Bringing the Geoprofessional to Life

by Barry Thacker, PE

Schnabel ENGINEERING

As the exploring engineer for "Empire Builder" James J. Hill in 1889, I discovered Marias Pass during 40-degree below zero weather.

He conquered the Rockies for an Empire Builder

Seventy years ago a 36-year-old civil engineer battled a roaring blizzard in 40 below zero weather to explore an elusive pass in the Rocky Mountains of northern Montana. This epic of human courage proved the passage existed and opened the way for Great Northern's low-level route between the Great Lakes and the Pacific Ocean.

John F. Stevens was determined to fulfill successfully an assignment from a man he never had seen—James J. Hill, the [illegible] confident that a low[illegible] ern tracks across th[illegible] the Continental Di[illegible] Canada. Maps sho[illegible] but there were no records that white men had explored it. Meriwether Lewis of the Lewis and Clark expedition vainly sought the pass and gave it its name in 1806.

Snow was already deep in the Rockies when Engineer Stevens took the job of locating the fabled pass. Factual information on the mountainous region was slim, and illness of his Indian guide forced Col. Stevens to alone make his successful reconnaissance of the Continental Divide on that bitterly cold and blizzardy winter day.

The doughty engineer's conquering of the Rockies gave Great Northern the lowest rail crossing of the Continental Di[illegible] the Montana Rockies with time-saving ease.

GREAT NORTHERN RAILWAY

TIME, JANUARY 25, 1960

James J. Hill

My statue at Marias Pass

So, you think your generation is the first to innovate…

“Big Smoke”

Earned a national reputation as a problem solver…

Engineer
Gustave Eiffel

In 1905, Secretary of War William Howard Taft recruited me to lead the construction of railroads in the Philippines…

Secretary Taft burst through my door, yelling, *"Stevens, what do you know about Panama?"*

While President Roosevelt was telling the press, "*We'll make the dirt fly*"…

Chief Engineer John Frank Stevens at Culebra Cut during Panama Canal Construction

I saw the Panama Canal as a railroad job, and it became American railroad engineering's greatest triumph.

…Convince President Roosevelt and Congress to build a lock-and-dam canal rather than a sea-level canal.

PHOTO FROM NOVEMBER
1906 PRESIDENTIAL VISIT
President Roosevelt sitting in the cab of the giant Bucyrus steam shovel at Bas Obispo (ICC Shovel 114)
Everyone knew success was certain after this visit!

When the U.S. entered The Great World War in April 1917, I offered my service and received a telegram to come to Washington.

First thing President Woodrow Wilson asked me when I walked in his office was, *"Stevens, what do you know about Russia?"*

The Trans-Siberian Railroad in the Early 20th Century
Trans-Siberian Line via China
Southern Branch through Moscow
Amur Line
Ussuri Line
Head of the Russian Railway Service Corps
Saint Petersburg
Moscow
Vologda
Vyatka
Perm
Yekaterinburg
Tyumen
Samara
Chelyabinsk
Omsk
Tomsk
Novosibirsk
Krasnoyarsk
Irkutsk
Chita
Khabarovsk
Harbin
Vladivostok
RUSSIA
MONGOLIA
IRAN
AFGHANISTAN
CHINA
CHINA
KOREA
JAPAN

My mission changed after the Communist Party seized control of Russia in October 1917, and President Wilson sent the AEF Siberia to protect American interests and assist in the removal of the Czech Legion from Russia…

For my service in Russia and China during and after the Great World War, I was awarded more medals than Sgt. Alvin York from Tennessee…

I finally came home in 1923.

Mississippi River Drainage Basin

In 1927, as President of the American Society of Civil Engineers, I proposed a joint commission between civilian engineers and the U.S. Army Corps of Engineers to once-and-for-all develop a plan to reduce flooding on the Mississippi River after the Great Flood of 1927.

At our annual ASCE Conference that year, I used the design and construction success of the Panama Canal as a model where flooding was controlled by dams on the Chagres River…

ASCE Vice President Arthur Morgan gave the keynote address on flood-control dams and reservoirs at the Conference...

Morgan was chief engineer for the first dams built to control flooding in America after the 1913 Dayton flood killed 400 people—this was at a time when the Corps of Engineers said dams offered no benefit to flood control according to its "levees only" policy…

"Dry Dams" with no moving parts designed according to his "conclusive engineering analysis method"

Morgan's "Dry Dams" worked as designed!

