

SOCIETY FOR INDUSTRIAL ARCHEOLOGY

NEWSLETTER

Volume 28

Winter 1999

Number 4

BIRMINGHAM, “PITTSBURGH OF THE SOUTH,” WELCOMES SIA FALL TOUR

“Birmingham is built upon foundations of steel, with an anvil chorus for its music and the rumble of ore cars, blended with the roar of mine blasting, as a theme for its legends.”

—Alabama: A Guide to the Deep South (Alabama Writers’ Project, 1941)

Hot metal was the theme of the 1999 SIA Fall Tour, “IA in Dixie,” Nov. 4-7, in Birmingham, Alabama. The nascent SIA Southern Chapter hosted the event, executing it without a hitch and even ordering up perfect weather. We enjoyed warm days, cool nights, and copious sunshine throughout the four-day tour. Most of the 110 registrants stayed at the Pickwick Hotel in the mildly bohemian Five Points district, with the overflow quartered at the Radisson, two blocks down “two-mule” hill near the University of Alabama-Birmingham campus.

Although Alabama industry mobilized to aid the

Confederate cause, and several charcoal iron furnaces were established to supply iron for war materiel, not until after the Civil War did ironmasters begin laying plans for the development of Jones Valley and what would become Birmingham. The Louisville & Nashville and the Chattanooga & Alabama railroads, both completed in 1872, furnished the vital link to markets, while the presence of abundant minerals—coal, iron ore, and limestone—provided the foundation for important iron and steel enterprises. Eastern capital flowed to Birmingham, which grew so quickly during the 1880s that it was dubbed the “Magic City.” By 1882, two blast furnaces established by James Withers Sloss were light-
(continued on page 2)



Bob Yuill photo

After bushwacking their way to the site, IA diehards pose at the portal of Sloss No. 2 mine, which opened in 1890 and closed in 1959.

ing the night sky. The first steel from Alabama iron was made in 1888, the first cast-iron pipe in 1890. By 1937, the Birmingham district was supplying three-fourths of the nation's sewer and water pipe. Mines, mills, factories, and furnaces spread over the cities of Birmingham, Fairfield, and Bessemer in Jefferson County and the surrounding counties of Bibb, Shelby, Tuscaloosa, and Walker that together make up the Birmingham District.

Twenty-nine diehards participated in a pre-tour foundry workshop conducted by Sloss Metal Arts at Birmingham's Sloss Furnaces National Historic Landmark Nov. 2 and 3 (see page 4). Then followed two days of intense but pleasurable process tours and, on Saturday and Sunday, a more leisurely smorgasbord of Civil War-era furnaces, Red Mountain iron-ore sites, the rococo Alabama Theatre, and much more. There was but one regret: The "world's largest iron man"—the 50-foot-tall statue of Vulcan, blacksmith of Roman mythology, executed by Guiseppi Moretti for the St. Louis Exposition of 1904—had recently been disassembled for restoration. Although some claimed that his buttocks, still in situ, could be glimpsed from the right vantage point, this writer never saw them.

Thursday's tour began not with hot metal but at the ultramodern **Mercedes-Benz sport utility vehicle assembly plant**, on the outskirts of Tuscaloosa. The brand-new manufacturing facility, lured to Alabama by the state's largess, produces 340 six- and eight-cylinder M-class SUVs each day. In addition to the 1,800 jobs the assembly plant itself provides, a handful of independent suppliers—providing seats, cockpits, and bodies—have also sprung up to supply Mercedes' "just-in-time" assembly needs. Tour goers walked the clean, dazzlingly efficient assembly line, which moves at a three-minute "tack time"—i.e., each task is allotted three minutes for completion—from start to finish. Fifty-

The *SIA Newsletter* is published quarterly by the Society for Industrial Archeology. It is sent to SIA members, who also receive the Society's journal, *IA*, published annually. SIA promotes the identification, interpretation, preservation, and re-use of historic industrial and engineering sites, structures, and equipment. Annual membership: individual \$35; couple \$40; full-time student \$20; institutional \$40; contributing \$60; sustaining \$125; corporate \$250. Send check or money order payable in U.S. funds to the Society for Industrial Archeology to SIA-HQ, Dept. of Social Sciences, Michigan Technological University, 1400 Townsend Drive, Houghton, MI 49931-1295; (906) 487-1889; e-mail: SIA@mtu.edu. Website: www.ss.mtu.edu/IA/SIA.html.

Mailing date for Vol. 28,4 (Winter 1999), February 2000. If you have not received an issue, apply to SIA-HQ (address above) for a replacement copy.

The *SIA Newsletter* welcomes material and correspondence from members, especially in the form of copy already digested and written! The usefulness and timeliness of the newsletter depends on you, the reader, as an important source of information and opinion.

TO CONTACT THE EDITOR: Patrick Harshbarger, Editor, *SIA Newsletter*, 305 Rodman Road, Wilmington, DE 19809; 302/764-7464; e-mail: phsianews@aol.com.

Carol Poh Miller photo



Robert Stewart photo

Touring the melt shop at SMI Steel.

At Empire Coke, a red-hot charge is pushed from a 1913-vintage Semmet-Solvay oven. It then travels by rail to the quenching tower.

three robots, many performing spot-welding, supplement human labor. Of particular interest was a glass cubicle where the SUV body is seamlessly and rapidly "married" to the chassis, and an "air shower" that removes dust and other particulates from workers before they enter the paint shop.

The next stop, **Empire Coke Co.** in Holt, was surely one of the high points as so little of its equipment, buildings, and operations have changed since it began production almost a century ago. Operating 365 days a year, the plant's 125 employees produce 120,000 tons of high-quality foundry coke and 30,000 tons of smaller industrial coke annually. Built in 1903, Empire is the oldest continually operated by-product coke plant in the U.S. The original plant consisted of 40 Semet-Solvay ovens. A second battery of 20 ovens was added in 1913, making a total of 60. The company owns its own coal reserves, comprising approximately 30 million tons of high-quality coking coal in the Arkadelphia Black Creek seam in Walker County. The Semet-Solvay design permits the rebuilding of individual ovens without shutting down the entire battery. Tour goers enjoyed close-up views of the ovens, quenching station, coal trestle, storage bins, crusher, and powerhouse, standing not 20 feet away as a red-hot charge of incandescent coke, after the requisite 30 hours' coking time, was pushed from one of the ovens into a waiting rail car. Normal daily production is 48 ovens pushed, or about 400 tons of coke.

After lunch—eaten on the bus, en route, owing to a jam-packed schedule—we visited the **Fairfield Works of U.S. Steel**. It was thrilling to stand at the base of the No. 8 blast furnace (1978), largest in the South, as it was tapped, the lighter slag diverted into one trough, molten iron running by gravity into the waiting submarine ladle car that would carry it to the mixers and the basic-oxygen furnace. Leaving the dramatic heat of the furnace, we ascended to the computerized command center to learn the interesting particulars. Thirty-seven operators working three shifts staff the furnace, which produces 6,400 tons of iron daily. Although historically Birmingham furnaces used local red (hematite) and brown ores, by the 1960s the minerals were exhausted. Today, most iron ore is imported from Central and South America (currently, from Venezuela). We were incred-

(continued on page 3)

BIRMINGHAM (continued from page 2)

lous to learn that *Japan* supplies the coke used in the smelting process. Our next stop at Fairfield was the 1930s-vintage 68-inch hot strip mill, where steel slabs from the continuous caster are reheated, then make their way through a series of roughing stands and finishing mills (extending the steel strip up to 5,000 feet in length) to two coil-winding stations. The finished strip, from 28-inches to 50-inches wide, and from 40-gauge to one-half inch in thickness, is supplied to the construction industry. A visit to the Fairfield "Dualine" zinc and aluminum coating line (for galvanized and galvalume products) ended a busy day of tours.

On Thursday evening, the **Sloss Furnaces National Historic Landmark**, a city-operated historic site and museum, hosted a welcoming reception featuring an iron pour (using the molds crafted by foundry workshop participants earlier in the week), a light meal, and self-guided tours of the Sloss site. The present furnaces, which date from the mid-1920s, became a *cause célèbre* when they were closed in 1971 and threatened with destruction. Through the efforts of the Sloss Furnace Assn., the property was deeded to the city of Birmingham. Today, besides serving as the quintessential symbol of the city and a model for large-scale industrial site preservation, the landmark site hosts music festivals, metalworking classes, and Halloween "fright nights," in addition to tours and lectures.

Friday morning began at the 2,000-acre site of Birmingham's **American Cast Iron Pipe Co.**, better known as ACIPCO, where 2,200 employees produce a diversified line of products including ductile-iron pipe and fittings, gate valves, tapping sleeves, and electric-resistance-welded steel pipe for the petroleum industry. We began in the latter mill. ACIPCO buys skelp (steel coil) from several suppliers, unrolls it, and shears it to specified width. A series of roll-formers then progressively shape the steel sheet into pipe. The pipe is welded, annealed, ultrasonically and hydrostatically tested, and coated with powdered epoxy. We next visited the machine shop and the monocast production unit, ACIPCO's primary melt shop for ductile iron, with its impressive 108-inch-diameter cupola (soon, we were told, to be replaced). Next came the *pièce de résistance*: the centrifugal pipe mill, which makes water and sewer pipe. There, a ladle pours molten ductile metal into a trough, which conveys it into a spinning, cylindrical steel mold

housed within the casting machine. The molten iron is thrown by centrifugal force against the outer wall of the mold, resulting, within minutes, in a seamless pipe of uniform diameter and wall thickness. Each casting machine is manned (yes, manned) by two workers: the casting machine operator and a "trough man." The trough man, after each pour, uses a paintbrush to coat the trough with a carbon and water mixture. The heat, noise, and drama of the operation are intense, even from the catwalk on which we stood; one could hardly imagine what it must be like to work down on the mill floor. Leaving the centrifugal casting operation, some of us had to leap for cover as a "sling out"—a sudden shower of hot metal—came our way as the pouring ladle finished discharging its contents and the last of the molten iron hit the lip of the spinning mill. ACIPCO's unusual corporate structure was evident as we walked through the plant. The company operates under the Eagan Trust set up by John Joseph Eagan (1870-1924), an ACIPCO founder and its first president. Eagan deposited all of the common stock of the company in the trust in order to demonstrate the practicality of operating an industry on "Christian principles." The trust provides complete medical and dental services, a pension plan, and a profit-sharing plan. An employee-participation system is designed to encourage teamwork and efficiency.

From ACIPCO we headed to **Boral Bricks**, America's largest brick manufacturer. One of fourteen manufacturing facilities, Boral's Bessemer plant occupies a former clay-pipe plant recently retrofitted to make brick. Here the Australian-owned company makes extruded face (or common) brick for a national market using varying proportions of four ingredients: blue shale, yellow shale, Centerville clay, and fire clay. Our tour began at the primary crusher, then moved to the grinding room, where materials are stored in segregated piles. A front-end loader deposits the correct proportions of raw materials in a pug mill, water is added, and the mill cuts "slugs"—long, wet cakes of colored brick. Some of the slugs are textured with artificial distress marks to simulate old, handcrafted brick. The soft, wet slugs are then wire-cut, separated and stacked, placed in a holding room, and dried for 24 hours. They then slowly pass through one of two 12-foot-wide, 2000° F kilns. Their journey takes 33 hours. After cooling, the bricks are baled into cubes containing 520 bricks each. Following the tour, we found complimentary box lunches and insulated "Boral Bricks" mugs waiting in our seats on the bus.

(continued on page 4)



Robert Stewart photo

Fall Tour '99 participants gather in front of the electrical substation at Birmingham's Cahaba Pumping Station.

For our next stop, one bus went to **Steward Machine Co.**, the other to **Hardie-Tynes Manufacturing Co.** (recently acquired by Steward). Steward, a large job shop, manufactures and supplies mining machinery, movable bridge machinery, gates for dams and spillways, gates for locks, large-diameter sheaves, and many other specialized machine elements. Unfortunately, it was not a workday, although management was there to escort us through and answer questions. Some of the projects on the floor were indeed impressive, including huge vertical-lift pumps with stainless-steel impellers, bound for the city of New Orleans (which sits below sea level and relies on the pumps to raise stormwater) and Boca Raton, Florida, where they will assist with restoration of the Everglades. Hardie-Tynes, like Steward, was not in production that day. Nevertheless, management gave us a thorough tour of the plant, which, since World War I, has produced steam turbines, valves, and air compressors for civilian and military maritime mar-

kets. The company is currently building Tomahawk missile-firing plenums for U.S. Navy destroyers. Hardie-Tynes also has a long tradition of machining and fabricating trunnions and sprockets for movable bridges. When we visited, several such pieces were nearing completion.

