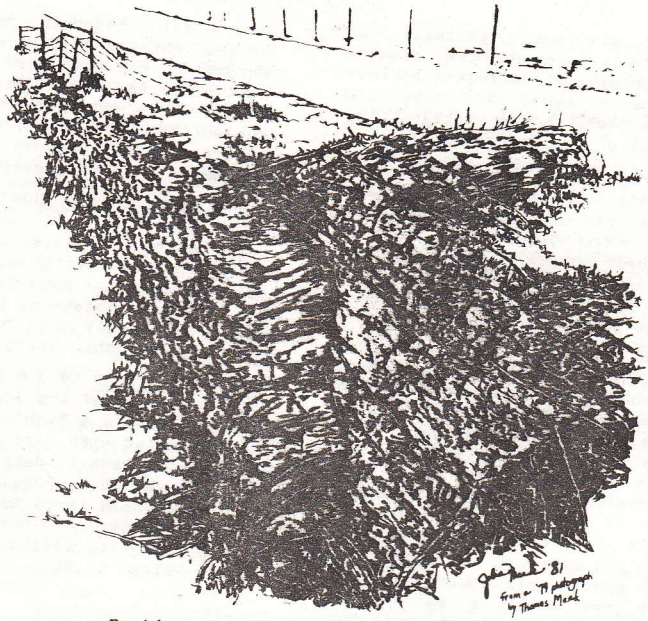
[2] REPORT OF THE CANAL COMMISSIONERS, 1836

[3] REPORT OF THE CANAL COMMISSIONERS: Chief Engineers'Reports J.L.Williams 1847; W.J.Ball,1852

[4] Between the State Line and Junction, Ohio, there were six locks on the W&E. These appear to have been of wooden construction, although we do not have details. Other W&E locks in Ohio are stone, although they may have been originally built of timber.

[5] REPORT OF CHIEF ENGINEER, 1852: W.J.Ball, Doc.Jour.

[6] Huntington Herald Oct.6, 1923: "Charles Foster, 93, Tells of his Life in This County, And of Its Changes" by F.S.Bash (Thanks to Doris M.Chambers of Huntington for this information.)



Portion of LOCK #28 in Carroll County
The only surviving Combined Lock on
the Wabash & Erie

...About the Drawings

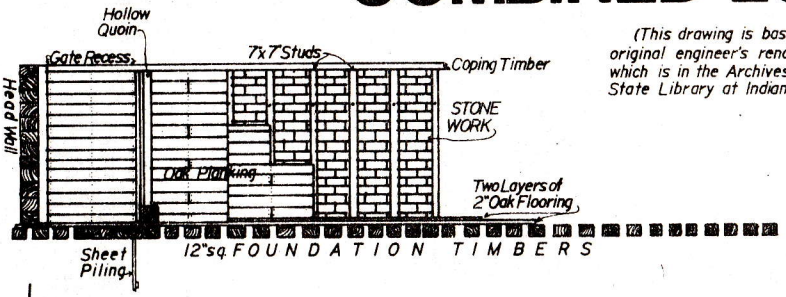
The diagrams of the lock types appearing in this issue must not be taken out of context. The drawing of the "combined" lock adheres rather closely to an original construction drawing of a "COMBINED LOCK OF NINE FEET LIFT" for use on the Whitewater Canal. It is assumed that the general construction of the locks did not vary from the Whitewater to the Wabash & Erie, and so the descriptions are hoped to suffice for all of the Indiana locks. The original 'Combined Lock' drawing is in the Archives of the Indiana State Library at Indianapolis, and is a beautiful and very skillfully executed rendering in watercolor and black ink. I have tried to retain the general style and "feel" of the original while introducing the modifications necessary for one-color printing at the much-reduced size in which it appears here. The other drawings utilize the same 'matrix' as regards the layout of the working parts, as it is assumed that this was fairly constant throughout the system, although variations certainly did exist.

As for the other drawings, no original or other depictions of the 'crib type' or 'frame type' locks could be found. The renderings of these structures were worked up from rather sparse written descriptions by the State Engineer William Ball. The author and draughtsman is not an engineer, and there is room in the written descriptions for considerable error of interpretation. In addition, certain details are not specified in the written descriptions and have been filled in as well as possible on the basis of speculation and my minimal knowledge of construction techniques.

