SIA 46th Annual Conference
Houston, Texas
May 18-21, 2017

Paper and Poster Abstracts

Sessions

Time	Session	Room	Moderator
8:30–10:00	1A: IA Methods	Conf. I&II	Marni Blake Walter
	1B: Agriculture & Aggregate	Salon A–C	Suzanne Wray
10:30–Noon	2A: IA Heritage	Conf. I&II	Steven Walton
	2B: Texas Tea	Salon A–C	Duncan Hay
Poster presenters will be asked to be at their posters from the end of session 2 until lunch is served (roughly 11:30-12:00) for questions			
2:00–3:30	3A: Historic Bridges 1	Conf. I&II	Patrick Harshbarger
	3B: Water Matters	Salon A–C	Saul Tannenbaum
3:45–5:15	4A: Historic Bridges 2	Conf. I&II	Patrick Harshbarger
	4B: (Sub)Urbanity	Salon A–C	Steven Walton

Session 1A: IA Methods

A Mill Man's Day

Paul White (University of Alaska Anchorage, Anchorage, AK)

ABSTRACT: Industrial archaeological investigations of the workplace have often revealed the existence of unique technological arrangements and local contrivances to make things work more effectively. A related but frequently elusive aspect to recover about the workplace has been the laboring experience. The documentary record tends to be sparse, with technical treatises detailing the components and theoretical operation of a given machine more so than lessons learned from the shop floor. Moreover, few workers committed reflections of their daily experiences to paper, evidently finding better things to do with their time than to detail all the elements of drudgery. The consequence is that even detailed documentation and investigation tends to fall short of bringing across a sense of the human experience.

This presentation discusses results from an ongoing archaeological investigation at the Gold Cord Mine, a small–scale and family operated gold mine in south–central Alaska. Here, the ore–processing mill, constructed in the 1930s, remains remarkably intact. Beyond having the full complement of crushing and recovery equipment, launders and belts still connect machines, and the shelves remain stocked with parts and supplies. The mill no longer runs, but the owner of the property recalls working in the mill as a child, and recalls in detail running the plant by himself during the 1970s. He notes idiosyncrasies in the operation of specific machines, as well as the daily routines he developed to run multiple machines simultaneously. Such information helps draw attention to the gulf existing between what the textbooks said and what was left for people to learn on the job.

BIO: Paul J. White is an Associate Professor of Anthropology at the University of Alaska Anchorage. His research on the historic mining industry has explored themes of technological change, environmental impacts, and relations between mining and colonialism. His forthcoming book, *The Archaeology of American Mining* (University Press of Florida, August 2017), synthesizes archaeological findings that have accumulated over five decades, identifying key areas of contribution and developing a prospectus for future research.

Logging Oral Histories: Geospatial Analysis of Coalwood Lumber Worker Migration

Tyler D. Allen and James Schwaderer (both Michigan Technological University, Houghton, MI)

ABSTRACT: Michigan's Upper Peninsula was characterized by the proliferation of extractive industries at the turn of the twentieth century. The Cleveland–Cliffs Iron Company first operated lumber camps in the Coalwood district, which lies in what is now Hiawatha National Forest just south of Munising, Michigan. These camps provided timber for mining reinforcements and cordwood for the charcoal kilns in Marquette. While most logging camps

were only in one location for a short period of time, camps within the Coalwood district operated for up to 12 years in the same location. Despite this seeming permanence, workers moved from one location to another in search of the best pay and working conditions. A GIS project has been designed to examine how oral history data can be used track worker movement. A base map was created using both current road and section data along with historic maps. Data from oral histories and censuses were attached to this map using a custom–built geocoder. The results of standard deviation ellipse analysis demonstrate that as time passed workers experienced a greater range of movement, which trended south toward large cities.

BIO: Tyler Allen is currently a master's student at Michigan Technological University, working towards a degree in Industrial Archaeology. He graduated from West Virginia State University in 2015 with a Bachelor of Arts degree in History, where he focused on Appalachian industrial heritage and African–American history. His current interests as a graduate student are industrial communities, logging camps, and Appalachian heritage. His thesis investigates worker autonomy at the Coalwood lumber camp in relation to the use of alcohol.

James Schwaderer is a Ph.D. student at Michigan Technological University. He received undergraduate degrees from Michigan State University in history and anthropology and did master's work at Western Michigan University focused on the intersections between virtual archaeology and distance education. There he created a digital recreation of an excavation from Fort St. Joseph using Minecraft to serve as an educational platform for elementary students. His current research will examine the foodways of three logging camps in the Coalwood lumbering district located just south of Munising, Michigan. Research interests include industrial archaeology, virtual archaeological methodologies, public outreach and education, and foodways with an emphasis on faunal analysis.

The Venn of IA: a case study of the Pullman project

Steven A. Walton and Timothy Scarlett (both Michigan Technological University, Houghton, MI)

ABSTRACT: Starting in 1880, George F. Pullman built a factory and model town on the south side of Chicago where he expanded output of his opulent and eponymous passenger and sleeping cars. The company persisted there, and in numerous other locations across North America until the 1960s, when it succumbed to the changes in rail travel and system. The remains of original factory (that part that has not been overbuilt or destroyed) and the planned town became a National Historic Landmark in 1970 and a National Monument in 2015. In 2016, Michigan Tech was asked to write an archaeological overview and assessment (O&A) of the Pullman National Monument. Due to its size, this project presents challenges that are rarely explicitly demanded of IA projects.