FLOOD WATERS BACKED UP BY ENGLEWOOD DAM

Taking your kids and grandkids to the dry dams after major storms became a rite of passage in Dayton to tell them the story of the Great Flood of 1913…

As president of Antioch College in Yellow Springs, OH, Morgan revitalized the school with a cooperative education program—*"the world needs more engineers able to talk about things besides engineering and baseball."*

But, the Corps nixed the proposed joint commission, thus standing by its "levees-only" doctrine for flood control.

Morgan published the periodical, *Antioch Notes*, to share his philosophy with others on education and social development, building a subscriber list of 20,000, which included Herbert Hoover and Franklin Delano Roosevelt.

While still serving as President of Antioch College, Morgan was chief engineer of the Muskingum Conservancy District in Ohio in 1933, when he got invited to visit newly-elected President Franklin Delano Roosevelt…

The Tennessee Valley is the first place in America where we can sit down and design a civilization.

—Arthur E. Morgan

The Knoxville News-Sentinel

PAGES 15 TO 28 KNOXVILLE, TENNESSEE, FRIDAY EVENING, DECEMBER 15, 1933.

Bock Is 'Water Man' for the TVA

Engineering and Geology Director Has Worked in 26 States

Built Railroads in South America, Mexico, Haiti.

(This is the fifth of a series of 20 sketches of key men of the Tennessee Valley Authority.—THE EDITOR.)

By JOHN T. MOUTOUX

MEN OF THE TVA

TAKING water from where it isn't wanted and putting it where it is has been the main life work of Carl A. Bock, director of general engineering and geology for the Tennessee Valley Authority.

"Water control and utilization" expresses it in more stilted language, if any prefer it that way.

During the past 23 years he has been in charge of flood control, irrigation, drainage, and reclamation projects in 26 states. Before joining the TVA he was vice-president of the Morgan Engineering Co., of which Chairman A. E. Morgan of the TVA was president. It was with the Morgan Co. that

Carl A. Bock, right, Chairman Arthur E. Morgan's right hand man on the TVA, has planned engineering projects in 26 states of this country, Haiti, Bolivia, and Mexico. He has specialized in water control and utilization.

This picture of the Miami River at its junction with the Mad River at Dayton, Ohio, was taken during the construction of the Miami Flood Control project by the Morgan Engineering Co. of which Mr. Bock was vice-president. The channel was dredged, the banks built up, and the land beyond the elevated banks filled in and transformed into parks. Even the river craft seen in the picture was built by the Morgan Co. The 1913 flood reached the second story of homes and stores in Dayton and flooded the streets as high as the street lamps. The flood control project cost $30,000,000. Since its completion Dayton and the other cities in the conservancy district have been freed of floods.

Other "Morgan Men"

The other TVA board members initially opposed funding for the City of Norris—

Four, 6-hour workdays per week to avoid fatigue…

Morgan was appalled by the 126 deaths that occurred during construction of Hoover Dam and convinced the other TVA board members to fund construction of the City of Norris.

Scrutiny at ASCE and World Conference on Large Dams Meetings

Morgan's plan worked—construction of Norris Dam was completed under budget and ahead of schedule with 6 fatalities, prior to the 1936 election.

Morgan became a rock star!

What did Morgan and his associates accomplish?

The TVA constructed an integrated system of dams in just 25 years, a feat never accomplished before or since

And they did so ahead of schedule
and within 1% of budget estimates.

Although Morgan was fired in 1938, the experts he hired and trained according to his Conclusive Engineering Analysis Method remained…

The TVA: a true Arsenal of Democracy

During World War II the TVA produced electrical power critical for shipbuilding, munitions, twinning of aircraft aluminum, and powered the world's first nuclear reactor at the Oak Ridge National Laboratory

In 1956, when he was 78 years old, Morgan was asked by a Quaker Friend to meet with Cornelius V. Seneca, head of the Seneca Nation.

Corps of Engineers' plan to build Kinzua Dam on Seneca land guaranteed by George Washington himself in a 1794 treaty that was to last "*so long as the sun rises and the river runs.*"

Morgan found what he considered a better alternative in the Conewango basin where extreme floodwater would drain to Lake Erie, but otherwise water could be stored for low-water augmentation to the Ohio River.