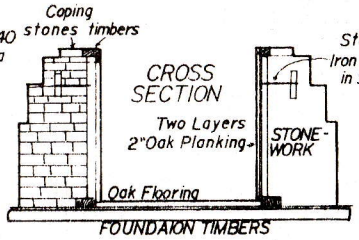
In light of all this uncertainty, the question might fairly be asked: "Why publish drawings which might be erroneous or even misleading?"

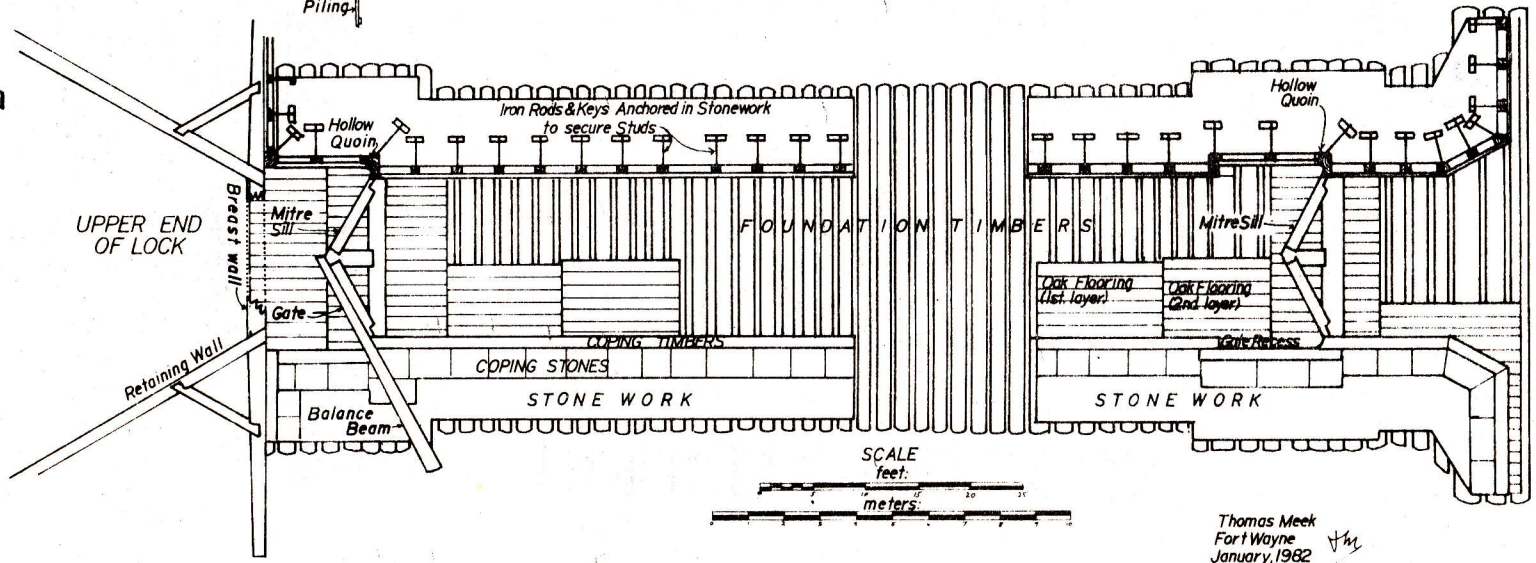
The main condition under which I can justify the publication of the drawings is that it be understood that they are of an hypothetical nature and represent a beginning, not an end. An "artist's conception" rather than a true rendering. It is hoped that these drawings might provide a sort of matrix for further study. We hope to continue the discussion in future issues of I.W so, if you have any ideas or suggestions, we welcome them.

Drawing 1 COMBINED LOCK



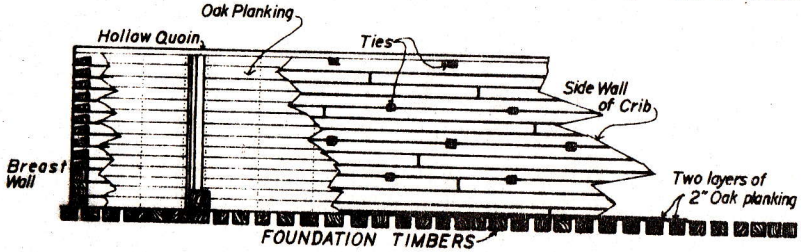
(This drawing is based upon an original engineer's rendering of ca. 1840 which is in the Archives of the Indiana State Library at Indianapolis.)