Sited on the remains of a factory, the project logically therefore seem undeniably the purview of IA. The original factory and town were indeed documented by HAER in 1978, though the main secondary works on Pullman remain more oriented towards business, architectural, planning, and social history (especially attending to the 1894 strike and its aftermath) than the history of technology, and nothing whatsoever has been done on the archaeology proper of the town or factory. On one hand, the town itself is far better preserved than the factory, which has suffered from over–building, large–scale demolitions,

looting, as well as a catastrophic fire in 1998. This, coupled with the need of the NPS to also tell the story of the Pullman Porters, who had nothing directly to do with the factory or much with the town itself, might well lend the project more easily to ethnographic and social analyses that are only incidentally industrial. On the other hand, Pullman is obviously the core of a technological, industrial, and business story that had repercussions across global railway infrastructure and management that resonate with the fields of history of technology and business history, both dear to IA.

The 'Venn' therefore, of the paper is an investigation of how the overlapping Venn diagram circles of the architectural, the technological (as a production site), the technological (as the product), the industrial (both production and organization), the social, and the ethnographic–not to mention the third dimension of the historical that has to both account for the period of significance of the site (1880–1897 as defined by the NPS), its longer term manifestations, and the reality on the ground in the community today–*need* to be brought together under the IA umbrella to tell a story of Pullman. This story in any of its individual garbs may be compelling, but to disassociate them denies this site, and sites like it, its value to IA. Further, the recognition that IA can take the lead on integrating these aspects may offer renewed dynamism to the field itself.

BIO: **Steven Walton** is an associate professor of history at Michigan Tech, teaching in the Industrial Archeology program there. His intellectual centre of gravity is machines and production, but this projects has thrown him into a multi–disciplinary (and perhaps interdisciplinary) team looking at the history and survivals in Pullman Ill. His work is diverse chronologically (from the Middle Ages to the Military–Industrial Complex), geographically (European and North American), and topically (machine construction, industrial production, and social networks), and yet he still find a center in the history of technology. He is also the new SIA Executive Secretary and editor of SIA's journal *IA*.

Tim Scarlett is an anthropologist and archaeologist at Michigan Tech University who is interested in how people deploy and grow creativity at work. Interested in may things as an eclectic scholar., he finds Pullman a compelling place where the new monument has a chance to become a space where people can contemplate the interconnections of building things and relations in industrial and 'post–industrial' society. A committed collaborator, he considers himself a scientist and a humanist and always tries to foreground students in his work. Scarlett has used archaeology to explore hardrock and dredge mining, foundries and furnace sites, potteries, mills, and many other types of sites, communities, and landscapes.

Session 2A: IA Heritage

The Preservation of the Sugar Industrial Heritage: Issues and Counterpoints

Gabriela Campagnol (Texas A&M University, College Station, TX)

ABSTRACT: The sugarcane agro–industry promoted a variety of urban types and acted significantly on the construction of the territory throughout the Americas. Over the last forty years, sugar production landscapes have been facing profound changes. Sugar towns, which flourished from 1910 to 1945, represent a small–scale urban–rural hybrid with agricultural, industrial, and residential features. Sugar plantations were the starting point for the development of many company towns. This presentation will (1) examine the preservation of the sugar industrial heritage in Brazil and in the Unites States with focus on the relationship between history and heritage conservation (or lack of) through a comparison between quintessential sugar heritage sites: Sugar Land, Texas in the United States, and the Piracicaba region in Brazil; (2) examine in a historical perspective the similarities and differences the rehabilitation projects and conservation issues; and (3) present the activities of the stakeholders in both countries. Sugar Land, Texas, which has an identity and a history intimately connected to the sugar industry, has been slowly losing its historical roots, and the industrial heart of the town is on the cusp of a large redevelopment project. In Brazil, the Engenho Central in Piracicaba is a former sugar complex and a city landmark, which is located on the banks of the Piracicaba River and near the historic downtown. Since the 1980s, the site and its fate have been the subject of political controversy and stewardship debates, resulting in several adaptive reuse projects, some of them by renowned architects, such as Oscar Niemeyer.

BIO: **Gabriela Campagnol** is an architect (graduated in 1999) and faculty member in the departments of architecture and landscape architecture and urban planning at Texas A&M University in College Station, Texas, where she teaches design, history and theory since 2007. She received her Master's (2003) and PhD (2008) degrees in architecture and urban planning from University of São Paulo, Brazil. She is the author of a book on sugar agro–industrial settlements, as well articles on history, theory, and practice of Brazilian architecture, sugar industrial heritage, industrial archeology in Brazil, and adaptive reuse. She is a founding member of the Brazilian chapter of The International Committee for the Conservation of the Industrial Heritage (TICCIH–Brazil).