The day ended at **SMI Steel**, a modern mini-mill opened in 1984. Confined to just 33 acres in a residential neighborhood of east Birmingham, the 450-employee plant, according to a company spokesman, makes the most steel per acre of any plant in the world. SMI is a 100-percent recycling plant, fabricating angles, flats, channels, and beams wholly from scrap. The scrap is melted in a DC electric-arc furnace. We watched from the pulpit, mesmerized, as a single 28-inch-diameter solid-carbon electrode was slowly lowered into the scrap-charged furnace, sparking immense fireworks. From the melt shop, the molten steel is taken to the ladle metallurgical station, equipped with three 14-inch diameter electrodes. There, a technician analyzes a temperature/chemistry

(continued on page 5)

Foundry Workshop Consensus: Cool

With its open sides and physical orientation, Casting Shed No. 2 at Birmingham's Sloss Furnaces was designed to take advantage of any available breeze. On a hot Alabama day, every bit of air was welcome. But with temperatures in the 40s and a brisk wind, the 28 participants in the Sloss Metal Arts Foundry Workshop, held Nov. 2-3 in advance of the fall tour, got an even more invigorating experience than they were expecting.

The workshop, led by metal artists Eric Johnson and Allen Peterson, began on Tuesday with a slide lecture on the history and development of casting. Participants were encouraged to bring items to use as patterns, although the foundry had hundreds from which to choose. We were introduced to parted molds, lost-wax casting, and scratch molds. After a quick lunch, we moved to the casting shed. It was too cold to hand-make wax patterns from wax blocks and sheets, so participants huddled around the melting pots waiting their turn to pour melted wax into plaster molds. The parted-mold crowd worked on building their boxes and packing sand. Bunsen burners became impromptu hand-warmers, putting long sleeves at risk. No amount of cold, however, could dampen our enthusiasm—or quell our laughter—as we attempted to apply gates (through which the hot iron would be poured) and vents (to expel air) to the patterns, which sometimes blew off in the wind or snapped off when

dropped. Cooperation became the watchword.

Wednesday was spent re-applying vents and gates which had seemingly self-destructed overnight and mixing the resin-bonded sand. It sets up quickly, so cooperation in packing is vital. Each lost-wax pattern is packed tightly in the sand inside a frame, the tops are smoothed down, and all gates and vents exposed. The lost-wax crowd tended to concentrate on animals, including bunnies (Bill McNiece), frogs (Fred Warner), owls (Sandy Norman), and ducks (Greg Galer). The group producing parted molds was more ambitious. Some, like Bill Hachtel, brought an architectural artifact to duplicate. Ken McIver brought a lovely Venus de Milo, and Joe Macasek brought an old wooden gear pattern. Their work involved building wooden flasks to hold the sand around their patterns, ramming one half at a time so that the flask could be opened, the pattern removed, and gates and vents cut into the rammed sand. When not working on their patterns, participants were expected to don protective gear and man the mauls to break up scrap cast-iron radiators for use in the furnace. Others measured out coke.

During Thursday night's opening reception at Casting Shed No. 1, a small cupola furnace was set up and all of the molds were poured. We had been warned that there was usually a 15-25 percent failure rate, but only two castings did not come out as planned when the molds were later attacked with hammers and mauls.

Everyone agreed that this was a great experience. Sloss Metal Arts hopes to offer a longer, more in-depth course that will include black-smithing.

S.L.N.



Fred Warner puts the finishing touches on his mold.



Foundry workshop participants pour iron at Thursday night's opening reception at the Sloss Furnaces.

Carol Poh Miller photo

Robert Stewart photo

sample; based on the results, manganese, silicone, and carbon are added to meet product specifications. Chrome, vanadium, or titanium may also be added. The steel is then poured into a continuous billet caster. The billets are cut to the desired length and stored in the billet yard. In the rolling mill, they are heated to 2200° F. in a pusher-type reheat furnace, then passed through roughing, intermediate, and finishing stands. The rolled products are cut and delivered onto an automatic cooling bed. The finished product—angles the day of our visit—is straightened, cut, stacked, and bundled for shipping. A brand-new Danieli stacker, controlled remotely from a pulpit, performed balletic feats of movement as two steelworkers skillfully manipulated the controls. At the conclusion of our tour, SMI employees greeted us with cold drinks and cookies, and passed out padded picnic coolers bearing the company logo. Dinner (that night on our own) was followed by the traditional “show-and-tell” featuring highlights of the 2000 SIA Annual Conference in Duluth.

In contrast with the intensity of Thursday and Friday, Saturday's pace was more leisurely. The buses joined the caravan of Crimson Tide supporters headed west on I-59 to the big game, exiting short of Tuscaloosa to head southeast into the Alabama countryside. It was a brilliant autumn morning and a distinct treat to disembark at **Tannehill Ironworks Historical State Park**, our first stop of the day. The park is home to the Iron & Steel Museum of Alabama, where Alabama Secretary of State James R. Bennett, author of the newly published *Tannehill and the Growth of the Alabama Iron Industry*, briefly greeted us, then signed books as we wandered among the displays. We then trooped to the furnace area, where portions of three slave-built Civil War-era charcoal iron furnaces have been restored. Jack R. Bergstresser [SIA], professor of archeology at the University of Alabama-Birmingham, recounted the history of the furnaces, which used local brown ore to provide pig iron for the Confederate war effort, and described the archeological work (some of it botched) that has been done at the site. At the height of production, Tannehill turned out 20 tons of iron each day. Then, on March 31, 1865, three companies of the Eighth Iowa Cavalry swept through the area, reducing the industrial site and the cabins of 600 slave laborers to ruins.

Leaving Tannehill, we headed back along Red Mountain toward Birmingham and the **Cahaba Pumping Station**. Cahaba, the main source of water for the Birmingham area for over a century, combines a modern pumping station with a learning center with displays explaining the process and history of Birmingham's water supply. The site's historic buildings house early tools, equipment, photographs, and

other artifacts, including two Brownhoist Co. cranes designed to travel on a circular track. We were free to wander the site and view old and new equipment at leisure. Many enjoyed box lunches—picnic-style, on the grass.

From Cahaba, we returned to downtown Birmingham for a visit to the gaudy and glorious **Alabama Theatre**. Paramount Studios built the “Showplace of the South”—an eclectic Romanesque/Grecian/Mediterranean confection—in 1927 at a cost of \$1.5 million. For 54 years it was the prime entertainment center of Birmingham, showing first-run movies and hosting a variety of live entertainment to the accompaniment of the Mighty Wurlitzer pipe organ. Rescued and restored by Birmingham Landmarks, Inc., the Alabama today hosts touring shows, meetings, weddings, and local arts groups, as well as occasional classic films. We toured the ornate lobbies and lounges and were free to wander through the back of the house, into the dressing rooms and projection booth. Cecil Whitmire, president of Birmingham Landmarks, then delighted the group with a short concert demonstrating the Mighty Wurlitzer's great range. After one particularly ornamental flourish, the irrepressible Colin Batchelor, only 10 years old but already an SIA hand, made a surprise cameo appearance, jumping out from behind the velvet curtain and bringing the house down with laughter.

The day's last stop was the **Barber Vintage Motorsports Museum**, home of the largest private collection of motorcycles in the world. On display are classic bikes as well as championship racing cycles and cars. Tour goers also visited the facility where the Barber staff restores and maintains these vintage vehicles. A few of us, foregoing the motorcycle museum, instead made our way on foot to the **Birmingham Civil Rights Institute**, opened in 1992. We walked first through Kelly Ingram Park with its numerous sculptures, some emotionally gripping, treating themes of the civil rights struggle in which Birmingham played a central role. Opposite the northwest corner of the park is the Sixteenth Street Baptist Church, where four black girls were killed by a bomb in

(continued on page <None>)



Fredric Quivik photos

Thanks to Birmingham Landmarks, Inc., the Alabama Theatre in downtown Birmingham has been restored to its 1927 glory.

Among the oldest buildings at the Cahaba Pumping Station, these pump houses, dating from the early 1900s, are each equipped with Brownhoist cranes that travel on a circular track.

Robert Stewart phot1



Little has changed at the Empire Coke Works in Holt since the plant began operations in 1903. Here, tour participants examine the by-products recovery plant. Just out of view to the right is the plant's battery of 60 ovens.

1963. The church is also squarely glimpsed through a large window at the institute, where it dramatically punctuates the institute's excellent historical exhibits.

The traditional Saturday evening banquet provided a refreshing change of pace—a Southern barbeque at Rickwood Field, America's oldest baseball park. Built by Birmingham industrialist Rick Woodward in 1910 to serve a booming iron-and-steel town, Rickwood Field was home to the Birmingham Barons (Class A) until 1987 and, from 1920 to 1963, the Birmingham Black Barons, one of the most thrilling teams in the Negro Leagues. Ty Cobb got his start here; so did Willie Mays. Today, under the direction of David Brewer [SIA], Rickwood Field is being restored as a place to relive the magic of baseball's glory years. After a delicious dinner of pork barbecue, coleslaw, baked beans, and pecan and chocolate cream pie, we enjoyed a panel discussion featuring veteran Black Barons Donald Harris, Willie Young, and Jessie Ritchie, who recalled their experiences both at home and on the road. The evening concluded with a prize giveaway (all items were donated by companies and organizations featured on the tour) and, for the hardy, an impromptu softball game played on the historic diamond.

Sunday offered a variety of options, including a walking tour of **downtown Birmingham**, ably led by local preservation consultant Linda Nelson. Beginning at the former wholesale district adjacent to the tracks of the Louisville & Nashville Railroad, Nelson led us down cobblestone-paved Morris Avenue and through the downtown business district, pointing out both architectural gems and planning disasters. Much of Birmingham's historic fabric has been lost to disinvestment and parking lots. Still, the size and scale of the downtown district belies a city of just 250,000.

Following the walking tour, many continued to the Civil War-era **Brierfield Ironworks**, the **Heart of Dixie Railroad Museum** in Calera, and **Shelby Ironworks Park**. Passing on the downtown walking tour and instead opting for "Xtreme IA," a second group enjoyed a vigorous hiking tour of abandoned iron-ore sites. Bode Morin and Bob Yuill led the "xtremists" over Red Mountain and through the woods to the remains of **Sloss Furnaces' Ruffner No. 3 mine**. The extant mine drifts, slopes, and ore crushers are now part

of Birmingham's Ruffner Nature Preserve, the largest municipally owned park in the country. The group then proceeded to Bessemer, bushwhacking through chest-high vegetation to the concrete portal and hoist house (its hoisting drum and electric motors intact) of **Sloss No. 2 mine**. The extremists then met up with the Brierfield group at the Heart of Dixie Railroad Museum, where everyone boarded historic Pullman passenger cars for the first leg of the eight-mile trip to Shelby Ironworks Park. The Calera & Shelby Railroad eventually will connect the two historic sites, but for now buses must meet the train halfway to complete the journey to Shelby. There, Jack Bergstresser demonstrated the operation of a Catalan forge he built several years ago based on an article published in the 1850s. Used from about the 12th through 18th centuries, the Catalan forge, through prolonged heat, removes non-ferrous material, leaving a relatively pure wrought-iron bloom (in contrast to the indirect process of a blast furnace, which completely breaks down the iron ore before separating it from the slag). Following the demonstration, everyone enjoyed a traditional Southern-style supper provided by the Historic Shelby Assn.

Thus ended a rewarding and memorable 1999 SIA Fall Tour. Dixie did not disappoint.

C.P.M.