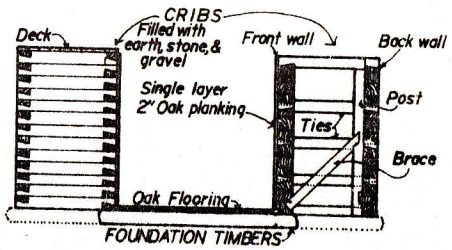


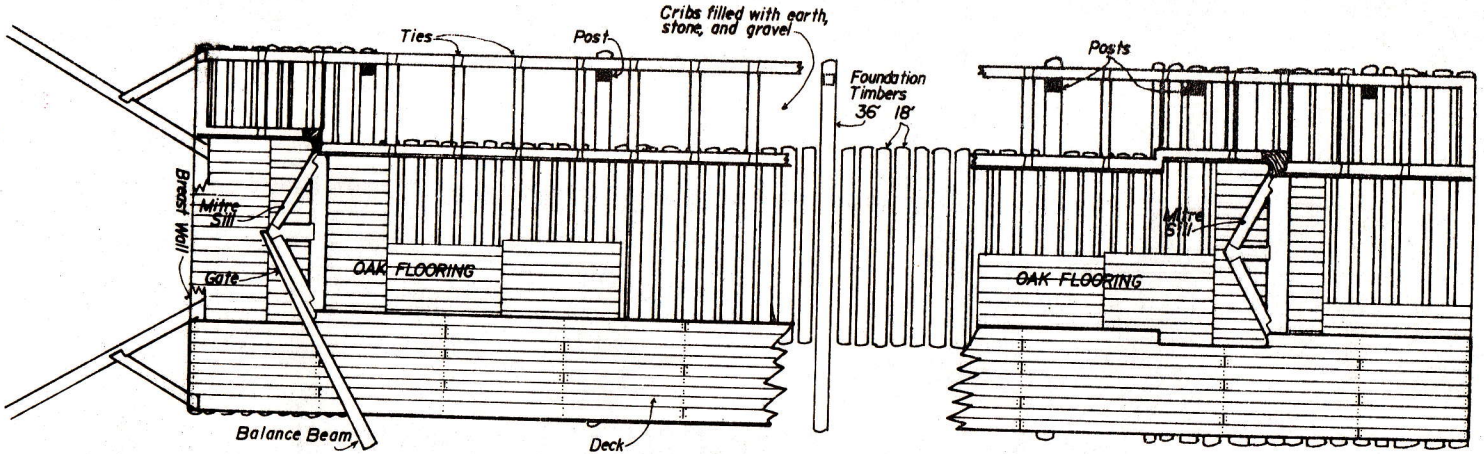


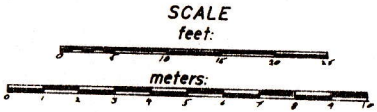
Thomas Meek
Fort Wayne
January, 1982

Drawing 2 TIMBER CRIB LOCK



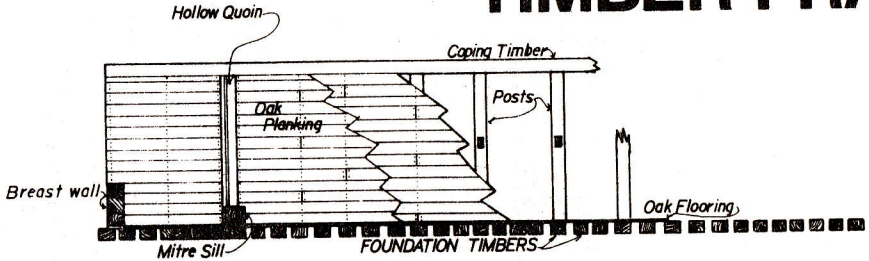


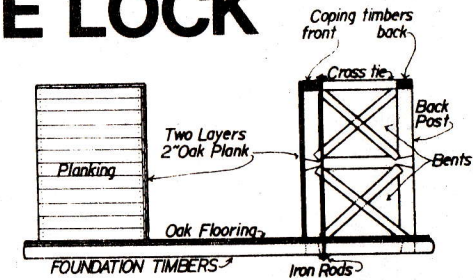


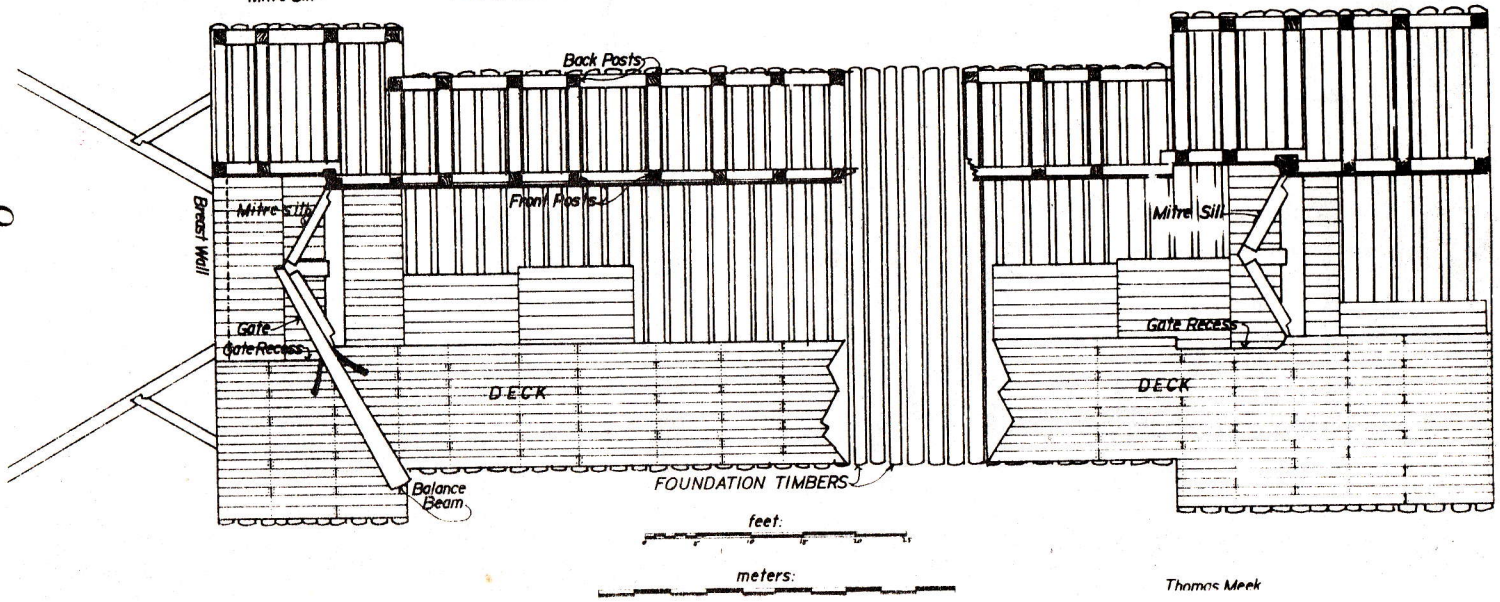


Thomas Meek
Fort Wayne
January, 1982 TM

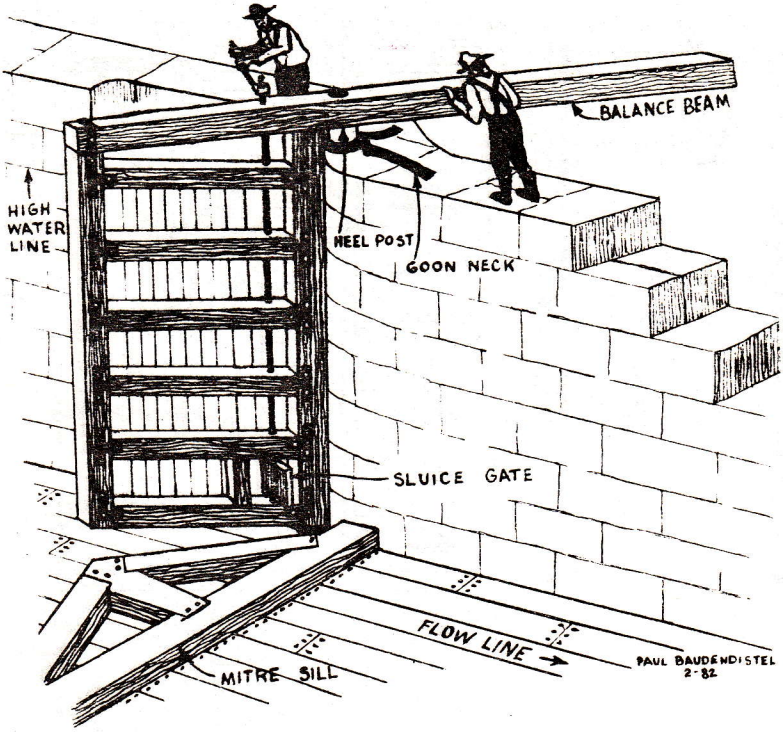
Drawing 3 TIMBER FRAME LOCK







Thomas Meek



Along the Whitewater Canal
by Paul Baudendistel

The following article is presented in hopes it may be useful to some one of our readers. I do not profess to being a writer or an authority, I just want to pass on these items which would have been helpful to me a few years back.

Several years ago I started trying to unravel the Whitewater Canal in Southeastern Indiana. At first it was just another pass-time interest like showing a visiting friend the local covered bridge. In no time I was one of a half dozen local canal buffs complete with my version of canal lock locations and research notes. I didn't realize at the time that I was formulating a structural index, it was just fascinating to me to find a lock ruin here-to-for unknown to me.

FIELD TRIP TO A LOCK RUIN

Have you ever ventured from the seat of your car out across an open field through mud wallows and raspberry patches to see a lock ruin said to be 'right near here'? Then I'm talking to you today. My name is Paul, I'm from Metamora, Indiana, Down on the Whitewater Canal. I am writing to you through this wonderful new channel, INDIANA WATERWAYS, to tell you how my sketching trips to potential canal structures got all out of hand and some of the additional observations and data collecting you might find yourself later interested in doing while you are looking over a canal structure site. These tips may save you several trips back in later years to satisfy your mind as to what you looked at but perhaps didn't see the first time.