Defining Time: Searching for Heritage at the Pullman National Monument

Sarah Herbert, Garand Spikberg, and Talva Jacobson (Michigan Technological University, Houghton, MI)

ABSTRACT: The Pullman National Monument on the south side of Chicago preserves the remains of various industrial buildings and structures associated with George Pullman's Palace Car Company. The boundaries of this site have undergone major transformations between its creation as a planned community in 1880 to expansion throughout the late neneteenth and early twentieth century, decline and eventual closure. This presentation will examine how the site's historic inventory of industrial structures, associated with factory

activities, have been recreated through the development of a longitudinal geogrpahical inforation system (GIS). Using georeferenced historic fire insurance plans an interactive cartographic model has been developed to visualize and synthesize the structures lost from this industrial community's historic inventory with those that have survived. This geospatial database has been further developed into an interactive webGIS platform that facilitates a realistic understanding of what changes have occurred over time. This model is an unique opportunity to provide a comprehensive database and digital footprint that can be spatially referenced to facilitate industrial archaeological research, planning initiatives and heritage management strategies designed to develop interpretive programs, rehabilitation or stabilization projects, and policy aimed at protecting the sites resources. This presentation will examine the challenges associated with the creation of an interactive webGIS, consider how variables define the digitization of site reconstruction, and identify how this historic GIS mapping project can enhance community participation by minimizing community impacts that are characteristic of development within heritage sites embedded into the living community.

BIOs: **Sarah Herbert** graduated from Houghton High School in May 2016 and completed extensive training and implementation of 3–dimensional modeling software related to 3D printing. She just completed her first year at Michigan Technological University and worked as an undergraduate research associate for the *Keweenaw Time Traveler* and contributed to the Pullman Historic GIS project. The two projects have taught her how contemporary tools such as GIS are used to better understand and visualize how the present has been shaped by the past.

Garand Spikberg is a fourth year Computer Science major at Michigan Tech, an active member of Delta Upsilon International Fraternity, and has been working as a research associate on the Copper Country Historical Spatial Data Infrastructure (*AKA* the *Keweenaw Time Traveler*) for the last year. In his time there, he has worked on city digitization, mentoring GRACE interns, and parsing city directories.

Talva Jacobsen is the Resident Archaeologist at Medalta Potteries National Historic Site in Alberta, Canada and a PhD Student at Michigan Technological University in Houghton, Michigan. She has been an archaeologist for 13 years and is actively working on research projects in both Alberta and Nova Scotia. With a particular interest in industrial archaeology's role in community development, she is has been working on developing conservation strategies to manage risk, preserve historic and archaeological resources, strengthen community identity, and build resiliency.

The group would also like to express their thanks to Don Lafreniere, Asst. Prof of Geography at Michigan Tech, under whose direction this project has been developed.

Session 3A: Historic Bridges 1

Round Peg/Square Hole: Developing the Guidelines for Rehabilitating Historic Covered Bridges

Christopher Marston (HAER, Washington, DC)

ABSTRACT: Fifteen years in the making, the NPS publication *Guidelines for Rehabilitating Historic Covered Bridges*, is one of the final deliverables that NPS' Historic American Engineering Record (HAER) will produce for FHWA's National Historic Covered Bridges Preservation Program (NHCBP). This initiative has funded the rehabilitation of over 200 covered bridges nationwide since 2002, as well as educational and research projects by both HAER and United States Department of Agricutlure's Forest Products Laboratory.

HAER has partnered with several covered bridge experts to document nearly 100 bridges (including 17 engineering studies), produce a Smithsonian–sponsored national traveling exhibition, write a book on wood truss history, designate seven National Historic Landmarks, and host two international conferences. At the First National Covered Bridge Conference in Burlington, VT in 2003, participants collaborated on the "Burlington Charter for the Preservation of Historic Covered Bridges." This charter outlined several goals for best practices of preserving covered bridges, and resolved to develop guidelines adapting the Secretary of the Interior's Standards for Preservation, Rehabilitation, Restoration, and Reconstruction for historic covered bridges. This book is the result of that resolution.

As project leader, the presenter worked with Tom Vitanza and a multi–disciplinary team to develop the guidelines. However, they found that while the Secretary's four standards focus on buildings, they do not easily convert to bridges. Unlike buildings, where exterior style and decoration are primary characteristics over the hidden structure, the opposite is true for bridges. The sacrificial housing of a covered bridge functions to protect the truss and be replaced as needed. Despite these contradictions, the team was determined to adapt the Guidelines by focusing on standards for rehabilitation.

Following the precedents of other NPS guidelines, the book is organized by the function of the structure. Chapters discuss a covered bridge's superstructure, substructure, exterior envelope, site features, and safety and protection systems. The Guidelines are presented in a two–column format describing recommended and non–recommended treatments.

To provide clear and consistent guidance, the recommended actions are prioritized to facilitate a well–planned rehabilitation project. Begin with documenting and identifying the character–defining features of a covered bridge, then focus on protection and maintenance. Where deterioration is present, repair is recommended. When repair is not possible, it may require replacement of historic features with new materials. When an entire feature no longer exists, it no longer plays a role in defining the historic character of the bridge. With adequate historical or physical evidence, the feature may be accurately reproduced. In limited instances, a new design for the missing feature may be appropriate if it is compatible with the rest of the historic bridge, and should be subtly differentiated so that it does not give the bridge a false historical appearance.