To the above report, I am pleased to add the following postscript prepared by Bode Morin, who, as chairman of the 1999 fall tour committee, did yeoman's work coordinating tour sites, meals, transportation, logistics, and finances:

The success of Fall Tour '99 is owed to the dedicated volunteers of the SIA Southern Chapter. Their contributions ensured that the tour ran smoothly. I would particularly like to thank the following for their fine efforts: David Brewer, as tour co-chair, coordinated bus routes and schedules, arranged and hosted the Saturday evening banquet at Rickwood Field, and served as a bus guide. Caryn Hollingsworth, director of the UAB Anthropology Laboratory, served as treasurer and registration manager. Jack Bergstresser, UAB professor of archaeology, wrote and produced (with assistance from Nick Kouchoucos) "The Merchant Foundry Iron Blast Furnaces That Made the Birmingham Industrial District Unique, 1876-1930," distributed to tour participants. He also produced the handsome four-color souvenir map, "Ironmaking Systems of the Birmingham District circa 1928," coordinated tours, and served as a bus guide. Ron Bates and Ruth Helms coordinated registration. Jack Moore, Garnet Garvin, and Rosie O'Beirne served as bus managers, Sarah Cowie and Bob Yuill as tour coordinators. Catharine Crowell created the logo and nametags. Jill Miller created the registration database. John Brasher, president of the Historic Shelby Association, hosted the group at Shelby Iron Works Park. Marty Everse and Vicky Gentry hosted the group at Tannehill and arranged for Jim Bennett to facilitate the U.S. Steel Fairfield tour. Mike Mahan hosted the group at Brierfield Furnace. Linda Nelson conducted the architecture walking tour. Julie Hamilton provided hors d'oeuvres for the Friday evening board meeting, and Ralph Pierson arranged our visit to the Heart of Dixie Railroad Museum and the train to Shelby. Finally, I would like to thank the Birmingham Convention and Visitors Bureau for providing registration materials and volunteer support, as well as each of the many companies that opened their doors to us so graciously.

B.M.

IA in Art

Duluth: Joseph Pennell and the Wonder of Work

One of the most enthusiastic delineators of industrial subject matter was printmaker, illustrator, and writer Joseph Pennell (1857-1926), who observed: "Work today is the greatest thing in the world, and the artist who best records it will be best remembered." A native of Philadelphia, he made his publishing debut in *Scribner's Monthly* in 1881, and thereafter had a long and productive international career. A significant participant in the Whistlerian Etching Revival, he was also a skilled lithographer. Several of his books explore industrial themes, including *Pictures of the Panama Canal* (1912), *Pictures of War Work in England* (1917), and *Pictures of War Work in America* (1918). Three images of Duluth and its environs were included in a fourth volume, *Pictures of the Wonder of Work*, published in 1916.

While Pennell was not the only artist to record the industrial beauty of Duluth, none conveyed the awe-struck enthusiasm for the larger-than-life scale of the mining and shipping enterprises of this city on the shores of Lake Superior. Each of his illustrations was accompanied by a paragraph composed by the artist, whose evocative prose is grounded in Romantic literary traditions, though the iconography of the structures he depicted is entirely modern in its Progressive Era faith in the rightness of progress and the virtue of industrial might. His words are extensively quoted here to convey a vivid period flavor, while his images capture the sublime magnitude of the enterprise he witnessed, which would help make the United States a leader in the steel industry.

Mining operations were established in the region by the mid-19th century, and by 1900, the Mesabi Range, located about sixty miles north of Duluth, had become the most extensive iron-ore field in the world, producing a sixth of the world's ore in massive open-pit operations. Scooped out from the earth by enormous steam shovels, it was loaded on trains to be sent for smelting. The mines were owned by the Rockefeller family but mined by Andrew Carnegie's corporation. Annual production grew from 13 million tons in 1902 to 63 million tons by 1929.

Certain American cities have long been strongly identified with



Joseph Pennell, "Approach to Duluth, The Land of Work and Beauty," Plate XXII from *Pictures of the Wonder of Work* (1916).

the water tower; instead of the cypress, the automatic signal; instead of the Cross, the trolley pole. Soon, however, all this will go—the mystery of the smoke will vanish in the clearness of electricity and the mystery of the trestle in the plainness of the concrete bridge. But it is here now, and the thing is to delight in it. Artists don't see it—and the railroad men who have made it don't know any more than the Greeks what a marvelous thing they have made." Imbuing his vision with a nearly religious fervor, he also noted a nostalgic regret for the increasingly fast pace of time that would someday render obsolete the structures he found so arresting.

His point of view in *Ore Wharves, Duluth* is more narrowly focused than in the first image. The structures assume an anthropomorphic quality and the artist conveys a strong sense of local color: "Mighty, terrifying are these monsters—filled chock-full with ore, which, when the empty steamers come alongside, vomit roaring red and gold and brown streams of ore that load them in half an hour, or less, and then are ready for more."

A visit to extensive open-pit mining operations outside Duluth inspired *Ore Wharves, Hibbing*. The scale was comparable to what he had witnessed several years earlier in Central America: "If one

industry, including New York, Detroit, and Pittsburgh, and the works of art associated with these metropolises have become technological icons for either the subject matter depicted or location pictured. But the more isolated city of Duluth does not conjure up the same imagery as, for instance, Charles Sheeler's paintings and photographs of the Ford Motor Company's River Rouge Plant. Pennell, however, found it as inspiring as any locale he visited.

In a panoramic view, *Approach to Duluth, The Land of Work and Beauty*, the artist's high vantage point permitted him to present a sweeping vista of modern industry. He captured the immense scale that so impressed him visually in words: "The lines of the winding waterways, each leading to a furnace, a mill, an elevator, are simply beautiful and the color absolutely lovely. This is the modern landscape—a landscape that Claude [Lorrain] would have loved. All his composition is in it—only the mills have replaced the palaces, the trestle the aqueduct; instead of the lone pine, there stands

(continued on page 8)

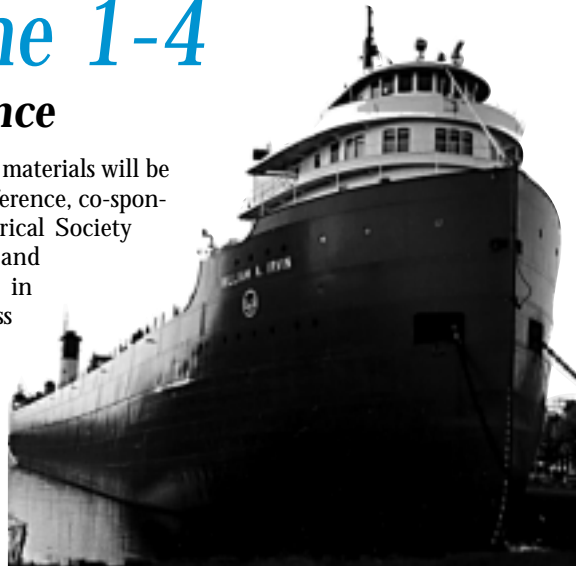
Duluth, June 1-4

SIA Annual Conference

Iron mining and transportation of bulk materials will be themes at the SIA's 29th Annual Conference, co-sponsored by the St. Louis County Historical Society and the Iron Range Resources and Rehabilitation Board, June 1 to 4 in Duluth, MN. You will not want to miss Duluth's impressive harbor with grain elevators, iron-ore and coal docks, and railyards. We will tour a historic ore boat and freighter. The opening reception will be in The Depot and The Lake Superior Railroad Museum, housed in an 1892 Chateausque station. Tentatively scheduled process tours include a light airplane manufacturer, the city steam generating plant, and a toothpick and corndog stick factory. SIAers will strike out to the iron range to visit open pit and underground mines, miners' villages, and a taconite plant. Conference materials are expected to be mailed to members at the beginning of April.

Make your hotel reservations early. SIA's conference coincides with other conferences being held in Duluth during the first week of June. It is recommended that you reserve your hotel room early. The conference hotel is the Radisson Hotel Duluth-Harborview. Double rooms are \$69/night, if reserved by May 2. Call (218) 727-8981 and ask for the SIA conference rate.

Student Travel Scholarships. The SIA has limited funds to help full-time students and professionals with less than three years experience attend the annual conference in Duluth. Those interested should submit a concise letter outlining their demonstrated



Sandy Norman photos

interest in and commitment to the field of industrial archeology or a related field, and one letter of reference. Deadline is April 3. Info: Mary McCahon, SIA Scholarship Committee, Lichtenstein Consulting Engineers, One Oxford Valley Mall, Suite 818, Langhorne, PA 19047; (215) 752-2206; fax, 752-1539; e-mail: historic@lichtenstein.com. Notice of awards will be made by May 1. ■



IA IN ART (continued from page 7)

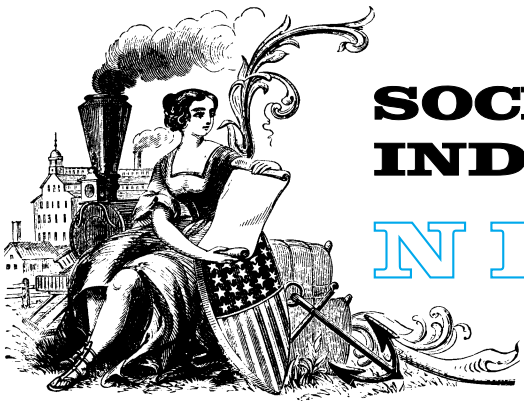
wants an idea of what the Culebra Cut looked like, when the Panama Canal was being dug through the mountains, it is only necessary to go to the ore mines near Duluth. There are the same great terraces, the same steam shovels, digging and loading the dirt, the same engines and trains, and in some of the pits the forms are even fine—amphitheatres—only the seats and steps are gigantic. But when the shadows begin to creep up from below, the place becomes a theatre for the gods, a theatre where there are no spectators, and the actors are the steam shovels with their white plumes and the engines with their black clouds. But they are finer than any poor mummer's makeshifts. And every now and then comes a burst of applause as a blast is fired more thrilling than ever heard in a play theatre. This is the theatre of the Wonder of Work." His sense of the spectacle of modern industry remains strong.

The artist's enthusiasm for industrial imagery was international, as the 52 plates in *Pictures of the Wonder of Work* amply reveal. Many of his prints and drawings picture new urban construction, including railway terminals, skyscrapers, and powerhouses. Famous IA sites such as steel works in Pittsburgh and Gary, Indiana, fascinated him, as did the stockyards of Chicago, copper mining in Butte and Anaconda, Montana. Coal breakers in the Shenandoah region and the inclines in Cincinnati also intrigued him, as did oil wells in Alberta, British Columbia, and refineries in Philadelphia. He visited England's great industrial centers—Leeds, Bradford, and Sheffield—in search of subject matter, as

well as Le Creusot in France and Charleroi in Belgium. In the midst of World War I, the German cities of Leipzig, Hamburg, Cologne, and Berlin, including Krupp's works in Essen inspired further sketches.

Pennell is one of several notable American artists to visit Duluth. Photographers especially found much to engage them. About 1902, Western landscapist William Henry Jackson (1843-1942) made a number of views of the city. In 1903, France's Benjamin Johnston (1864-1952), one of the nation's first photojournalists, recorded the extensive mining operations, ore dock, steel, and lumber mill workers, and miners, as well as mining and shipping activity. Margaret Bourke-White (1904-1971), who admired Pennell's work, was sent there in 1929 on assignment for *Fortune*, Henry Luce's new magazine of business and industry. Her essay on "Trade Routes across the Great Lakes" appeared in the inaugural issue of February 1930. Arnold Genthe (1868-1942) made portraits of several Duluth residents in 1918 and 1924. During the Depression, John Vachon (1914-1975) was sent to Duluth by the Farm Security Administration, and his August 1941 series records the grain elevators and boats, as well as the trimmers and crew that would become vital to a nation about to enter World War II.

AUTHOR: Betsy Fahlman is a professor of art history at Arizona State University. Readers are encouraged to suggest essay ideas for the column, or submit their own to her at: School of Art, Arizona State Univ., Box 871505, Tempe, AZ, 85287-1505; e-mail: fahlman@asu.edu ■



SOCIETY FOR INDUSTRIAL ARCHEOLOGY NEWSLETTER

PUBLICATIONS OF INTEREST

A Supplement to Vol. 28, No. 4

Winter 1999

COMPILED BY

Mary Habstritt, New York, NY; and Patrick Harshbarger, SIAN editor.