Morgan said, *"After seeing the prospect of creating $100M in value of low-water augmentation in the Conewango basin, I resigned my association with the Senecas and returned my fee, so I could work for myself without compensation.*

If I could create that kind of value to the public, I would have compensated my country for the privilege of citizenship."

On December 28, 1961, Morgan appeared on NBC's "Today Show," where NBC reporter Hugh Downs questioned him about Kinzua Dam to raise public awareness about the plight of the Seneca Nation…

The Kinzua Dam was built, George Washington was dishonored, the Seneca Nation was betrayed, Pittsburgh got less than total flood control, and the Ohio River lost its low-water augmentation, but Arthur Morgan was made an honorary member of the Seneca Nation.

As Morgan suggested, the Seneca Nation used the compensation it got for its loss to educate future generations to fight its battles.

How did the doctors, lawyers, and engineers of the Seneca Nation council their Indian chiefs to fight future battles?

Indian Opponent

Littlejohn Changes Mind on Tellico Dam

Hawk Littlejohn, noted Cherokee Indian who has been among the opponents of TVA's Tellico Dam project, has changed his stand on the issue.

In a letter to The News-Sentinel, Mr. Littlejohn said he now will "have to go along with Dr. Arthur A. Morgan's thinking on the project.

Dr. Morgan TVA's first board chairman, last summer suggested that TVA scrap the project and use the land already bought along the Little Tennessee River for the benefit of the Cherokees who once lived there.

However, Dr. Morgan recently changed his own mind and indicated he thinks the dam should be built. One factor in his change of opinion was the March flood which caused much damage in Chattanooga. Dr. Morgan said Tellico Dam could have averted much of that damage.

In his letter to The News-Sentinel, Mr. Littlejohn said:

"I have the greatest respect and admiration for Dr. Arthur A. Morgan as an engineer and as (a) humanitarian. I know that the Cherokee people are very sad about the flooding in Chattanooga. I have to go along with Dr. Morgan's expertise and wisdom regarding the Tellico Dam project. I hope that TVA shows their humanitarianism toward the great loss that the Cherokee people will suffer at the completion of the Tellico Dam project and perhaps find some compensation for their loss.

"I am not speaking as a spokesman for the Cherokee people—I speak for myself and let God decide on the completion of the Tellico Dam project."

19 April 1973–Knoxville News-Sentinel

When he was 94 years old, Morgan helped broker a deal between the Cherokee people and TVA, which enabled TVA to build Tellico Dam in return for funding works to preserve Cherokee heritage.

The Visionary

TVA Heritage

Arthur Morgan saw TVA as little less than a means of reinventing civilization. He was to prove far more adept at technical engineering than social engineering. But to the extent that TVA was and is an ongoing visionary experiment, the original impetus came from him.

Arthur E. Morgan's farsighted vision and exacting discipline built a system of dams and social management that changed the lives of millions of Valley residents. But what he couldn't manage was human nature.

Arthur E. Morgan was one of the most influential Directors of the Tennessee Valley Authority, and one of the most controversial. Perhaps he was also the one you'd be most likely to remember if you saw him in the street.

At 6 foot 2, he was as thin as Ichabod Crane; behind his black-rimmed spectacles his eyes had an intense and critical look that gave him the aspect of a startled predatory bird. Morgan caught people's attention, both with his appearance and with his unusual ideas.

When President Franklin D. Roosevelt hired him in 1933 as the first Chairman of the TVA Board, Morgan was famous for two things that might seem to have nothing to do with each other: building efficient dams for flood control, and believing in the perfectibility of humankind. In TVA he saw his chance to bring the two together.

Arthur E. Morgan's farsighted vision and exacting discipline built a system of dams and social management that changed the lives of millions of Valley residents...

A brilliant technical manager, Morgan launched a string of dam-building projects that almost always came in on time and under budget. But the dams, he believed, were only part of a larger effort to transform life in the Tennessee Valley. Morgan saw TVA as little less than a means of reinventing civilization. He was to prove far more adept at technical engineering than at social engineering. But to the extent that TVA was and is an ongoing visionary experiment, the original impetus came from him.

The idealistic Morgan's most evident achievement is literally cast in concrete: the TVA dams.