Additional equipment required for these field observations will not break you up. They consist of a cloth tape measure of at least fifty feet and a note book. Eventually, your rough notes may be rewritten into a polished field book of some sort. I call mine a structure index log. Wouldn't it be nice to find one written a century ago! That's cause enough for me to take the trouble now.

Well there it is! A lock ruin in this case. You look at it, study camera angles. Did you bring your camera? Why of course you did. I wish I could learn to take more black and white glossy. That seems out of date today but printers frown at my pretty little color prints. 'Can't use Them', they keep telling me. But I never thought I'd ever want to have them printed. You got color film? You look at me, then take a couple of pictures. After admiring the labor that went into this pit, you soak up some images and impressions of the moment and you're ready to return to the car. You might not have minded staying there a bit longer but what else was there to do? Too many potential canal buffs lose interest at this point. Their photos are not as they remembered the scene and in too short a time their photo album says to them: 'You see one lock ruin, you've seen them all.' Not so, lad!

I've found on our canal that the locks generally aren't gone, they're just buried. Some times so little is left to be seen that it is difficult to determine whether it was a cut-stone lock or a combination lock. Both had a finish row of cap stone along the top. Lock Classification goes into my notebook. If all you see are two rows of cap stone you may as well put your camera up and give me a hand with my senseless paper work. Assuming we know approximately where we are and can determine which way the canal flowed through this