

## **SPOTLIGHT ON PA – THE JOHNSTOWN FLOOD**

For our first PA Spotlight Lesson we will be focusing on the Johnstown Flood of 1889.

The purpose of this lesson is to learn about the event, better understand its causes and effects, and to practice research and citation skills through the use of modern sources.



### **TASK #1: Learn about the Johnstown Flood**

*In order to learn the basic story of the Johnstown Flood, watch the linked video on Schoology. While you watch the video, answer the following questions.*

1. When did the Johnstown Flood happen?

**May 31, 1889**

2. Why did the flood occur?

**A man-made dam supporting a canal system collapsed and caused much water to flow downhill, carrying debris along with it.**

3. What devastation occurred before the wall of water hit Johnstown?

**The water hit Cambria Iron Works at Woodvale which swept railroad cars and barbed wire. It also catches fire when it hits Gautier Wire Works.**

4. Describe events as the wall of water hit Johnstown:

The city residents were surprised as the wall of water and debris came down. Some people tried to escape by running towards high ground but most were hit by the surging floodwater, and crushed by debris, caught in barbed wire, or drowned. Some who reached attics, roofs, or managed to stay on pieces of floating debris waited a while for help to arrive.

5. Describe the aftermath of the flood in Johnstown:

2,200 residents had died, the city was left in ruins, and many were left homeless.

**TASK #2: Read modern sources associated with the event**

*Read the two articles provided, and complete the questions that follow:*

ARTICLE #1

## **“Johnstown Flood of 1889: Greatest disaster in the state continues to resonate”**

[Text](#)

**PETER SMITH**

Pittsburgh Post-Gazette

[petersmith@post-gazette.com](mailto:petersmith@post-gazette.com)

<http://www.post-gazette.com/news/state/2014/05/25/Johnstown-Flood-of-1889-continues-to-resonate/stories/201405250142>

MAY 24, 2014

11:57 PM

At first, many people didn't even see the water for all it was plowing before it.

The estimated 37-foot-high torrent that exploded into Johnstown on the afternoon of May 31, 1889, had carried away so much in its 14-mile rampage down the Little Conemaugh River valley that one survivor recalled it as a "dark mass in which seethed houses, freight cars, trees, and animals."

In minutes, the entire contents of a man-made lake surged through this Cambria County industrial city, situated deep in a valley within the Laurel Highlands. Some 2,209 people were crushed, drowned or incinerated after the debris caught fire. Thousands became homeless. Johnstown became an epicenter of disaster relief and telegraph-era news coverage -- and a byword for the Gilded Age's class struggle.

Generations would pass before terms such as 1-percenter, superstorm and climate change entered the national vocabulary -- and the term "underwater" would itself enter the lexicon of mortgage finance.

But 125 years after the great Johnstown Flood of 1889, Pennsylvania's deadliest disaster continues to resonate in fields as diverse as ethics, water physics, legal theory, the growing economic divide and the increasingly fraught relationship between humans and their natural environment.

The disaster followed the catastrophic failure of the poorly maintained South Fork Dam at Lake Conemaugh, the exclusive resort of Pittsburgh's industrial elite -- including families whose names still adorn the Steel City's landmarks and skylines, such as Carnegie, Frick, Mellon, Phipps and Reed.

This week, Johnstown plans to commemorate the flood through religious services, readings of the victims' names and accounts of the flood, solemn music and other activities. Bells will ring through the valley, and 2,209 luminarias will be lighted in the evening along the dam ruins at the Johnstown Flood National Memorial.

"The flood story holds its fascination and relevance 125 years later," said Shelley Johannson, director of marketing and communications at the Johnstown Area Heritage Association. "The anniversary commemoration gives us a chance to look back at this defining event in the nation's history, and celebrate and recognize how far Johnstown has come as a community."

Even more than a century afterward, new artifacts and eyewitness documentation have come to light, and researchers are still filling in the story.

One recent study found that the South Fork Fishing and Hunting Club did an even worse job than previously documented in maintaining the dam. Another found that while the rich, powerful club members never paid a cent in legal damages, the disaster brought such outrage that American courts swiftly began expanding plaintiffs' rights to sue for damages in cases of industrial destruction -- even from defendants named Carnegie.

And the disaster fueled debate in the Gilded Age on issues -- the widening income gap, the outsized influence of money on the political process and justice system -- that resonate today in an era when the proverbial 1 percent consolidate a growing share of the nation's wealth.

"This was when the term robber barons was coined," said Richard Burkert, president of the Johnstown Area Heritage Association. "The concern at the time was, can you have a viable democracy when great wealth controls the political process? And even in the case of horrible accident like this, you have a group of people who are above the law, which is the way Victorian Americans saw this."

## **Natural forces, human assist**

The flood also looks like a forerunner of modern disasters, such as hurricanes Katrina and Sandy, in which natural forces were aggravated human-caused factors such as coastal erosion, engineering failures and flood-plain development.