A career in STEM is not just a job, it's an adventure!
If we don't inspire the next generation to pursue careers in STEM, who will?
…teaching 8th-grade science class as a living STEM-historian

…teach 5th and 11th-grade history classes as a living STEM-historian

Mining engineer David R. Thomas, shown in circle, was a leader of miners during the Coal Creek War, which ended slavery (convict leasing) in Tennessee

…Conducting teacher-training sessions on the Coal Creek Labor Saga, which is now part of the social studies curriculum in Tennessee…

The Courier News
Wednesday, January 18, 2017

Engineering Better Readers in Briceville welcomes Lt. Governor

Staff Reports
editor@mycouriernews.com

It is that time of year again — time for Briceville Elementary School's Engineering Better Readers program to kick-off another year of reading to achieve success.

This year marks the third year Briceville Elementary School has participated in the Engineering Better Readers program, a nationwide program where a select number of schools are involved in an incentive to read type program to encourage school-age children to become avid readers at an early age.

Lt. Governor Randy McNally is welcomed by a Briceville Elementary School student during last Friday's "Engineering Better Readers" event. It was McNally's first "public appearance" after being named Lt. Governor Jan. 10. — Submitted

The EBR program kick-off this year was on Friday, Jan. 13, in the cafeteria at BES

Students in all grade levels listened to guest speakers Lt. Governor Randy McNally, Representative John D. Ragan, and Anderson County Mayor Terry Frank talk to them about the importance of read-

According to one teacher: "Last year, one of my students was struggling with reading, but then we started Engineering Better Readers and she started reading multiple books each night to earn points to buy prizes. By the end of the school-year, she was one of the best readers in my class."
So, how could portraying a famous geoprofessional as a living historian benefit your firm?
—It's fun—

Engineers
Herbert Hoover
and James B. Eads

Engineers of the
Panama Canal

Special thanks to:

- Dr. J. David Rogers, PE, Missouri University of Science and Technology
- Dr. Aaron Purcell, Virginia Tech
- Professor Clifford Foust, University of Maryland
- John Philip Bachner, Bachner Communications
- East Tennessee History Center—McClung Historical Collection
- Knoxville News-Sentinel Historical Archive

Geologist
Lou Henry Hoover

Mining Engineer
Bert Hoover

Coal Creek Scholars at Annual Scholars Day Event

Victoria and Kyle being interviewed in a TV news report as shown at ASFE (GBA) Conference in 2002….

The Courier News
Wednesday, December 27, 2017

Completing the circle in Briceville

The Coal Creek Scholars program began as a dream for an unbroken circle where Briceville students can participate in K-12 community service projects to celebrate their heritage and qualify for college scholarships.

In return, they agree to inspire Briceville fourth and fifth graders to continue that tradition.

The unbroken circle was on display Monday, Dec. 18, when 13 college students or graduates from Briceville told this year's fourth and fifth graders the importance of going to college during the 16th annual Coal Creek Scholars Day event.

Casey Swindall, Frances-Lee Dougherty, and Kyle Leinart told how their college degrees have enabled them to own their own businesses, thus helping them live the American Dream.

Jessica Hays McKinney told how she used her Coal Creek

Above: Coal Creek Scholars are pictured with Briceville Elementary School fourth and fifth graders during "Coal Creek Scholars Day." Not only did students get to hear from the scholars, but also got a visit from Santa AND were able to wear pajamas to school (it was Pajama Day.) Left: Barry Thacker speaks to students about RESPECT.

As a graduate of Briceville School with a master's degree in education, she is uniquely qualified for her current position — you can't ask for a better role model than that for Briceville students.

Briceville School's technology teacher Janis Bishop asked scholars if you need to be the smartest in your class to go to college, prompting them to respond in unison, "No."

Developing good study habits to earn good grades is important, but so is treating others with respect.

When you are applying to college or for a job, you will be asked to provide references. How you treat others will likely be the determining factor in whether you receive a positive or negative recommendation.

Disrespectful students will never live the American Dream, regardless of their grades.

The Courier News

Sunday, December 29, 2013

Ray E. Cox's newspaper of choice in Clinton, Tennessee • Volume 127 Issue 19

Coal Creek Scholars

Chris Silcox
chris@hometownclinton.com

'Never forget where you came from ...' but go as far as an education will take you

More than a dozen former Briceville Elementary School students returned to their former classrooms during the 12th Annual Coal Creek Watershed Foundation Scholars Day to deliver a profound message to the school's current fourth-and fifth-grade students: "Take advantage of the educational opportunities provided to you and never forget where you came from."