The book concludes by showcasing eleven covered bridge rehabilitation case studies, comprised of a various truss types, rehabilitation issues, budgets, and locations. Once published, the Guidelines will be a useful resource for educating engineers, State Historic Preservation Officers, Departments of Transportation, bridge owners, preservationists, residents, and industrial archeologists in preserving these historic symbols of American engineering for future generations.

BIO: **Christopher H. Marston** has been with the Historic American Engineering Record (HAER) since 1989, after receiving degrees in architecture from the University of Virginia and Carnegie–Mellon. The project leader of the HAER National Covered Bridge Recording Project since 2002, he oversaw the documentation of nearly 100 covered bridges, including the designation of seven National Historic Landmarks. He is co–executive editor of Covered Bridges and the Birth of American Engineering, and served as associate curator of the Smithsonian traveling exhibit, Covered Bridges: Spanning the American Landscape. He was also co–editor of the award–winning *America's National Park Roads and Parkways: Drawings from the Historic American Engineering Record*. Besides serving as SIA Vice President, Christopher is an active member of several other preservation organizations, including Transportation Research Board's Committee for Historic Preservation and Archaeology, Preserving the Historic Road, and the Rustic Roads Advisory Committee in Montgomery County, Maryland.

The Piano Bridge Rehabilitation

Carolyn Nelson (TxDOT, Autsin, TX)

ABSTRACT: An 1885 Pratt truss bridge in Fayette County, Texas went from the Preservation Texas Most Endangered List to a beautifully restored heritage tourism masterpiece. This presentation is the narrative of the project from beginning to end. The Piano Bridge is an 1885 King Iron Bridge Company Pratt through truss located between the two "Painted Churches" communities of Ammansville and Dubina near Schulenburg, Texas.

In 2010, the Texas Department of Transportation (TxDOT) embarked on a collaborative effort with the Fayette County and the local community to rehabilitate the historic truss bridge. Federal money provided approximately 80 to 90 percent of the cost for the rehabilitation. TxDOT provided the bridge design and environmental clearance to secure funding for the rehabilitation. The bridge design was completed using the Secretary of Interior Standards for Rehabilitation. Environmental clearance requirements included Section 106 of the National Historic Preservation Act of 1966 and United States Department of Transportation Section 4(f) processes.

Preservation Texas, Inc., a statewide historic preservation advocacy group, added the bridge to its "Most Endangered" list in 2011. State–mandated regulations require bridge rehabilitation projects be awarded to the lowest bidder in a state bidding process. The Davis Construction Company of Lansing, Michigan won the bridge rehabilitation bid. Davis Construction specialized in historic bridge rehabilitation and after moving the bridge to a field alongside its crossing, they completely dissembled the bridge. Davis Construction used hot rivet repairs, and they were able to complete the bridge rehabilitation within reasonable

timelines, regardless that one of their main welders was in a devastating personal car accident.

This presentation will outline why this particular bridge was ideal for rehabilitation because it was in good repair and had integrity as determined using the National Park Service Bulletin 15 standards. This presentation will also discuss county–owned verses state–owned historic bridges, and the role TxDOT must take to balance safety with historic preservation and meeting the needs and desires of local communities who often do not have the 10 to 20 percent funding match needed to fund the bridge rehabilitation. The community had a grand reopening ceremony where the local community, including a high school history class, celebrated the reopening of the historic bridge. In March 2017, citizens of Fayette Country received an award from Preservation Texas for their successful rehabilitation efforts of the Piano Bridge.

BIO: **Carolyn Nelson** is an architectural historian for the Texas Department of Transportation (TxDOT). In her 11–year career with TxDOT, she has overseen several historic bridge rehabilitation projects including the rehabilitation of the Del Rio High Bridge. She also serves as the Public Involvement liaison and enjoys working with local groups. She has degrees from the University of Michigan in America History and Eastern Michigan University in Cultural Geography/Historic Preservation.

Restoration of the Supremely Important and Charming Shaw Bridge

Ian Nitschke (Claverack Historic PAC) and Francis E. Griggs, Jr. (Claverack Historic PAC, Rexford, NY)

ABSTRACT: This presentation will describe the Spring 2017 initiation of the careful restoration of the long neglected Shaw Bridge, in Claverack NY, for pedestrian/bicycle traffic (although it was built in 1870 for horses and carriages as well). The Shaw Bridge is the best example of a Whipple Bowstring Truss bridge (patented in 1841), which was one of the first bridge designs in the world that used scientific principles by New York State engineering genius Squire Whipple who published these principles in the 1847 book: *A Work on Bridge Building*. Although designed for the Enlarged Erie Canal (1836–1862 – and hundreds were built for the canal), others were also built elsewhere in New York State, Massachusetts, Ohio, and Japan. The Shaw Bridge is one of only eight left, the lone one in its original location and the only double span. The bridge is clearly eligible for Historic Civil Engineering Landmark status in the USA and this presentation will argue that it is also a World Heritage Bridge candidate.

Squire Whipple's importance cannot be overstated. He was one of the first to develop theoretical and mathematical design principles for bridge design, he was critically important for the development of the Enlarged Erie Canal and early railway industry, was one of the first to use pre–fabricated construction, and helped New York State to become a world leader in the ninteenth century. The restoration of the Shaw Bridge will be a fitting tribute to the Civil Engineering pioneer Squire Whipple, whose extraordinary intellect was matched only by his humility, which has resulted in a neglect of his contributions.