lock, let's orient ourselves. Directions left and right will be as if standing at the upper end of the lock looking down stream through the chamber. I do this because canals meandered through our country much like rivers and compass bearings can be a good source of confusion. Example: The tow path runs along the left bank at this lock. I assumed that the towpath ran along the right side of our canal, but in some areas I found it on the left. I learned to make a note of the tow path if it still existed. Then I found structures with the spillway on the left side instead of on the right as they all were in my mind.

There is often a pond or small basin below the lock caused by the spillway falls, and the canal bed above the lock may be built in a fill section instead of a cut. I always thought of them digging the canal until I saw sections of earth fill with the canal bed constructed on top. Now I'll take some measurements. "Boy, is this guy gung ho" you say. We've all read that the canal was built 26' wide at the bottom and 40' wide at the water surface. That the water was four feet deep and the tow path was ten feet wide. Locks were 15' wide and 90 ft between gates, right? Measure a few and you'll begin to wonder how a boat builder knew what his limits were. There is a recessed area at each end of the chamber where the lock gates stood when fully open. A safe way to measure the length is to measure from the center of one recessed area to the center of the other. Unfortunately, the lock is rarely clean enough to get a 'lift' measurement and that is probably the most important. I started doing these measurements when I filled out a structural index form for the American Canal Society. Historic Landmarks of Indiana has a standard index form for historic buildings but it is not applicable to canals. Might the new Indiana Canal Society come up with such a form for us?