GENERAL INTEREST

- ▶ R. C. Cox and M. H. Gould. **Civil Engineering Heritage Ireland.** Thomas Telford, 1998. 296 pp., illus. (Avail: Institute of Civil Engineers, 1 Great George St., London, SW1 3AA, U.K.). Inventory of 202 entries including bridges, harbors, docks, lighthouses, canals, railroads, reservoirs, and water towers. Primarily 19th century. Rev: *IAR* (June 1999), p. 66.
- ▶ David W. Dunlap. **In Chicago, Layers of History but Uncertain Future.** *New York Times*, Sun., May 2, 1999, Real Estate sec., p. 7. Recounts the current state of the historic Pullman neighborhood in Chicago and renewed efforts to save the public buildings since the Dec. fire that ravaged the administration building, with its landmark clock tower, and adjacent erecting shop.
- ▶ Demeter Fertis and Anna Fertis. **Historical Evolutions of Infrastructure: 15,000 Years of History.** New York: Vantage Pr., 1998. 191 pp. illus. \$18.95. The evolution of infrastructure from ancient times to the present, taking into account the influences of each period's leaders in literature, mathematics, architecture and science.
- ▶ **Forgotten NY.** Website includes photographs of remnants of New York City's past. Some, like the subway images, are accompanied by historical information, while others, like those of the former Flushing airport, have only sketchy captions. If you're interested in looking for traces of the past in NYC, this may at least provide inspiration.
- ▶ **Industrial Archaeology News** is the quarterly newsletter of the Association for Industrial Archaeology (AIA) in Great Britain. In addition to news of IA events in the UK, its Autumn 1999 issue included articles on *Bath's Industrial Museum*, *Routeways over Standedge* (over 200 yrs. of transportation history over a pass in the Pennine watershed), and *A Proposed Limekiln Typology*. The newsletter, as well as the association's scholarly journal *IA Review*, are benefits of AIA membership. Back issues available. Also available: David Eve, **A Guide to the Industrial Archaeology of Kent.** 60 pp. Produced for the AIA's 1999 conference. The format is similar to guidebooks to SIA annual conferences. Info: AIA Office, School of Archaeological Studies, Univ. of Leicester, Leicester LE1 7RH, UK; e-mail: AIA@le.ac.uk.
- ▶ **Industrial Patrimony: Resources, Practices, Cultures** is the new journal of TICCIH. The first issue (1999) includes (in English): Hans Kania, *Zollverein Colliery* on preserving a large-scale industrial landscape in the Ruhr; Piotr Gerber, *The Project and Realization of the Museum of Industry and Technology in Walbrzych*, the creation of an industrial museum at a coal mine in Lower Silesia; Gyorgyi Nemeth, *The Miskolc-Diosgyor Ironworks*, industrial preservation in northeast Hungary; Eugene Logunov, *Iron Ore and the Iron Works of the 18th-20th c. in the Urals*, threats to Russia's iron heritage in the transition to a market economy; Orjan Hamrin, *Preserving and Interpreting the Flatenberg Foundry*, a museum in Bergslagen, Sweden; Stuart B. Smith, *The Death of Industry Yet the Growth of Heritage*, on historic mines in Cornwall; Franco Mancuso, *Safeguarding the Industrial Heritage and the New Needs of the City: The Case of Venice*, problems preserving industrial sites in cities that predate the industrial revolution; Michael Cotte, et. al., *Restoring and Reusing Historical Bridges in Kyushi Island*, efforts to preserve bridges on one of Japan's main islands. The journal is available from: Écomusée de la Communauté Urbaine Le Creusot-Montceau les Mines, Industrial Patrimony Journal, Chateau de la Verrerie, B.P. 53, F 71202, Le Creusot Cedex, France. \$51; \$41 TICCIH members; \$35 students.
- ▶ Richard W. Iobst. **Civil War Macon.** Mercer Univ. Pr., 1999. 450 pp., photos. \$35. In the heart of the Confederacy, Macon (GA) was considered a secure location for hospitals, prisons, and industry. Three chapters (101 pp.) detail difficulties in the face of wartime shortages, of converting the Findlay Iron Works to a cannon foundry, manufacturing small arms, and building a laboratory to improve and standardize ordinance.
- ▶ Donald MacKenzie and Judy Wajcman eds. **The Social Shaping of Technology.** 2nd ed. Open Univ. Pr., 1999. 352 pp. \$26.95. How technology is affected at a fundamental level by its social context. Theoretical articles and case studies including: the watermill and feudal authority, automatically controlled machine tools, airplane cockpit design, and the M-16 rifle.
- ▶ Kristin Ohlson. **Historians Fight to Save Cleveland's Ore Unloaders.** *New York Times*, Sun., June 6, 1999, National section, p. 26. Describes the final battle in the fight to save the Hulett's.
- ▶ Marilyn Palmer and Peter Neaverson. **Industrial Archaeology: Principles and Practice.** Routledge, 1998. 180 pp., illus. \$39 paper. Textbook of theory, investigative techniques, and preservation options from a British perspective. Rev: *IAR* (June 1999), p. 62.
- ▶ Frederic L. Quivik. **Whither Industrial Archeology.** *TICCIH Bulletin* (Summer 1999), pp. 3-5. Report on SIA's symposium held last November in Lowell.

- F. M. Scherer. **New Perspectives on Economic Growth and Technological Innovation.** Brookings Inst. Pr., 1999. 167 pp. \$16.95. Evolution of economic growth theory from the Industrial Revolution to the present. Emphasizes technological change as the most crucial dynamic force for growth. By former chief economist of the Federal Trade Commission.
- Frederick D. Schwarz. **HAER at 30. I&T** (Fall 1999), pp. 8-9. Commemorates 30 years of the Historic American Engineering Record.
- John C. Van Horne. **The Latrobe Papers: A Retrospective;** Jeffrey A. Cohen, **Life and Afterlife of an Editorial Project: The Papers of Benjamin Henry Latrobe, 1970-1995.** *Annotation: The Newsletter of the Nat'l Hist. Publ. & Rec. Comm.* (June 1999), pp. 13-18. Critical review of a 25-yr. project to collect and edit Latrobe's papers. Latrobe is generally acknowledged as America's first professional architect and engineer.
- Ronald L. Lewis. **Transforming the Appalachian Countryside: Railroads, Deforestation, and Social Change in West Virginia, 1880-1920.** Univ. of NC Pr., 1998. 348 pp. \$18.95 paper. Interaction of industrialization, resource depletion, economics, and social change. Rev: *RH* (Spring 1999), p. 162.
- **Rebuilding # 26.** *Railway Museum Quarterly* (Summer 1999), pp. 7-9. Restoration of a 1908 interurban car at the East Troy RR Museum. Described as a model project for how it ought to be done with careful study of the car for clues to how it was manufactured and modified.
- John Smatlak. **Conservation and Collections Management.** *Railway Museum Quarterly* (Summer 1999), pp. 2-7. Basic ideas and straightforward suggestions for railway museums and volunteers to protect and preserve their collections.
- Joe Walsh. **Pennsy Streamliners: The Blue Ribbon Fleet.** Kalmbach, 1999. 160 pp., photos. \$15.95. Pennsylvania RR 1930s streamlining.

RAILROADS

- Mike Bartels, et. al. **The CN&W Cowboy Line.** South Platte (NE) Pr., 1998. 64 pp. History of the Chicago & North Western RR's Omaha-Chicago line and its conversion into the longest (247 m.) rails-to-trails project in the nation. Extensive coverage is given to bridges over Pine Creek and Niobrara R. Rev: *RH* (Spring 1999), p. 156.
- Mason Y. Cooper. **Norfolk & Western's Shenandoah Valley Line.** N&W Historical Soc. (Box 201, Forest, VA 24551), 1998. 241 pp., photos. \$53.45 ppd. Rev: *RH* (Spring 1999), p. 160.
- A. Bray Dickinson, Roy Graves, Ted Wurm and Al Graves. **Narrow Gauge to the Redwoods: The Story of the North Pacific Coast Railway and San Francisco Bay Paddle-Wheel Ferries.** 1999. 168 pp., photos. \$37.95. Reprint ed.
- **Hill Group's Full Photographic Archive.** The James J. Hill Papers and Louis W. Hill Sr. Papers at the James J. Hill Reference Library (now collectively called the James J. Hill Group) has put its entire collection of some 8,000 photographs online. These include images from the 1870s to just after WW II, drawn primarily from the personal papers of James J. Hill and Louis W. Hill, Sr. It is possible to browse small sub-collections, such as "Railroads," which includes images of the Great Northern and its predecessor, the St. Paul, Minneapolis & Manitoba, or to search the entire collection by keyword. Photographs are available for purchase (\$25 for non-profit use, \$200 for-profit).
- Wendell W. Huffman. **Railroads Shipped by Sea.** *RH* (Spring 1999), pp. 7-30. Shipping railroads to California from the Eastern U.S. and Great Britain prior to the completion of the transcontinental railroad in 1869.
- Clifton E. Hull. **Railroad Stations and Trains Through Arkansas and the Southwest.** White River Prod. (24632 Anchor Ave., Buchlin, MO 64631), 1997. 190 pp., photos, maps. Brief histories of six railroads traversing Arkansas on the way to Texas and the Southwest. \$34.45 ppd. Rev: *RH* (Spring 1999), p. 155.
- John F. Humiston. **The South Works Narrow-Gauge Railroad.** *RH* (Spring 1999), pp. 73-126. Railroad of the Illinois Steel Co. (later Carnegie-Illinois), Chicago, 1880-1950s.

WATER TRANSPORTATION

- Michael Bernstein. **Fabricated Ship Construction at Bristol, Pennsylvania 1917-1921.** *Nautical Research Journal* v. 44, 3 (Sept. 1999), pp. 139-150. Illus., tables. History of the Merchant Shipbuilding Corp. shipyard, established during WW I to build freighters.
- Cheryl B. Chaput. **Collecting for America and the Sea: It's an Odd Duck: Rod Stephens and the Development of the DUKW.** *Log of Mystic Seaport* v. 51, 1 (1999), pp. 17-22.
- James Douet. **Opinion.** *TICCIH Bulletin* (Summer 1999), p. 1. Describes European efforts to document and preserve historic naval dockyards, many recently opened to visitors because of the end of the Cold War.
- Benjamin A. Fuller. **Native Legacy: America's Favorite Small Boats.** *Log of Mystic Seaport* v. 51,1 (1999), pp. 12-16.
- Larry Lowenthal. **From the Coalfields to the Hudson: A History of the Delaware & Hudson Canal.** Purple Mt. Pr. (Box E3, Fleischmann's NY 12403), 1997. 298 pp., illus. \$28.50 ppd. A "premier study" of the canal, according to the reviewer. Rev: *RH* (Spring 1999), p. 163.
- William R. Newhouse, et al. **A Joint Effort.** *Civil Engineering*, Sept. 1999, p. 34-37. Restoration of the Haxall/Kanawha Canal in downtown Richmond, VA, which included installing and modifying sewer pipelines under the canal as part of a concurrent sewer separation project.
- Ronald Paxton and Jean Leslie. **Bright Lights: The Stevenson Engineers 1752-1971.** (Avail: Prof. Roland Paxton, Civil & Offshore Engineering, Heriot-Watt Univ., Edinburgh EH14 4AS, U. K., but all checks made to: Gillespie Macandrew.) 207 pp., illus., US \$46 by check via sea mail; \$52 air. Canada, if you can, £17.95 plus £3.50 sea mail, £7.00 air. Entirely new revelations about the famed Stevenson family of civil engineers and lighthouse builders, based largely on previously unexamined documents, even new material on Robert Louis, who began his career as a reluctant trainee engineer. The family built practically every lighthouse—major and minor—on the Scottish coast.
- Mark Starr. **Documenting Complex Curved Surfaces.** *NCPTT Notes* (July 1999), pp. 5, 9. New electronic methods improve speed and accuracy of documenting historic ship hulls.

- Jerry Stockbridge. **Move It or Lose It: Saving the Cape Hatteras Lighthouse.** *Structures* (Fall 1999), pp. 36-38. (Published by the Nat'l Council of Structural Engineers Assoc., Inc.) When the shoreline encroached on the 1870 lighthouse, engineers and other specialists picked it up and rolled it away.
- John R. Ward. **The Little Ships That Could.** *I&T* (Fall 1999), pp. 34-43. Building destroyer escorts in Denver and Duluth during WW II.

AUTOMOBILES & ROADWAYS

- Thomas F. Howard. **Sierra Crossing: First Roads to California.** Univ. of Calif. Pr., 1998. 226 pp., illus. \$28. Building roads over the Sierra Nevada.
- John Jacobus and Skip Gear. **Boys Just Wanted to Have Fun: Remembering General Motors' Fisher Body Craftsman's Guild (1930-1968), Nurturer of the Creative Male Soul.** *Automotive History Review* (Spring 1999), pp. 21-33. A history of the model-building scholarship contest offered by GM. These teenage boys would put up to 2,000 hrs. into this project. Avail: Soc. of Automotive Historians, 1102 Long Cove Rd., Gales Ferry, CT 06335.
- Ruth Milkman. **Farewell to the Factory: Auto Workers in the Late 20th Century.** Univ. of Calif. Pr., 1997. 247 pp. \$15.95. The human side of the decline of the U. S. auto industry.