BIO: **Ian Nitschke** is the Chair of the Historic Preservation Advisory Committee for the Town of Claverack, New York. For several years, he has been involved in the effort to restore the supremely important Shaw Bridge in Claverack. He also initiated the 2016 New York State law designating the Claverack Creek watershed as an Inland Waterway, which allows the Town to apply for waterfront program technical assistance and grants. Among other activities, he helped create the Claverack Historical Society in 2015. Dr. Nitschke is a retired New York State Public Service Commission utility analyst, retired energy efficiency consultant, and retired physics professor. Currently he is a licensed real estate broker in his wife's firm, Peggy Lampman Real Estate, in Claverack, NY.

Francis E. Griggs, D.M.ASCE (Distinguished Member American Society of Civil Engineers), is a retired civil engineering professor and currently a historic bridge consultant. Besides the Shaw Bridge, he has been involved in the restoration of three other Whipple bowstring arch bridges: Union College, Schenectady, NY (moved from Johnstown, NY in 1980); Vischer Ferry, NY (moved from Fonda, NY in 1997); and Black River Canal Bridge, Boonville, NY (moved from Talcottville, NY in 2001)

Session 4A: Historic Bridges 2

Before the Bridge: a chronological review of Roebling's work before the Brooklyn Bridge

Paul King *(New York City College of Technology, Brooklyn, NY)*

ABSTRACT: Before the Bridge is a chronological review of the body of work by Roebling that preceded the construction of the Brooklyn Bridge. Roebling's work is unique in the use and development of woven wire cables that were integral to his suspension bridges and aqueducts.

To put this work and ingenuity in context, it is interesting to note that Roebling's work paralleled the changes in transportation from the heyday of commercial barges pulled along canal systems, to the introduction of railway systems with steam locomotives powered by coal, to the of evolution of the electrified public transportation systems with the incorporation of separate decks on the Brooklyn Bridge for the Brooklyn Metropolitan Transit (BMT) subway system to roadways designed to carry horse drawn carts and motorized vehicles across the East River.

He began his bridge–building career with the Allegheny Suspension Aqueduct and the Smithfield Street Suspension Bridge in Pittsburgh from 1844 to 1846 followed by the Delaware and Lackawaxen Suspension Aqueducts from 1848 to 1849 and later the Neversink and Roundout High Falls Aqueducts from 1849 to 1851 for the Delaware and Hudson (D & H) Canal system built to transport coal on barges from the hills of Pennsylvania to the Hudson River and then to market in New York City. He then transitioned to railway suspension bridges with the Niagara Railway Bridge from 1851 to 1855 and the Kentucky River Railway Bridge started in 1854 and suspended in 1857 as the civil war neared. After the Civil War, his work resumed and he completed the Covington and Cincinnati Bridge in 1863 and the Cincinnati Bridge in 1866 followed by the culmination of his career with the Brooklyn Bridge in 1883.

This presentation is a follow–up to two previous SIA conference presentations on the topic, which focused more specifically on Roebling's work for the D & H Canal. This presentation follows the working outline for a book proposal entitled "Before the Bridge". While there are historical accounts of the construction of the more significant work of Roebling there is limited publication of archival drawings of these major works that focus on the evolution and innovation of their construction.

BIO: **Paul C. King**, a Professor of Architectural Technology at New York City College of Technology is a licensed Architect with degrees in Architecture, Landscape Architecture and Urban Design and is past president of the New York chapter of the Society of American Registered Architects. A pioneer in the use of technology he was instrumental in the transition his profession from traditional hand drawing to computer based methodologies, he provides leadership as an educator and travels to run faculty development workshops on the "Reflective Teaching Portfolio".

A resident of Sullivan County, New York, he became keenly interested in the history of the D&H canal and the early work of Roebling when he discovered that the lake he lived on was built to provide water to

the canal. He is continues to research the work of Roebling "Before the Bridge" and the innovations that led to the design and construction of the Brooklyn Bridge.

A Tale of Two Bridges: the San Francisco Oakland Bay Bridges of 1936 and 2013

Stephen Mikesell (Mikesell Historical Consulting, Davis, CA)

ABSTRACT: This presentation will summarize the findings of my book, *A Tale of Two Bridges: the San Francisco Oakland Bay Bridges of 1936 and 2013*, which will be published by the University of Nevada Press in April 2017, two months before the SIA conference. The paper will summarize the long history of planning that led to construction of the original Bay Bridge in 1936. Planning for the bridge began in the early 1920s but did not materialize until Herbert Hoover – a California engineer – put the weight of the federal government behind it. The paper will discuss the financial constraints on the project – a finite amount of money that could not be exceeded ––– and the valiant efforts of the engineers to bring it in on time and under budget. It will also detail the daunting challenges facing the design engineers – Charles Purcell for the state and consulting engineers Ralph Modjeski, Daniel Moran, and Leon Moissieff.