The Johnstown Flood "is very much a natural disaster in quotation marks," said Megan O'Malley, chief of interpretation at the Johnstown Flood National Memorial, run by the National Park Service at the site of the former Lake Conemaugh.

Yes, it was raining heavily on May 31, 1889, inundating Johnstown and much of Pennsylvania even before the dam failed. But nature didn't put 15 million tons of water behind that poorly maintained earthen dam.

"There is a very strong environmental component that is beyond the control of humans, but you can't escape the fact that there are very, very substantial and clear examples of human negligence," Ms. O'Malley said.

Nobody was attempting to kill 2,000 people, but "there's an element of being indifferent that is extremely sinister, too," she added.

The South Fork Dam was originally built by the commonwealth to hold water that supplied a canal system --which quickly went out of business. The dam deteriorated under later owners before passing on to the South Fork Fishing and Hunting Club, whose members used Lake Conemaugh to sail, fish, socialize and escape the heat of Pittsburgh and the pollution of their own industries.

It has long been known that the club-supervised renovations on the dam actually weakened it in many ways -- lowering its height to accommodate a carriage-way, neglecting to repair a sag in its center, failing to replace drainage pipes that had been scrapped by a previous owner and installing a fish screen on the spillway that was fatefully clogged with debris on the day of the flood.

But the list of flaws only grew in a recent study of the dam by University of Pittsburgh at Johnstown researchers.

The dam once had a second spillway, but the club rendered it useless by lowering the dam below its entry point, the report said. And to patch holes in the dam, the club had used porous clay and other weak materials, which crumbled away on the day of the flood.

The ethical responsibility is unmistakable, the researchers wrote in a 2013 article in the journal Pennsylvania History: "It is hard to imagine what else the [club] could have done to invite the forthcoming disaster."

The study also concluded that the dam burst earlier than previously believed -- shortly before 3 p.m. rather than after -- and that the lake re-formed twice on its way to Johnstown. Each time

the waters got stuck behind railroad viaducts jammed with debris before bursting through with reloaded energy before entering Johnstown with enormous force.

The flood offers a cautionary tale today in an era of worsening flood-and-drought cycles attributed to climate change, said one of the researchers, Carrie Davis Todd, now professor of geology at Baldwin Wallace University in Ohio. "As the rest of our infrastructure continues to age, the likelihood of failure [grows], especially with more extreme precipitation and high-water events," she said.

### **The club's skillful defense**

At the time, some thought it was blasphemous to call the flood an "act of God," either as a theological term or a legal euphemism for nature. "A jury of Pennsylvania Lutherans, Reformed Dutch, Presbyterians, Methodists, Baptists or Catholics will not take readily to the attempt to cast the responsibility of such a catastrophe from the shoulders of the fine rich gentlemen who owned the fish pond and the rotten dam to the shoulders of God," said the influential American Law Review.

But the lightly capitalized club was skillfully defended by the law firm Knox & Reed, forerunner of today's Reed Smith, and even those cases that reached a jury failed. It's not clear why because documentation of the cases is minimal. But Jed Handelsman Shugerman, a Fordham University law professor, has written that the plaintiffs' main challenge was pinning responsibility on not just the club but its individual members.

Before the flood, many American courts had made it hard to sue industry and its captains, with the Pennsylvania Supreme Court absolving a mining company in 1886 of polluting a neighbor's land by saying "personal inconveniences ... must yield to the necessities of a great public industry."

But almost overnight after Johnstown and other dam breaks, courts in many states began holding industries to the British standard of "strict liability," meaning they had to pay damages for the messes they created without the plaintiff having to prove negligence.

"A series of terrifying experiences with the [industrial] revolution's darker side made the industrial age's risks more salient," Mr. Shugerman wrote in a study of the flood's legal fallout. Pennsylvania's top court practically ate its own earlier words when it ruled that Carnegie Bros. & Co. in 1891 could be held liable for polluting a neighbor's farm with its coke works. "The production of iron or steel or glass or coke [is] of great public importance," but the neighbors "stand on equal ground" before the law, the court ruled.

Had the flood lawsuits succeeded, there's no telling what would have happened to the fortunes that seeded what are today U.S. Steel, the law firm Reed Smith, Carnegie Mellon University, the Frick Art and Historical Center, the Phipps Conservatory and the Carnegie libraries, museums and philanthropies.

Tragically, 1889 wasn't the last time floodwaters wreaked devastation in and around Johnstown. Like much of Western Pennsylvania, the city was flooded during the deadly St. Patrick's Day storms of 1936, and torrential rains broke more dams in 1977, killing 85.

Today, as Johnstown works on renovating everything from its historic buildings to its rivers, it is also confronting the longer-range ecological costs of the industrial age. When residents commemorate the flood next weekend, they will do so at waters considerably cleaner than the discolored waters of years past.

"This whole heedless, headlong development that characterized the 19th century -- really the consequence of that is laid bare by the suffering of people here in Johnstown," Mr. Burkert said. "It's really taken 100 years or more to begin to address that legacy of environmental damage."