Next we look over the stone work. I'm not real sure why but I've seen knowledgable people do it like a bunch of moss inspectors so I do too. They are caught up in their own thoughts at this point. Some look for little pictograph trademarks left there by the stone masons, or a chiseled 'X' left by a surveyor as a level circuit bench mark. Stone in the locks along the Whitewater was quarried locally. The limestone here is of fair quality but there was not an abundant supply close at hand. There is a real variety in the stone used and sometimes it is obviously from more than one quarry. Even the poorer workmanship has stood up very well.

In addition to the stone masons there were carpenters and blacksmiths on a lock contract, plus sawyers to cut the timbers for gates and floor. During restoration of Lock 24 below Metamora, it was decided that a concrete floor would be put in. They cleaned out the mud and there was the old oak flooring useable as it was for several more

years. Blacksmiths' work may still be seen here and there. Boatspikes and tie rods, angle braces used to reinforce the gate timbers and sluice gate control rods. Just below the recessed areas look in the cap stone for the goon neck. This is a forged strap that braced the heel post. Here is where the gate hung. On the combination lock it may seem a wonder that so many of the tie rods are still in place. They extend three feet into the wall and are secured there with a stone about six inches thick bedded into the wall. The stone is drilled with a hole through which the rod passes. A 90 degree bend on this end of the tie rod holds it in by resting against the back of the stone. That's why they're still there and I'm glad they are.

Is there something I forgot to do? Any sign of an old mill race around this lock? I draw a rough map of what I can see from here. Houses, barns, roads etc. They help me plot this site on a topography map. At home I go through my research notes. All of our locks have a name, some have two or three local names. Generally it is the name of the farmer at that time or the contractor who built it. Lock 25 up at the mill here at the Whitewater Canal State Memorial is called Metamora Lock. Lock 24 below town was called both Millville and Gordons. Between them is the Duck Creek Aqueduct but that is a whole different story. This concludes our field trip for today. Perhaps we could go to an aqueduct sometime if anyone is interested.

End

(continued from page 2)

"The intention of the Commissioners having been made known, a large number of citizens of the town of Fort Wayne and its vicinity, together with a number of gentlemen from the valley of the Wabash, convened at the Masonic Hall for the purpose of making arrangements for the celebration of this important undertaking; whereupon Henry Rudisell, Esq. was called to the Chair, and David H. Colerick, appointed Secretary."

"The procession having then formed agreeably to order, proceeded across the St. Mary's River to the point selected, when a circle was formed, in which the Commissioner and orator took their stand. Charles W. Ewing, Esq. then rose, and, in his usual happy, eloquent manner, delivered an appropriate address, which was received with acclamation. J. Vigus, Esq. one of the Canal Commissioners, and the only one present, addressed the company; explained the reason why his colleagues were absent; adverted to the difficulties and embarrassments which the friends of the canal had encountered and overcome; noticed the importance of the work and the advantages which would ultimately be realized, and then concluded by saying, 'I am now about to commence the Wabash and Erie Canal, in the name and by the authority of the State of Indiana.' Having thus said, he 'struck the long-suspended blow'-broke ground-while the company hailed the event with three cheers. Judge Hanna and Capt. Murray...next approached and excavated the earth, and then commenced an indiscriminate digging and cutting. The procession then marched back to town in the manner it went forth, and dispersed in good order."

* from History of Allen County, Illustrated, 1880 T.B. Helm: Kingman Bros. Chicago

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CIRCULATION: Write to: INDIANA WATERWAYS c/o Allen County-Fort Wayne Historical Society, 302 East Berry Street, Fort Wayne, Indiana 46802 Rates: $5.00 yearly (six issues) Single issues $1.25 each. INDIANA WATERWAYS is published bi-monthly by DANDELION, 1414 Broadway, Fort Wayne, Indiana, 46802.