The presentation will move forward to the 1989 Loma Prieta earthquake, which damaged a 50' section of this 8–mile–long bridge. It will detail the tortured planning effort that ultimately led to a decision to demolish the east spans of the Bay Bridge and replace them with a concrete viaduct and self–anchored suspension (SAS) span. The replacement decision was made on the basis of cost estimates that showed a viaduct and cable–stayed replacement project would be slightly less expensive than a $1 billion retrofit. The state elected to force the Bay Area to pay for the project through increased tolls but gave Bay Area residents the power to choose the bridge type. A design committee chose an untried single–tower SAS design. Cost estimates ballooned from $1 billion to more than $5 billion, leading the state to abandon its "buy American" commitment and get steel for the SAS from Chinese suppliers. The final product cost more than $6.5 billion and has significant structural issues, most attributable to shoddy work by the Chinese firm. The presentation will conclude with five lessons that help explain why the 1936 bridge construction and design were so successful and the 2013 less so.

BIO: **Stephen Mikesell** is an historic preservation specialist and public historian living in Davis, CA. He is the former Deputy State Historic Preservation Officer for California. His books include *Historic Highway Bridges of California* (1990), *Sierra Railway* (2016), and *A Tale of Two Bridges: the San Francisco–Oakland Bay Bridges of 1936 and 2013* (2017). He has published numerous articles in *Public Historian*, *Journal of the West*, and other journals. He has delivered historic bridge papers at SIA, California Preservation Foundation, the Transportation Research Board (TRB), and other conferences. This presentation will utilize numerous historic views of the construction of the two bridges as well as technical drawings illustrating engineering challenges posed for both bridges.

Overpass Architecture: Defining the Landscape of the Mid–Century & Today

Rachel Will (Wiss, Janney, Elstner Associates, Inc., Chicago, IL)

ABSTRACT: The Interstate Highway System is regarded as one of the greatest achievements defining the character of the mid–twentieth century. The overpass, a major visible facet of this immense advancement, greatly altered the way of life for many Americans. It affected everything from engineering and architecture to the American's cultural perception. The overpass acts a node on the ribbon of pavement connecting American society, providing a main aspect characterizing our past, as indicated by the following quote addressing highway aesthetics:

> Roads are more than just conduits of commerce and transportation. People drive for pleasure, for recreation, for diversion. They drive to experience the out–of–doors, to see and learn of the country around them. Most of our exposure to the landscape today is from a car, and what we see from the road is what we come to know of our country. The roadway, then, plays a strategic role in displaying and interpreting the country's natural, historic and cultural features. (*Annual Report to the President and to the President's Council on Recreation and Natural Beauty*)

While many times overpasses/interchanges are considered for their mere functionality, the topic of overpass architecture and design of the mid–twentieth century warrants a closer look as is illustrated in this this paper. Interstates, the greatest symbols of American progress in the age of the automobile, are distinguished by the overpass/underpass structures. These impressive structures define the notion of the interstate and landscape of the mid–century. This presentation will highlight specific examples of overpass architecture and their affect on mid–century architecture.

BIO: Rachel Will is a Senior Associate with the Chicago office of Wiss, Janney, Elstner Associates, Inc. She performs building envelope evaluations and investigations of distressed and deteriorated conditions in existing buildings. Her expertise includes documentation and investigation of building facades as well as preservation and repair of historic buildings.

Session 1B: Agriculture & Aggregate

Colonial Agro–industry in Mexico: Ex–Hacienda Ocotzá

Mauricio Athie and Miguel Aldana (Estudio Taller Arquitectura [ESTAR], Mexico City, Mexico)

ABSTRACT: Industrial heritage in the colonial era from the sixteenth to nineteenth centuries as well as in the early twentieth century is extremely rich. It includes extensive hydraulic infrastructure such as the aqueduct of Padre Tembleque (recently added to the UNESCO World Heritage list) and important agribusiness conglomerates concentrated in haciendas which for centuries covered much of Mexico. Haciendas were large rural estates dedicated to the manufacture of agro–industrial products, such as rope and hemp textiles in Yucatan, sugar and alcohol in Morelos, meat and milk products in the Bajio area, and pulque. Pulque is a mildly alcoholic beverage (10–15 % Vol) of Aztec origin, consumed in Mexico city and surrounding area since pre–colonial times until industrialized beer became the preferred "moderation drink" throughout the Mexican Republic.

The manufacturing of pulque required large areas of land dedicated exclusively to the cultivation of a type of agave (*Agave salamina* or *Agave atrovirens*) able to produce large quantities of a sweet liquid called aguamiel. Aguamiel was piped out to a large gourd and then transferred to pigskins to be transported by donkeys to the vat building (tinacal) where it would be fermented for a couple of days to produce pulque. The final product, which had a very short useful life, was transported to the city by railroad and distributed to pulquerías immediately upon arrival. This presentation refers to Ocotza, one of the haciendas pulqueras in the state of Hidalgo, which was active from the early nineteenth century until the implementation of the Agrarian Reform of 1920s.

Hacienda Ocotzá is an interesting example of early industrial archaeology because it comprised infrastructure for the production of pulque and lime, and it had major hydraulic features such as a reservoir, canals, and an irrigation system that covered thousands of hectares. Ocotza was taken over as part of the Agrarian Reform and its buildings were destroyed. Estudio Taller Arquitectura (ESTAR) is currently working on a partial rehabilitation and re–purposing of the extant buildings as a conference center and tourist attraction. The presenters will show a virtual reconstruction of the hacienda, with emphasis in its industrial infrastructure, and the Hacienda Ocotzá re–purposing project.