POWER GENERATION

- T. Lindsay Baker, ed. **Windmillers' Gazette.** Quarterly. Avail: Box 507, Rio Vista, TX 76093. Vol. 18, 3 (Summer 1999) includes Norman A. Marks, *A History of the 17-Inch Windmill*, a history of the Aero Manufacturing Co. (Geneva, NB), makers of toy and model windmills. Also, T. Lindsay Baker, *Interchangeable Wheels and Vanes for Open-Geared and Oil-Bath Steel Windmills.* Vol. 18, 4 (Autumn 1999) includes "Easy to Have Running Water Like City Folks" *Windmills and Pressurized Water Supply Systems.*

WATER CONTROL & RECLAMATION

- Stephen G. Tatro. **Dam Breaching: The Rest of the Story.** *Civil Engineering*, Apr. 1999, pp. 50-55. Evaluates the possible removal of four dams, built between 1956 and 1975, on the Snake R. to improve salmon migration. Impact of increased river flow on other existing river structures and embankments. Includes a chart of federal dams recently removed, slated for removal, and being considered for removal.

CONTRIBUTORS TO THIS ISSUE

T. Lindsay Baker, Rio Vista, TX; Robert Casey, Dearborn, MI; Yvonne Desloges, Ottawa, Ont.; Don Durfee, Houghton, MI; Betsy Fahlman, Tempe, AZ; Bill Griffin, Birmingham, AL; David Guise, Georgetown, ME; Mary Habstritt, New York, NY; Duncan Hay, Charlestown, MA; Arlene Johnson, Houghton, MI; Zahir Khalid, Islamabad, Pakistan; John Light, Ottawa, Ont.; Lee Maddex, Morgantown, WV; Carol Poh Miller, Cleveland, OH; Bode Morin, Birmingham, AL; Sandy Norman, Boca Raton, FL; Catherine Precourt, Stonewall, Mant.; Edward Rutsch, Newton, NJ; Barbara Small, Jersey City, NJ; Robert Stewart, West Suffield, CT; Robert Vogel, Washington D.C.; Robert Yuill, Springville, AL.

BRIDGES

- Mark Aldrich. **Engineering Success and Disaster: American Railroad Bridges, 1840-1900.** *RH* (Spring 1999), pp. 31-72. Analysis of the cause and effect of bridge failures, especially the impact of trading safety for economy in 19th-c. America.
- Steven Gatke. **Crib Trestles and Bridges.** *Timber Times* (Issue 21, June 1999), pp. 28-32. Fascinating photos of "Lincoln Log" style bridges used by West Coast logging railroads. Surely enough to make a bridge engineer's hair stand on end, but they appear to have worked quite satisfactorily and with reasonable safety.
- Walter C. Kidney. **Pittsburgh's Bridges: Architecture and Engineering.** Pittsburgh History & Landmarks Foundation (1 Station Sq., Ste. 450, Pittsburgh, PA 15219), 1999. 248 pp., photos. \$53.95 ppd. Essay and guide to 50 landmark bridges in "the city of bridges." Includes archival photos and images by noted photographer Clyde Hare.
- Barbara Moran. **A Bridge That Didn't Collapse.** *I&T* (Fall 1999), pp. 10-19. Maine's Deer Isle bridge was built at the same time as the Tacoma Narrows, and with virtually the same design. One difference: it still stands.
- **The Rebuilding of Victoria Bridge, 1897-1899.** *Canadian Rail* (May/June 1999), pp. 59-87. An exhaustive and well-illustrated history of the Grand Trunk RR's truss bridge at Montreal. *Canadian Rail* is the bi-monthly magazine of the Canadian Railroad Historical Assoc., 120 Rue St-Pierre, St. Constant, Quebec J5A 2G9. Membership in the CRHA includes a subscription. \$36CA/\$31US.
- Rafail Veksler and Abhay P. Thorat. **The Arch Bridge Mystery.** *Civil Engineering*, Sept. 1999, p. 48-51. Evaluation, including investigating the reason for significant concrete spalling in spite of loads and wind stresses well within allowable limits, and the planned restoration of the historic Manayunk railroad bridge in Philadelphia.

BUILDINGS & STRUCTURES

- Paul Marsden and Timothy Whiteman, eds. **The Top 10 Construction Achievements of the 20th Century.** KHL International (Southfields, Southview Rd., Wadhurst, East Sussex TN5 6TP, UK), 1999. 272 pp., illus. \$64.95. Based on nominations made at Conexpo-Con/Agg 99, an exhibition for the construction, aggregate and concrete industries, and a final vote by industry executives and editors, this list includes such projects as the Golden Gate Bridge and Hoover Dam. Multiple photos and diagrams of initial designs, work in progress and the completed projects are accompanied by detailed accounts that include problems encountered during construction.
- Charles P. Roberge, et. al. **Saving the Exeter Street Theater.** *Structures* (Fall 1999), pp. 17-21. (Published by the Nat'l Council of Structural Engineers Assoc., Inc.) Innovative repairs to wood roof trusses in the 1885 theater in Boston.
- Michael Stratton. **New Materials for a New Age: Steel and Concrete Construction in the North of England, 1860-1939.** *IAR*, v. 21:1 (June 1999), pp. 5-24.

(continued on page 19)

CANADIAN NEWS—THE LACHINE CANAL PROJECT

P.É. Cadorette, Parks Canada, photo.



Excavation of Lock No. 5.

Parks Canada has been given the go ahead for Montreal's Lachine Canal project. The objective is to restore the 19th-century canal and open it to navigation by the year 2002. The project also includes the development of an interpretation center dealing with the canal as a transportation and waterpower resource that was key to the industrialization of the island of Montreal. The multidisciplinary project, a Canadian government undertaking, is intended as a two phase venture with a total budget of \$33 million for the first phase. The city of Montreal will also invest in parallel projects for an additional sum of \$40 million.

The 14 km.-long canal was opened in 1825 and closed to navigation in 1970. During this period, it was enlarged twice and hundreds of industries were established along its banks. The first canal had seven locks while the two enlargements had only five. Work has already started on lock restoration and on one of the bridges that crosses the canal. Lock No. 5 in the town of Lachine, where all three entries of the different canals are still visible, is a remnant of the first canal enlargement and was unearthed by contractors under the supervision of archeologists. Lock No. 4, from the second canal enlargement, will be restored to its 1870s period of construction. Locks No. 1 and 2 were restored in the early 1990s by

another federal agency.

Initial planning located the interpretation center in the Redpath Sugar complex, which dates to 1856 and was the first sugar refinery in Canada. The high cost of restoration work, however, has deterred the government from going ahead with this part of the project. Several other locations, which would incorporate all or parts of historic industrial buildings, are being considered.

While archeologists are busy keeping pace with contractors restoring the canal and its locks, historians are gathering the material necessary for the interpretation center. They have already turned up 13,000 photographs, maps and plans, and produced a map of the canal showing some of its most prominent industrial complexes. The final objective is a comprehensive atlas of the canal and its industrial corridor.

The atlas will locate the various industries and graphically represent their production, energy usage (waterpower, steam, and electricity), and workforce (distribution by gender, child employment, salaries, strikes, etc.).

Another part of the atlas will deal with the links between industries themselves. For instance, the largest shipyard in Montreal was located on the canal. Adjacent to the shipyard were two of its suppliers, a marine engine foundry and a cordage factory. Another example of the synergy of industrial development along the canal is related to the railroad industry. The Grand Trunk Railway built its shops adjacent to the canal. Nearby wood workshops produced seating for the passenger cars, and these shops in turn stuffed their seats with wadding. Seat stuffing had to be recovered from some kind of fabric. Dominion Textile operated the second largest textile factory in Canada and probably sold its leftovers to the wadding company. These examples are but limited indications of the complexity of the industrial corridor. Out of 17 major industrial groups identified by Canadian researchers, 16 are known to have been present alongside the canal between 1840 and 1940. No wonder the canal is considered the birthplace of Canadian industry, earning it the nickname "Little Lowell" and, later "Smoky Valley" by inhabitants of the area.

Y. D

LETTER TO THE EDITOR

On the Suburbanization of Paterson, New Jersey

To the Editor:

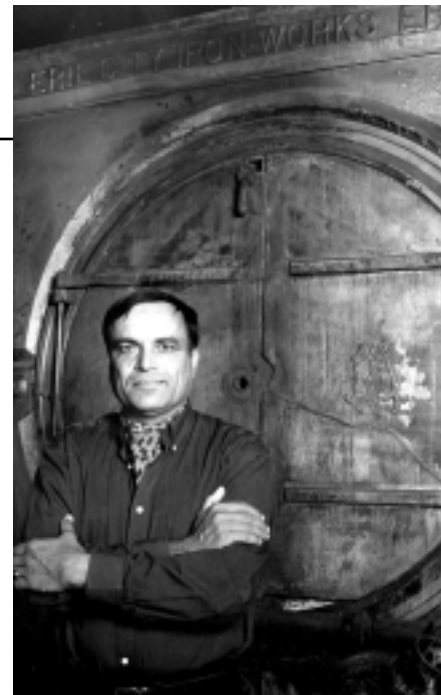
Thank you for sending the recent edition of *SIAN*. It is a beautiful publication. I'm very impressed with the quality of the layout, the images, and the content throughout the newsletter. I'm also very pleased with [David Soo's] article on the ATP (Allied Textile Printing) site in Paterson's Great Falls Historic District (*SIAN* v. 28,2, Summer 1999.) Thank you for all your help and for the opportunity to express our concerns.

The Paterson Friends of Great Falls has recently made a presentation to the Roebling Chapter of the SIA at their annual symposium. The President of the chapter, Lance Metz, has said that they will get involved in the 106 Review process of the ATP site. Additionally, SIA President Sandy Norman has also requested the ATP background package from the National Park Service and will

(continued on page 15)

The Smallest Oil Refinery in the U.S.

Zahir Khalid, businessman and former Pakistani airforce fighter pilot, reports on the odd set of circumstances that led to his efforts to preserve the 1933 C & H Oil Refinery in Lusk, Wyoming, which may be the smallest in the world.



Owner Zahir Khalid stands beside one of the late-19th-century Erie City Iron Works stills at the Lusk, Wyoming refinery.

Richard L. Collier, Wyoming State Historic Preservation Office, photo

In October 1998, while surfing the Internet at my home in Islamabad, Pakistan, I came across a sale advertisement for an oil refinery in Wyoming. Just for the sake of curiosity, I dialed the telephone number and I was connected with a gentleman in Louisiana who faxed me some limited information about the refinery. One thing led to another and I found myself talking to the owner, Joe Chamberlain. What attracted me most to the refinery were his words defining it as “the smallest oil refinery in the United States” with a production capacity of only 190 barrels per day. I started to imagine it to be the cutest of refineries. I researched, contacted people, and read whatever I could lay my hands on about the subject. No one seemed to believe that there existed a refinery with such a tiny production capacity because modern-day refineries have a capacity in excess of over 250,000 barrels per day. I decided to visit the United States in order to see it for myself.

In November, Chamberlain picked me up from the Denver airport. The next morning we set course for Wyoming to see the refinery, closed 20 years earlier. To my Pakistani sensibilities, it was overwhelming to see the vast open and empty land as we drove toward Lusk. We finally reached the town with a population of barely 1,500 people. As we came to a stop in front of a bunch of trees and a rudimentary structure of some sort, covered with grass and shrubs, the owner pointed toward this location and identified it as the refinery that I had been so eager to see. Shocked by the state of the outfit in front of me, I felt the life draining out of my legs.