Coal Creek Watershed Foundation President Barry Thacker says that Coal Creek Scholars Day is always his favorite day of the year.

"This is what it's all about," said Thacker. "It's a big part of why we do this."

The Coal Creek Scholars Program was established in [illegible] Creek Watersh[illegible] to give gradua[illegible] mentar[illegible] ing a c[illegible] A 1[illegible] perce[illegible] ated [illegible]

cent from the rest of Tennessee. The same census showed that 0.5-percent of adults in Briceville graduated college compared to 16-percent from the rest of Tennessee.

Thacker is on a personal mission to help reverse that disturbing trend by making sure all the children of Briceville are afforded every educational opportunity to [illegible] goals.

[illegible] history of the region — Briceville is the site of one of the worst mining disasters in Ameri[illegible] Mine

Creek itself. Thacker says that it's his group's efforts to enhance educational opportunities for the children of Briceville - some of which are decedents of the miners who perished in the 1902 blast - through events like Scholars Day that has become the nucleus of all that [illegible]

[illegible] school ad[illegible] and applications for other scholarships.

The high school seniors who receive assistance through the CCWF are asked to serve as mentors to current Briceville Elementary students

A former Briceville Elementary School student talks to current BES fourth- and fifth-graders about how the Coal Creek Watershed Foundation Scholarship has benefited her through the years during the Thursday, Dec. 19, 12th Annual Coal Creek Watershed Foundation Scholars Day. More than a dozen former BES students took turns talking to current BES students, encouraging them to take pride in where they come from and to take advantage of all the opportunities afforded to them through the Coal Creek Watershed Foundation. — Chris Silcox

Creek Scholars, future Coal Creek Scholars, staff of Briceville Elementary School, and Dr. [illegible] Creek Scholar's Day. Scholarship recipients able to make the trip and [illegible] rgriff, Victoria Wright, Krystina Long, Samantha [illegible] owe, Ricky Bailey, and Emily [illegible]

Sunday, December 28, 2014

[illegible]er News

encouragement for the future

[illegible]y come from.
[illegible] the 14 scholars that

people for shaping them into the individuals they are and

from Briceville," said Coal Creek Scholar and former

and high school didn't think a whole lot of Briceville but [illegible] can honestly say that I am who I am today because of the people of Briceville."

Bailey is currently the st[illegible] dent body president at Tenn[illegible] see Temple and is working ward becoming a minister delivered to the audienc[illegible] 13 fifth graders and 14 f[illegible] graders one of the day's heartfelt testimonials.

"This means everyth[illegible] me," Bailey remarked can convince (the B[illegible] dents) to take adva[illegible] the opportunities [illegible] being given here th[illegible] mean so much to m[illegible] such a great oppo[illegible] them."

Bailey noted th[illegible] of the Coal Creek [illegible] he would gradua[illegible] Temple with zer[illegible] debt.

Witnessing th[illegible] nection the fo[illegible] students mak[illegible] the current [illegible] gets old for [illegible]

The ment[illegible] program is [illegible] cle to rem[illegible] thus, for e[illegible] Scholars [illegible] ger than [illegible] the visio[illegible]

Se[illegible]

[illegible] Barry Thacker, the Scho[illegible] [illegible]ram has evolved [illegible]tion and [illegible]lle com-

[illegible] Coal Creek [illegible]ld Thursday [illegible] inside a BES [illegible]ssroom - was [illegible]evious Scholars [illegible] that a group of [illegible]ulate former BES [illegible]ood one-by-one be[illegible] of current students [illegible] encouragement and [illegible]nials of the good that [illegible]ome through the Coal [illegible] Watershed Scholarship, [illegible]ch is made available to all [illegible]S students.

The Coal Creek Scholars [illegible]bove all remind the young[illegible]sters the importance of be[illegible]ing proud of who they are and

Sarah Byrge speaks to Briceville fourth and fifth graders during the annual Coal Creek Scholars Day last week. In the background are fellow Coal Creek Scholarship recipients Jonathan Sharp (left) and Kristina Long. — Chris Silcox

Unlike others, this engineering achievement just keeps getting stronger with age.

Engineer change in your community the old-fashioned way…one student at a time

Anderson County High School
Scholarship Award Ceremony

Barry Thacker, PE, 865-584-0344,
bthacker@schnabel-eng.com

Schnabel ENGINEERING