ARTICLE #2

<http://upj.pitt.edu/floodreport>

## Historic Challenge

### Study Contests Cause of Dam Breach That Led to 1889 Flood

Researchers from the University of Pittsburgh at Johnstown used hydrology and mapping expertise to challenge the 127-year-old findings of the cause of the 1889 Johnstown Flood.

Their report concludes that changes to the South Fork Dam by the South Fork Fishing & Hunting Club doomed the dam to fail. It stated that, before the Club acquired the property, the dam had partially breached in 1862. Had the Club repaired the dam to its original 1839 specifications it would likely have survived the storm of May 30-31, 1889.

Their article was published June 16, 2016, in the journal *Hydrology*, Volume 2, Issue 6, and titled [Dam-Breach hydrology of the Johnstown flood of 1889—challenging the findings of the 1891 investigation report.](#)

The report is the result of five years of research. According to the publication, the geologists modeled the hydraulics of the dam and used published LiDAR data (an infrared laser-based mapping system) to digitally recreate the onetime dam and lake that once served as the South Fork Fishing and Hunting Club's summer getaway.

"We had a GPS survey conducted that allowed us to estimate the lake levels at the time the dam failed," Coleman told the Johnstown ***Tribune-Democrat***, crediting Musser Engineering of Central City and Pitt-Johnstown engineering professor Brian Houston for partnering in that effort. The researchers found that the Club's employees had lowered the dam's crest by nearly three feet, one foot more than previously reported.

They also found that the lowering of the dam eliminated the action of an emergency spillway that was provided in the original design to protect the dam during floods. By making that move and failing

to replace five discharge pipes, the Club members "drastically affected that dam's ability to discharge storm water," Coleman said.

The geologists' report concluded that changes to the dam prior to its failure had reduced by one-half the dam's ability to discharge storm water. Those changes included impeded drainage and the lowering of the crest. The South Fork Dam was the largest earth dam (made of dirt and rock, rather than steel and concrete) in the United States, and Lake Conemaugh was the largest man-made lake at the time. The embankment of the South Fork dam measured 860-feet-wide by 72-feet-high, according to a [2013 article](#) published in *Pennsylvania History* by Kaktins, Carrie Davis Todd, Wojno, and Coleman.

The luxury outdoor club's members included industrialists Andrew Carnegie, Henry Clay Frick and Andrew Mellon. An 1891 report by the American Society of Civil Engineers blamed the flood on unusually heavy rainfall.

They asserted that the rainfall was so great the dam would have failed even if it had been rebuilt to its original design.

The discharge capacity of the original dam was more than *twice* that of the reconstructed dam and therefore could have avoided overtopping during the 1889 storm for as much as 14 hours even under extreme conditions of inflows to the lake. Such extreme conditions did not exist then because local streams reached maximum flood levels hours before the dam breach. The dam as originally designed and built would never have been overtopped and destroyed by the 1889 storm.

Coleman and his fellow researchers found evidence that the original dam with its higher crest survived a flood event shortly after it was built, in the spring of 1856 following a rapid snowmelt in the region. At the time the dam was at its design height and appears to have performed as intended, with two operating spillways and discharge pipes also in use.

Two of the engineers who investigated the Johnstown flood had previously investigated the failure of the Mill River Dam in Massachusetts in 1874. Although the incidents were similar, the engineers presented very different findings. Coleman commented on the discrepancy in a [Pittsburgh Post-Gazette](#) story. "In that (Mill River) report, they lambasted the whole operation. The owners, the materials they used, the builders - everything," he said. "But you see an entirely different philosophy appear at Johnstown, when they're investigating a dam owned by the greatest industrialists and financiers in the country."

The dam gave way on May 31, 1889, causing the Johnstown Flood's historic toll:

- 14.3-million tons of water from Lake Conemaugh rushed 14 miles downstream to Johnstown, according to the *Hydrology* report's [Analysis section](#)
- more than 2,200 people killed
- 33 train engines were pulled into the raging waters, creating greater hazards, according to [History.com](#)

At the time, it represented the single greatest loss of life in American history, according to the [Johnstown Flood Memorial Museum](#).

A [Post-Gazette editorial](#) on July 13, 2016, noted: "The newest chapter on the Johnstown flood, written not by historians but geologists, fixes blame for the disaster squarely on a sports club owned by some of Pittsburgh's industrial tycoons. The study represents an important convergence of academic disciplines and sheds new light on a tragedy that still haunts the region."

**TASK #3: Reflection on the Articles**

*After reading the two articles above, answer the following questions. Make sure to directly quote one or both of the above articles. When you do, attempt to properly include internal citation in your response.*

1. To what extent should the South Fork Hunting & Fishing Club be held responsible for the Johnstown Flood of 1889?

2. What did we learn about the Gilded Age when it comes to the importance of industry over the rights of individuals and the protection of the environment?

**TASK #4: Practicing a Works Cited:**

*Attempt to provide a works cited below. Cite all three sources used in this lesson: the youtube video and the two articles:*