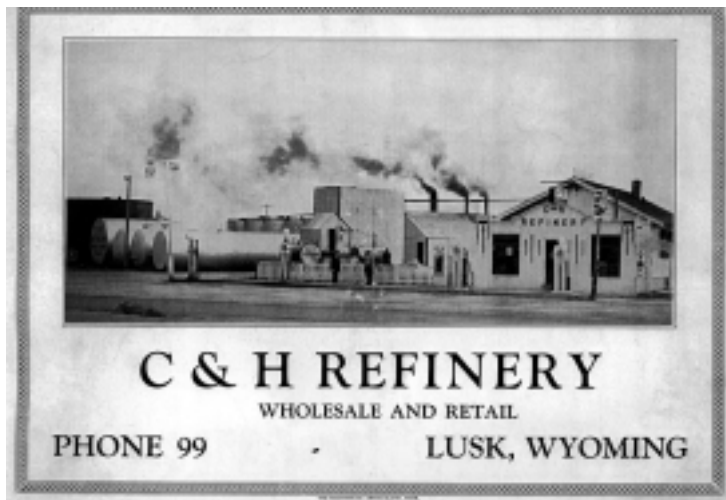
I inspected the location. I could see only oil tanks outside a small building of 28 ft. X 50 ft. of sheet iron. There were holes in the walls and roof. A 2 ft.-wide door allowed us entry to the building. It was a discouraging sight, vines creeping all over the floors and walls, which were giving way with mud oozing out of them. As I decided to give it up as bad joke, the owner pointed at two metal doors and said, “the Smithsonian wanted these stills from me 20 years ago.” These words shook me up. The smallest refinery in the

nation, built in 1933, an institution like the Smithsonian interested in the stills—perhaps there was something valuable here. Anyone could see that the refinery was a commercial disaster, but here was a challenge to bring it back to an operational state and preserve it as a piece of American heritage. I decided to buy the place. The owner demanded immediate cash, probably because he did not believe that I was serious. It took me a day to arrange the required amount and I became the owner of the C&H Refinery. My objective was to return the refinery to running condition.

The building is insulated by primitive methods; the walls are made of two metal sheets with mud filled in between them. Inside this tiny room are two stills manufactured by the Erie City (PA) Iron Works. Apparently, the stills were fabricated in the late-19th century and moved to Lusk in 1933. There are three steam-driven pumps and a boiler. All these things are connected with numerous pipe lines, which seem to run everywhere in the room. On these pipes there are many valves and pressure and temperature gauges. The firing of the stills is an event in itself. Even in these modern times they are ignited with a burning piece of cloth tied to the end of a long rod. The levels of crude inside are measured using an old reliable method: glass tubes. Ventilators are opened and closed by pulling ropes.

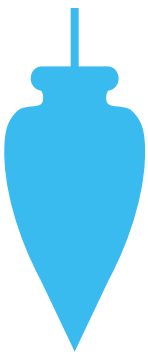
I could not possibly have predicted the difficulties involved in bringing back to life an oil refinery that had been so long dormant. There were no written guides or instructions. There was no help forthcoming, as anyone known to have been closely associated with the refinery’s operation was no longer living. Helplessness was a good way to describe my feelings. My living 12,000 miles away from the site further complicated things. But as it is said, “when there is a will there is a way.” I assembled a team of local helpers, and so through trial-and-error method we started inching forward.

While no specific task was without problems, the most trying, complicated, and hazardous was cleaning the stills. They are tank-like structures when viewed from the outside. Inside they contain a hollow space and a honeycomb of pipes evenly spaced. There are of course inlets and outlets. The hollow space is filled with crude oil and steam passes through the pipes, eventually boiling the crude and taking it through various temperature levels to col-



C&H Oil Refinery from a ca. 1950 advertisement.

(continued on page 14)



2000 GENERAL TOOLS AWARD

Call for Nominations

The General Tools Award Committee invites SIA members to submit nominations for the **2000 Society for Industrial Archeology General Tools Award for Distinguished Service to**

Industrial Archeology. The award, presented annually at the SIA annual business meeting, recognizes individuals who have given sustained, distinguished service to the cause of industrial archeology.

Criteria for selection are as follows: (1) The recipient must have given noteworthy, beyond-the-call-of-duty service, over an extended period of time, to the cause of industrial archeology. (2) The type of service for which the recipient is recognized is unspecified, but *must be for other than academic publication.* (3) It is desirable but not required that the recipient be, or previously have been, a member of the SIA. (4) The award may be made only to living individuals. Teams, groups, agencies, firms, or any other collective entities are not eligible.

The nomination, which should not exceed three double-spaced typed pages, should address the specific accomplishments that qualify the nominee for the award. Supplementary material (the

candidate's resume, for example) may be appended to the nomination. Nominations must also include the name, address, and telephone number(s) of the nominator. Nominations may be made by any SIA member in good standing.

The General Tools Award was established in 1992 through the generosity of Gerald Weinstein [SIA], chairman of the board of General Tools Manufacturing, Inc. of New York City, and the Abraham and Lillian Rosenberg Foundation. The Rosenbergs founded General Hardware, the predecessor to General Tools. The award consists of a citation, a commissioned sculpture, and a \$1,000 cash award. Previous recipients are Emory Kemp (1993), Robert Vogel (1994), Edward Rutsch (1995), Patrick Malone (1996), Margot Gayle (1997), Helena Wright (1998), and Vance Packard (1999).

Nominations, *which must be received on or before April 1, 2000*, should be submitted to: Duncan Hay, Chair, SIA General Tools Award Committee, National Park Service, Northeast Museum Services Center, Charlestown Navy Yard, Charlestown, MA 02129-4543; (617) 242-5613; e-mail: duncan_hay@nps.gov. ■

Smallest Oil Refinery (continued from page 13)



Exterior and interior views of the refinery as it appears today.



lect the various products, namely water, naphtha, kerosene, and diesel. Stills at my refinery are mini, the quantity of work may be less, but the difficulties are much greater due to the limited access available for performing cleaning. The cleaning was after 20 years, a colossal effort by any standard. The entry into the stills is from a small hole barely 18 by 20 inches, just enough for a child to slip in. Everybody performed so well that the Wyoming Department of Environmental Quality issued a certificate of operations without problem.

The Lance Creek oil field was established in 1919 by the Ohio Oil Co., which had discovered oil in relatively shallow wells (4,000-ft. to 5000-ft. deep). C & H Refinery was established by Ohio Oil employees Roy E. Chamberlain and Jim Hoblit in 1933. During the Great Depression, Ohio Oil put everyone on half time. Chamberlain, then a chemist and warehouseman, looked for some additional employment. He encouraged Hoblit to go in with him as a partner and build an independent oil refinery at Lusk. Chamberlain secured permission from the general superintendent of Ohio Oil to buy Lance Creek crude oil for the refinery. They built and operated C & H Refinery together and sold the oil for home heating to Lusk residents, who had previously been dependent on coal. The 1933 price of Lance Creek oil was 97 cents per barrel. Chamberlain sold out to Hoblit in 1936 and went on to

become a state senator for Niobrara County for three terms. He was also one of the founders of Ranger Oil Co. and President of Bell Royal Co., which later merged with Glasscock Oil Co. to form Bell Western Corp. The refinery was operated by the Hoblit family until 1974 when it was sold to Joe Chamberlain (no relationship to founder Roy Chamberlain). In 1978, no longer financially viable, the refinery was closed. Twenty years later, fate intervened and an ex-fighter pilot from Pakistan arrived and made a deal

which flabbergasted everyone. The refinery is now in operating condition. It has been photodocumented by the Wyoming historic preservation office, and a National Register nomination is in preparation. The Guinness Book of World Records is currently researching to determine whether the C & H Refinery in fact is the smallest in the world. Info: Zahir Khalid, fax: 011 925 128 1005; e-mail: stak@isb.compol.com. ■

LETTER TO THE EDITOR

(continued from page 12)

present it before the board of the SIA. That's great news.

Your contributors to the editorial page ask, what is the role of SIA today? How do professionals and non-professionals relate to SIA? Your organization has a broad-based membership that, as a whole, has the ability to discern which sites have importance within the nation. SIA members learn from each other on a continuing basis as to what is archeologically significant in their region. Regional chapters hold seminars and organize tours to bring important attention to sites of concern. This is invaluable.

The decisions every society must make over which historic properties stay or go are ultimately political. But the politicians look to the experts and the experts look to the data. The Advisory Council on Historic Preservation has only twelve administrative reviewers to analyze every site across the nation. I suggest SIA take the opportunity to seek to be a participating organization in all 106 reviews that involve industrial properties. In inner cities, factories and mill buildings are being abandoned at an unbridled rate. It will take an organization such as SIA to provide expert recommendations for preservation. The citizens of the nation will benefit from this important role of the SIA.

Barbara Small
Paterson Friends of Great Falls
Jersey City, NJ

To the Editor:

This is a follow-up to David Soo's piece on Paterson. In September, I resigned the job of conducting an industrial archeology survey of the ATP site in Paterson's National Historic Landmark District after a series of serious breaches of support trivialized my efforts to keep the site's development in compliance with the preservation regulations formulated by the U.S. and New Jersey governments. During the two years that this survey was being undertaken, I attended several meetings with the regulatory agencies in which I gave updates on our progress. At those meetings, the City of Paterson often had to explain why it had breached the rules. Each time the agencies worked out ways to correct and proceed with the project and with Paterson's assurance of future good behavior. Paterson did not make good on any of the promises and continued to make little or no adjustments to their plans for the sake of historic preservation.

I've come to the conclusion that we will continue to see and pay for a policy that will ensure that the redevelopment of Paterson's NHL District will be done in ways that suit development at the expense of historic preservation. Paterson's record is abysmal. For example, back in the 1970s Paterson kept preservationists, including their own industrial archeologists, away from the "restoration" of one of the main raceways. Without a historic clue, they removed the raceway's clay liner with heavy machinery and caused a leak that has not been within anyone's power to mend.

More recently, a new building was constructed on the area documented as the site of Paterson's first mills. A policy was put in place in which below-ground industrial archeology was limited only to observations made during the contractor's excavations for the new building. The report of this work tells of seeing early walls beneath the foundations of the last factories on the site. We will never know what they were because they could not be identified during excavation. In other words, the archeologists could not carry out a method of research that might have answered many questions about the first mills built on the raceways of Paterson.

Lastly, if we examine the loss of technical reports and artifact

collections, the lack of master planning, the sad Paterson Museum, and the lack of city commitment to interpretation and maintenance of the landmark district, we would discover a mess.

Should this be swallowed whole? After all, they're too dumb to get it right in Paterson and New Jersey. I'm from Jersey and I don't care to go that route because I see a very astute political situation in which Paterson has used the historic landmark as a way to garner preservation funds and then use guile to keep control of those resources. Let me be the first to say publicly, "The King has no clothes on." I suggest that we coalesce our efforts around the notion that an outside agency, i.e. the National Park Service, come to Paterson to develop the historic landmark and control the use of preservation funds in some way that will allow redevelopment without the loss of the very reason for the landmark's existence.

Edward S. Rutsch
Newton, NJ

Proposed Slate 2000 SIA Election

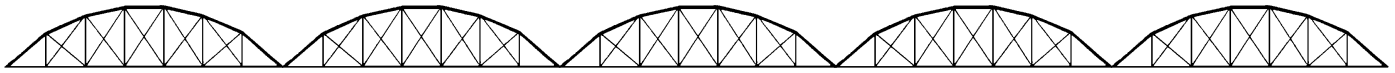
The SIA Nominations Committee is pleased to present the following slate of candidates for the 2000 elections of Directors and Officers:

Vice President: (2-year term): Elect one	Chris Andreae Vance Packard
Treasurer: (3-year term): Elect one	Nanci K. Batchelor
Secretary: (3-year term): Elect one	Richard K. Anderson, Jr.
Director: (3-year term): Elect two	Robert C. Stewart Mary Habstritt Bode Morin
Nominations Committee: (3-year term): Elect one	Lee Maddex Bob Frame

SIA by-laws state that the Nominations Committee shall notify the membership of the proposed slate of candidates no later than 70 days before the Annual Business Meeting (Section 2.05.a). This is that written notice, **it is not a ballot**. Additional nominations can be made in writing over the signatures of no fewer than twelve (12) members in good standing (dues paid for 2000) and delivered to the chair of the Nominations Committee at the address below by April 15, 2000. Candidates must have given their consent to be nominated and must also be members in good standing. Ballots with a biographical sketch and photograph of each candidate will be mailed to members for a vote in late April.

The 2000 Nominations Committee is Robert H. Casey (chair), David Shayt, Patrick Harshbarger, Fred Quivik, ex-officio. Reply to: SIA Nominations Committee, c/o Robert H. Casey, Henry Ford Museum, Box 1970, Dearborn, MI 48121-1970.

Reminder: SIA membership dues were mailed in late December. Only members who have paid their dues will be allowed to vote. The membership period is the calendar year. ■



Elusive American Truss Bridges

David Guise [SIA] is researching the evolution of the 19th-century American truss bridge for an upcoming book. His goal is to demonstrate why a large variety of truss designs were developed and examine how the introduction of new materials, progress in construction techniques, and expansion of theoretical knowledge, combined to cause a particular truss type to be superseded by a different, "better," configuration. In the first installment in a series to appear in SIAN, he shares his research to date on the Kellogg truss. Articles on other elusive truss configurations will appear in subsequent newsletters. The series is intended to serve as a catalyst to elicit additional information, especially the location of historic photos, plans, and descriptions.