BIO: **Mauricio Athié** is completing his Associate Degree in Studio Art at Montgomery College in Maryland, following his retirement in 2015 from a career in Environmental Engineering. During the previous 40 years, his work focused on environmental and social impact assessment of development projects throughout the world, with long term assignments in Latin America. Mauricio's interest in industrial archaeology dates from the mid–1970s when he worked in the chemical industry and in hydraulic infrastructure in his native Mexico, to today.

Miguel Aldana is currently a director at Estudio Taller Arquitectura (ESTAR) in Mexico City, where he is working on the adaptive reuse of the agro–industrial infrastructure of the Ex–Hacienda Ocotzá, a hacienda pulquera in the state of Hidalgo. The project includes convert it into a hotel–spa, and an arts and crafts market. Miguel is an Engineer–Architect from Instituto Politécnico Nacional in Mexico, specialized in urban development planning and a keen interest in the industrial archaeology of his country.

State of Evolution: Concrete, Steel, and the Ralston Purina Grain Processing Facility

Alexis Reynolds *(Blanton & Associates, Inc., Austin, TX)*

ABSTRACT: Rising from the Fort Worth skyline, the Ralston Purina grain processing property is a prominent group of structures and buildings along present–day Interstate 35–West. Initially constructed in 1911 as a terminal elevator, within a few years the elevator expanded into one of only three large–scale grain processing properties in Fort Worth at the time.

Fort Worth became a grain and livestock trading hub, and the Ralston Purina property received grain from farmers within the larger Fort Worth–Dallas region and processed the bulk grain into wholesale livestock and pelleted feed. Over a span of 45 years, the Ralston Purina property transformed into multi–processing facility with a receiving elevator connected via conveyor to several mills. The property consists of twenty–three inventoried structures and buildings including multiple elevators, mills, storage blocks containing numerous steel and reinforced concrete storage bins, warehouses, loading sheds, and smaller storage sheds.

In 2009, the Texas Department of Transportation (TxDOT) determined the Ralston Purina property eligible for the National Register of Historic Places. It is significant as one of Fort Worth's few intact examples of the design and construction evolution of a grain processing facility. It is also significant as a rare collection of construction types within a single complex, including some of the earliest uses of reinforced concrete elevators, steel elevators, and slipform concrete mills in Fort Worth. Reinforced concrete elevators and steel elevators were still in experimental design stages in the first few decades of the twentieth century, and the slipform concrete building was one of the most advanced concrete technologies in the early 1900s. Finally, the property is also unusual because it is significant for one of its designers, Fort Worth civil engineer Charles M. Davis. Mr. Davis specialized in experimental concrete technologies, designing mills and elevators, as well as experimental concrete residences in the Fort Worth area. He used some of the earliest slipform concrete technologies of the time to design and construct the 1918 and 1929 mill additions to the Ralston Purina facility. As a result, the Ralston Purina property became an iconic local representation of early twentieth century emerging grain elevator and mill design and construction.

BIO: **Alexis Reynolds** is a Senior Historian at Blanton & Associates, Inc. She was previously a historian with Mead & Hunt, Inc. and a full–time in–house historian consultant with the Texas Department of Transportation (TxDOT) from 2006–2011. Ms. Reynolds received her Bachelor of Arts degree in American Studies from Skidmore College in 2003 and her Master of Science degree in Historic Preservation from Eastern Michigan University in 2006. Ms. Reynolds continues to work closely with TxDOT in evaluating industrial properties including rice elevators and wastewater treatment plants and in developing statewide programmatic approaches for historic bridges.

Development and Effect on Sports Performance in Competition Materials in Historical Process of Antique and Modern Olympic Stadium in Terms of Industrial Archeology

Cengiz Arslan *(Faculty of Sport Sciences, Firat Univesity Elazig, Turkey)*

ABSTRACT: Over the years, many changes have affected sport arenas and stadiums, including the development of new architectural designs suitable for human ergonomics, sporting equipment, rules, and audiences. Many countries in the world are engaged in the development of innovative industrial materials to accomodate these changes. In this presentation, we will examine the changes in stadium architecture in the historical period and the industrial evolution of stadiums from ancient Greece to today.

The first ancient Olympic stadium built in Greece in 776 BC was 630 feet long (192m), where only running races were held. The first 13 Olympic games were held there through BC 393. The first of modern Olympics was organized in Athens in 1896, and today modern Olympic stadiums have a huge capacity of 75,000 to 100,000 people with an activity area that is 345 feet by 230 feet (105x70m).

Materials specific to sports arenas have undergone many changes from its first forms to today. Developments have gained momentum in the sport industry and focused on improving the athletic performance. The traditional sports competition arenas and competition materials have undergone mechanical changes such as shape, design, and aesthetics with the development of computer and electronic systems. While stadiums (the word originated from the Greek word *stadion*) were previously built as an open and rectangular facilities, closed and oval stadiums architects are widespread today. In fact, only stadiums designed for soccer are widespread in Europe, while football or baseball stadiums are widespread in the United States. Today, it is preferred to build multi–use facilities, which has a field in the middle and a running track around it.