Kellogg Truss

The Kellogg truss was a combination truss, one made from two materials. The chords and vertical posts were wood, the tension diagonals were wrought iron. Combination trusses bridged the evolutionary gap between all-timber designs and the eventual adoption of all-metal solutions.

Charles Kellogg started his career as a sawmill operator and timber-bridge builder. In 1870, he obtained a patent for an iron connection system that facilitated the construction of a version of a Pratt truss. Although Kellogg's patent did not show an overall truss pattern, a projection of the detail into a full-blown truss generated what has become known as a Kellogg truss. The principal difference between the silhouettes of a Pratt and a Kellogg is that the Kellogg configuration introduced a second diagonal within each of the square panels of a Pratt.

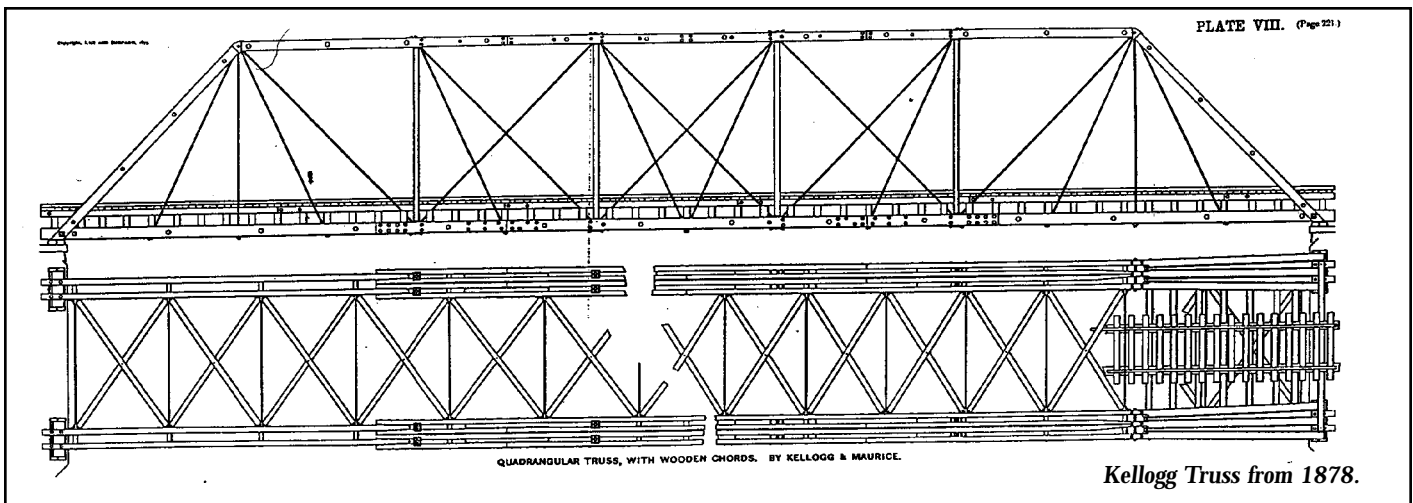
In 1872, Kellogg formed a partnership with C. S. Maurice, a graduate of Rensselaer Polytechnic Institute of Troy, NY, and established a successful bridge building company in Athens, PA. Initially they built combination trusses known at the time as either Kellogg or Kellogg-Maurice trusses. Soon thereafter, the firm began building iron trusses in a variety of configurations. In 1884, Kellogg and Maurice joined with Charles McDonald, Theodore Clark, Edmond Hayes, and George Field to create the Union Bridge Works, which grew into one of the country's major bridge construction firms.

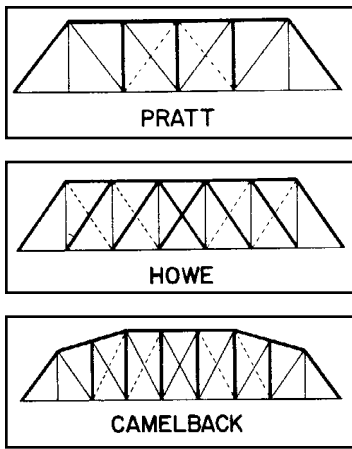
Like many elusive truss configurations conceived during the 19th century, the Kellogg truss was a response to a specific need and set

of circumstances. When the situation changed, the configuration was abandoned. By 1916, the eminent bridge engineer, J. A. L. Waddell, considered Kellogg's truss pattern a "freak," commenting that "it never had any valid claim to existence." The Kellogg truss, although ultimately discarded by the engineering community, was evidently held in high regard by some of Kellogg's contemporaries. George Vose wrote in his Manual for Railroad Engineers (1878) that the Kellogg truss "has been adopted in many places and has given entire satisfaction."

Kellogg's design was not without underlying logic in the context of its initial use of materials (mostly wood), its relatively low cost, and the way it met the needs of the narrow, single track, truss bridges typically constructed in the 1860s and 1870s. Kellogg no doubt observed that the bottom chords of timber trusses were having trouble supporting the increasing weight of locomotives and tended to sag between panel points. The floor, or deck, of narrow single-track timber bridges of that era commonly consisted of framing members (often only closely spaced railroad ties), which simply spanned between the lower chords of the pair of trusses that constituted the bridge. The ramification was that it introduced a bending stress in the chord because the chord was being called upon to act as a uniformly loaded beam spanning between panel points. This bending stress, called a secondary stress by engineers, was in addition to the pure tensile stress placed on the truss chord due to the distribution of stresses within the overall truss pattern.

There were logical remedies to lessen the bending problem in the load-bearing lower chord: either decrease the distance





between panel points by changing the angle of slope of the web diagonals to 30 degrees rather than 45 degrees, or provide an additional support for the load-bearing bottom chord. Kellogg provided an intermediate support by inserting a second diagonal that halved the distance between panel points. This solution required fewer verticals, producing a saving in material that may have balanced the cost of the second diagonal.

The omitted vertical would have provided greater rigidity to the truss, especially as the loads increased. At the time, however, loads were relatively light. Later, as locomotive speed and weight increased, rigidity became a more critical issue.

Kellogg's connection detail was clever in a number of ways. It facilitated varying the number of pieces of timber that were combined to form the truss chord. This permitted builders to vary the number of pieces on either side of the chord splice (the length of the bridge required that the chords be spliced several times), permitting a simple way of reducing the cross-sectional area of the chords toward the abutments where the stresses are lower. The connection detail also permitted the thickness of the vertical web posts to vary in response to their stress requirements. (Web stresses increase from the center to the ends of the truss.) This ability to adjust the size of the various truss parts permitted economies of material in a very competitive market. In those days, bridge builders usually bid on a job using a solution of their own choice. Kellogg even concerned himself with the often neglected problem of maintenance, creating a connection piece that permitted "the coating of the interior with paint or other medium for resisting the corrosive action to which the cast-iron portions of bridges are frequently subjected."

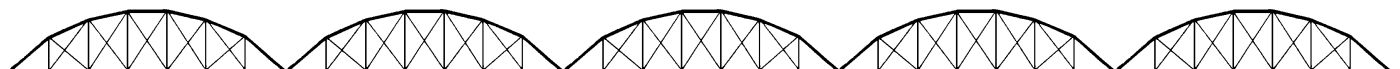
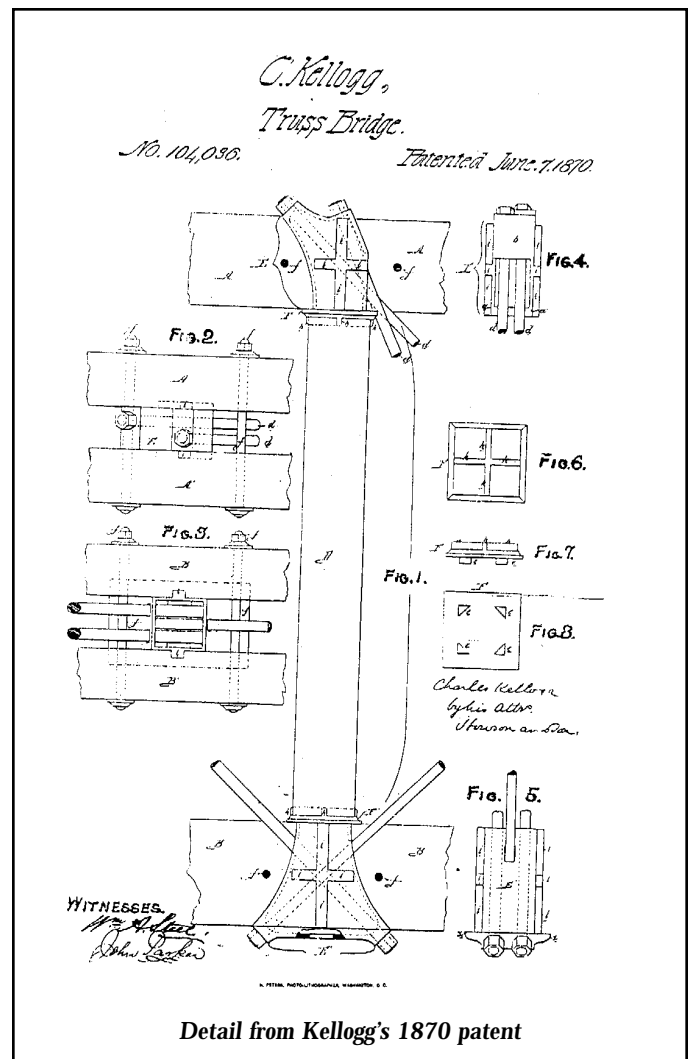
The Kellogg truss was an attempt to find an economical way to improve the load-carrying capacity of a combination truss. It was conceived at a time when iron was still dear. As bridges were required to support increasingly heavier and faster trains, the flaws in Kellogg's concept became more apparent. Iron was stronger and, as it became cheaper, could be used in ways not possible in wood. In later years, all-metal truss bridge builders found an even better solution to the bending problem by running their stronger wrought-iron and then steel deck beams parallel to the length of the bridge, from panel point to panel point, where they were then supported by cross deck beams perpendicular to the trusses. These were connected to the lower chord only at the panel points, thus the truss chords were not subject to the same degree of bending.

Several mysteries surround the Kellogg truss. Why did Kellogg believe his overall configuration was better than the well-established Howe truss? The Howe configuration was, and remains to this day, a most efficient solution for a combination truss span of modest length. The tensile members of the Howe's web are verticals, and thus do not require an elaborate connection to the horizontal chords, needing only a simple washer and nut at each end of the rod. (Howe diagonals, which run in the direction opposite to those of a Pratt, are timber compression struts). Further, one

can only speculate whether any Kellogg timber-chord trusses were constructed with iron verticals in lieu of wood posts. Although it is reasonable to think that all-metal Kellogg trusses were built, there is nothing to substantiate this. If an all-metal version was built, then Waddell's harsh criticism would be better justified.

In hindsight one can say Kellogg should, or could, have done something else. Given his background, the materials, economics, and problems of the moment, it was a reasoned, even if flawed, search for an answer. This was an idea, however, proposed barely twenty years after the publication of America's first textbook on truss design (Squire Whipple's *A Work on Bridge Building*, 1847). One should not lose sight of the fact that, while perhaps theoretically flawed, Kellogg's solution resulted in the construction of successful bridges. When circumstances changed, and knowledge increased, it became apparent that there were better solutions. Kellogg himself moved on to build some of these "better" configurations. No Kellogg truss bridges, of any material, are believed to survive today.

Info: David Guise, Box 132, Georgetown, ME 04548; (207) 371-2651; e-mail: davidguise@clinic.net. ■



NOTES & QUERIES

Stonewall Quarry began operations in the early 1880s as part of an emerging limestone industry in Stonewall, Manitoba. The quarry industry was the vital mainstay of the local economy for nearly a century. Depletion of usable limestone combined with economic factors to cause the quarry industry to shut down in 1967. Mindful of the contribution quarrying had made to the community's history, the Town of Stonewall adapted the quarry property for use as a park, opened in 1985. The abandoned quarries and their towering limestone kilns have been transformed into the centerpiece of an interpretive and recreational facility. The park's interpretive area is built around a pot kiln built in the early 1880s and three draw kilns built in 1904. The kilns were used to process limestone into quicklime. At present, all four kilns are deteriorating. The Town of Stonewall along with park staff are searching for ways to preserve and protect the kilns, and they are seeking advice from SIA members who have had experience with similar sites. Info: Catherine Precourt, Stonewall Quarry Park, Box 250, Stonewall, Manitoba, Canada ROC 2Z0; (204) 467-5354; fax 467-5260; e-mail: stoneq@mb.sympatico.ca.



Lime kilns (1904) at Stonewall Quarry Park, Stonewall, Manitoba.

The **1999 Ironmasters Conference** was held April 23-25, on the campus of West Virginia University. Cosponsored by the Institute for the History of Technology and Industrial Archeology and the SIA Three Rivers Chapter, the three-day conference explored historic ironmaking and showcased West Virginia's outstanding iron and steel heritage. On Friday morning 20 participated in an early bird tour of the Ohio Valley steel industry in the Wheeling area. The first stop was **Wheeling-LaBelle Nail Work**, one of two remaining American cut-nail factories. Next was lunch at Wheeling's West Virginia Independence Hall, the birthplace of West Virginia, a magnificent 1859 wrought and cast-iron frame building originally constructed as a U.S. Custom House. After lunch, the group headed across the Ohio River in a torrential downpour, bound for **Wheeling-Pittsburgh Steel's Steubenville South Works**, better known as Mingo Junction. For many, this was the highlight of the day. In a marathon afternoon, we saw the basic oxygen furnace convert pig iron into steel, and then followed the molten steel to the continuous caster, where it was cast into steel slabs. Completing the circuit, we toured the rolling mill and watched as the thick slabs were reduced to coils of sheet steel. On Saturday morning, about 60 assembled for a day-long symposium. There were presentations on charcoal making, bloomeries, metallurgy, furnace documentation and interpre-

tation, and big steel. Saturday evening, the ironmasters were treated to a reception and dinner, followed by a show-and-tell session. On a clear and chilly Sunday morning many conference attendees embarked on a driving tour of two of northern West Virginia's charcoal iron furnaces. The group first visited the **1854 Virginia Furnace** located near Albright, then they hiked down to the **1836 Henry Clay Iron Furnace** at the Coopers Rock State Forest. After taking in the grand vista from the Coopers Rock Overlook, the conference ended and the ironmasters scattered to the four winds until next year. The 2000 Ironmasters Conference is scheduled for May 5-7 at Saugus, MA (see calendar for more info). [Editor's note: thanks to Lee Maddex for turning in this report.]

Historic Mining Walking Tour. Ruffner Mountain Nature Center (Birmingham, AL) is now offering historic mining walking tours as a result of the research and participation of Jack Bergstresser [SIA], who assisted with a similar tour for the 1999 SIA Fall Tour. Ruffner Mountain is part of Red Mountain where the statue of Vulcan stands. It was the site of iron mines from the 1860s to the 1960s. Significant material remains of the mines and the mining landscape remain for interpretation. Jack's tours have been so well received that Bill Griffin, a local resident and photographer, felt inspired to report to the SIA. He writes that "the tour group was moved by Jack's description of the miners' lives. We came to realize that Birmingham's industrial reputation was built on the foundation of dedication, hard work, and sacrifice of the miners." Info: Ruffner Mountain Nature Center, 1214 81st St. South, Birmingham, AL 35206; (205) 833-8264 M-F; 833-8112 weekends. The nature center welcomes volunteers and donations for its programs.



Bill Griffin photo

Ruffner Mountain tour group pauses to contemplate an ore crusher.

10th International Symposium on Molinology. For the first time the symposium will be coming to the Western Hemisphere when its participants gather at Stratford, VA, for the Sept. 16-24 event. Molinology is the study of wind-, water-, and animal-powered mills. This symposium is the quadrennial meeting for The International Molinological Society (TIMS), and it generally takes place in Europe. Scholars, historic preservationists, and mill owners/millers meet for presentations on the application of the natural forces of power to human work. The week-long meetings combine formal presentations with visits to historic mills. Participants come from all parts of the world, though the presentations are in English. Membership in TIMS is a require-

CHAPTER NEWS

Samuel Knight (California) has been working on the restoration of a 1909 flatcar at the California State Railroad Museum. They have also been continuing their work to help save the Knight Foundry. Chapter members helped organize a new not-for-profit Knight Foundry Preservation Society, which has negotiated terms to purchase the foundry. The chapter held a two-day tour to the Marin Headlands to view historic lighthouses and military installations including bunkers and gun batteries from WW II.

The New England Chapters held their combined winter meeting and papers session at Plymouth (NH) State College in early February. In January, the Southern NE Chapter toured the Belcher Malleable Iron Foundry in Easton, MA.

Oliver Evans (Philadelphia) toured the construction of a new combined sewer overflow being built in an underground tunnel near the Fairmount Waterworks in November. The annual Filmfest, hosted by Lance Metz, was held in December. ■

NOTES & QUERIES

ment for participation in the symposium. Registration (including lodging and meals) is available to TIMS members for \$1,000. In addition to the formal symposium, TIMS members in North America have organized three optional pre-symposium tours. These will visit steam, water, and electrically powered mills in Missouri; watermills in northern Virginia and West Virginia; and wind engines (American-style pumping windmills) in Texas. Info: Derek Ogden, TIMS America, HCR 5, Box 339, Madison, VA 22727; (540) 672-1303; fax 672-0218; e-mail: butler_j@mediasoft.net.

The **European Federation of Associations of Industrial and Technical Heritage (E-FAITH)** is a new organization established to promote cooperation and communications between non-profit associations involved in the recording, conservation, development, management, and interpretation of industrial sites in Europe. Among the group's aims is to launch a campaign for a European Industrial and Technical Heritage Year. Information is available on the website of the Flemish Assoc. for Industrial Archaeology: www.conservare.be/vvia/Euro2002/E-Faith.htm.

Paper proposals are invited for the conference, **Kitchens: Design, Technologies, and Work** at the Hagley Museum and Library, Wilmington, DE, Nov. 10, 2000. Proposals may address household, commercial, and industrial kitchens in North America after 1850. Of interest are changing design and technology of kitchens and their contents (such as appliances and furniture), the social relations of kitchen work (cooking, cleaning, etc.) within firms or households, and the spatial relationships inside kitchens, as well as between kitchens and other spaces in homes or institutions. Proposals are due by Apr. 21, 2000 and should include an abstract of no more than 500 wds. and a brief c.v. Info: Roger Horowitz, Center for the History of Business, Technology and Society, Hagley Museum and Library, Box 3630, Wilmington, DE; (302) 658-2400; e-mail: rh@udel.edu. ■

PUBLICATIONS OF INTEREST

(continued from page 11)

TEXTILES

- ▶ Roger N. Holden. **Water Supplies for Steam-powered Textile Mills.** *IAR*, v. 21:1 (June 1999), pp. 41-51. Condensing engines required large quantities of cold water, explains why Lancashire cotton mills continued to be built adjacent to water courses well into the 20th century.

IRON & STEEL

- ▶ Iain Hedley and Ian Scott. **The St. Helens Iron Foundry.** *IAR*, v. 21:1 (June 1999), pp. 53-59. British iron foundry (1798-1939) known for casting and building pumping and winding engines for the mining industry.
- ▶ David Weitzman. **Pouring Iron: A Foundry Ghost Story.** Houghton Mifflin, 1998. Surely to please adult SIAers and children, alike. In this fictional account, the real Knight Foundry (1875, Sutters Creek, CA) is seen through the eyes of a boy, Howard, a modern-day apprentice, who meets foundrymen (ghosts from the past) who show him their craft. Rich in detail, it goes step-by-step through the making of the mold to the pouring of the iron with the ghost story adding suspense and mystery. Illustrated with beautiful line drawings by Weitzman (author and illustrator of another SIA favorite *Superpower*). The Knight Foundry was a featured site of the 1996 SIA annual conference.

ABBREVIATIONS:

- I & T = American Heritage of Invention & Technology
- IAN = Industrial Archaeology News (UK)
- IAR = Industrial Archaeology Review (UK)
- NCPTT = National Center for Preservation Technology & Training, National Park Service
- RH = Railroad History
- TICCIH = The International Committee for the Conservation of the Industrial Heritage

Publications of Interest is compiled from books and articles brought to our attention by you, the reader. SIA members are encouraged to send citations of new and recent books and articles, especially those in their own areas of interest and those obscure titles that may not be known to other SIA members. *Publications of Interest* c/o the **SIA Newsletter**, 305 Rodman Road, Wilmington, DE 19809.

We endeavor to make citations as complete as possible, but they are from a variety of sources, and are sometimes incomplete. If a date, publisher, price, or other statistic is missing, it simply means that it was unavailable, and, unfortunately, we do not have the time to track down these missing bits. The SIA, unless otherwise noted, is not a source for any of the cited works. Readers are encouraged to use their library, bookstore, or school for assistance with locating books or articles.

CALENDAR

2000

April 6-9: Preserving the Historic Road in America, Morristown, NJ. Sponsored by the National Trust for Historic Preservation. Info: Dan Marriott (202) 588-6279; e-mail: dan_marriott@nthp.org.

May 5-7: 2000 Ironmasters Conference, Saugus Iron Works NHS, Saugus, MA. Info: Curtis McKay White, Saugus Iron Works NHS, 244 Central St., Saugus, MA 01906; (781) 233-0050; e-mail: curtis_white@nps.gov.

June 1-4: SIA Annual Conference, Duluth, MN. Co-sponsored by the St. Louis County Historical Society and the Iron Range Resources and Rehabilitation Board. Info: SIA-HQ, Michigan Tech Univ., 1400 Townsend Dr., Houghton, MI 49931; Web site: www.ss.mtu.edu/ia/sia.html.

June 7-10: Vernacular Architecture Forum, Annual Conference, Duluth, MN. Info: Michael Koop, Minnesota Historical Society, 345 Kellogg Blvd. West, St. Paul, MN 55102; (651) 296-5451; e-mail: michael.koop@mnhs.org.

July 14-18: First International Conference, National Association of Mining History Organizations, Cornwall, England. Sponsored by Carn Brea Mining Society and Camborne School of Mines. Info: Maureen Holmes, Rivergarth, Bar Meadows, Malpas, Truro TR1 1SS, UK; e-mail: namho@csm.ac.uk.

August 17-20: Society for the History of Technology (SHOT) Annual Meeting, Munich, Germany. Info: SHOT Office, Dept. of History, Auburn Univ., Auburn, AL 36849. Web site: <http://shot.press.jhu.edu/associations/shot>.

August 23-26: Society for Commercial Archeology Annual Conference, Manitou Springs, CO. Conference theme: Automobile culture in the Rocky Mt. West. Web site: www.sca-roadside.org.

Aug. 30-Sept. 7: TICCIH 2000: The Millennium Congress, London, England. Three days of working sessions in London, followed by choice of 4 days of regional touring of industrial sites in either Cornwall, Wales or Scotland. Info: Rosy Hayward, The Science Museum, London SW7 2DD, UK; e-mail: cc@conference-contact.co.uk

Sept. 16-24: 10th International Symposium on Molinology, Stratford, VA. (See article elsewhere in this issue.) Info: Derek Ogden, TIMS America, HCR 5, Box 339, Madison, VA 22727; (540) 672-1303; fax 672-0218; e-mail: butler_j@mediasoft.net.

Oct. 11-13: Preserving the Recent Past II, Philadelphia, PA. Info: Box 75207, Washington, D.C. 20013-5207. Web site: www2.cr.nps.gov/tps/recentpast2.htm.

Oct. 12-14: Pioneer American Society Annual Conference, Richmond, VA. Theme: "19th-Century Industrial Development." Historic industrial sites tour, river cruise. Paper proposal deadline is Sept. 1. Info: Marshall E. Bowen, Geography Dept., Mary Washington College, Fredericksburg, VA 22401; (540) 654-1493; fax, 654-1074; e-mail: mbowen@mcw.edu.

Oct. 19-22: SIA Fall Tour, Sarnia, Ont. The Ontario oil district including Petrolia Discovery, the Oil Museum of Canada, the Don gas field, and Fairbank oil. Tour headquarters will be in Sarnia, across the Blue Water Bridge from Port Huron, MI. Info: Petrolia Discovery (519) 882-0897. Further info and registration materials will be sent to members over the summer.

Department of Social Sciences
Michigan Technological University
1400 Townsend Drive
Houghton MI 49931-1295

**SOCIETY FOR
INDUSTRIAL
ARCHEOLOGY**

Return and Forwarding Postage Guaranteed
Address Correction Requested

BULK RATE
U.S. POSTAGE
PAID
Minneapolis, MN
Permit No. 110