Stadiums for “cadet” sports, which include walking, jogging, jumping and throwing skills from basic forms of movement, have been a primary focus for many years. Changes in track and field contest material and equipment played an important role in the development of sports performance. Architectural and hardware features have greatly improved athlete performances, such as in high jump the tilting characteristic of fiberglass poles and advancements in shoes have affected running tracks. As a result, the stadium and the sport field designs, hardware and performance analysis made in these areas is constantly evolving with the influence of modern technology.

Keywords: Sport, Stadium, Athletics, Material, Olympic Games, Archeology

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BIO: **Cengiz Arslan** has Ph.D. in the field of sports sciences, and he has competed actively in athletics (pole vault) and gymnastics. He focuses in the field of sports sciences and sports performance, training, and sports history. He has worked on many scientific papers, papers, and projects in these fields. He is currently working as a professor and the Dean of the Faculty of Sports Sciences at Firat University in Elazig, Turkey. He is married and has two children.

Session 2B: Texas Tea

Oilfield Earthen Pit Storage: Early 20th Century Technology of Southeast Texas, 1901–1930s

Mary L. Barrett *(Centenary College of Louisiana, Shreveport, LA)*

ABSTRACT: Earthen pits have been used since the mid–1800s to hold oilfield liquids and solids, both as valuable products and as wastes. Pit construction and storage knowledge was first extensively recorded for heavy oil storage pits used in the first decades of the twentieth century. Earthen oil tank farms were common in areas of important heavy oil production in California, Arkansas, and the Gulf Coast of Texas and Louisiana. The best publicly–available descriptions of U.S. earthen storage methods and procedures exist for southeast Texas, which includes the greater Houston region. Earthen tanks or pits were used to store heavy crude oil (18 to 24 degrees American Petroleum Institute [API]) from 1901 until the mid–1930s. Most pits ranged in capacity from 25,000 to 350,000 barrels. Early pit technology focused on reducing the three oil loss types–seepage, non–recoverable stable emulsions, and evaporation. The greatest seepage loss was always during initial oil storage, and while construction in clay formations was favored over sand formations, pits were known to seep. Storage companies often charged an additional storage fee to allow for oil losses from seepage and evaporation. Typical losses by all means ranged from 8 to 10 percent during the first year of storage, followed by longer–term losses of 3 to 5 percent. Methods to reduce loss included construction in clay formations, trenches around pits to gather seepage oil, wooden roof construction over tanks, and improved emulsion treatment methods.

In 1904, the Batson, Saratoga, Sour Lake and Spindletop oilfield areas had about 18.8 million barrels of earthen storage capacity. The discovery of Humble Field in 1905 resulted in Humble becoming the largest earthen storage center with over 6 million barrels of oil stored here by early 1906. Some large oilfield earthen storage facilities became longer–term tank farm storage for regional heavy crude production. Approximately 8 to 11 million barrels of crude oil were in earthen storage from 1917 through 1924. Tank farm earthen storage gradually decreased during the 1920s and was abandoned by the mid–1930s. The post–1930s storage abandonment history varied from removing wooden roofs only, to burning and burial of tank waste, to various cleanup procedures and infilling of the pits. The Texas Railroad Commission required study and remediation at several sites in the 1980s and 1990s, often initiated due to nearby urbanization. Any existing abandoned pits were not allowed to remain and were cleaned up. State open–file records of 12 storage sites with 50 pits document how crude oil seepage and early pit closure methods, if any, affected the surface and shallow subsurface geochemical signature. The hydrocarbons migrated vertically and laterally. Downward oil migration, commonly less than 10 meters (around 33 feet), sometimes resulted in a free product accumulation at the shallow groundwater table. Oil had also migrated laterally from the subsurface pit edge, usually traveling less than 50 meters (around 164 feet) along horizontal more–permeable bedding. Cleanup procedures included waste removal, land farming oily soils and pumping free product from the groundwater.

BIO: **Mary Barrett** is a sedimentary and petroleum geologist and an oilfield waste historian with professional backgrounds in both academia and industry. She received a Bachelor of Science and Master of Science degrees in geology from Stephen F. Austin State University, Nacogdoches, Texas, and a PhD degree in geology from the Johns Hopkins University, Baltimore, Maryland. After working for Mobil Oil in improved recovery in old oilfields, she became a geology professor at Centenary College of Louisiana, in Shreveport, LA. She continued sedimentary rock research, served as a petroleum geology consultant, and began studying and writing about the history of oilfield wastes in our country. About a decade later, she began working with attorneys as an expert in the history of petroleum fields and related wastes; she has worked for both defendants and plaintiffs in the past ten years. She is currently a Professor Emeriti of Geology at Centenary College.

Goose Creek Oil Field, Harris County, Texas – First Offshore Texas Oil Production

Jeff Spencer *(Petroleum History Institute, Bellville, TX)*

ABSTRACT: The Goose Creek Oilfield is located in Harris County, Texas, approximately 25 miles east of downtown Houston. Oil was discovered at Goose Creek in 1908, but in 1916, the multi–thousand barrel per day oil gushers brought attention to the area. Drilling progressed from the onshore banks of Goose Creek and the shoreline of Tabbs Bay, to the bay's islands, and then into the shallow waters of Tabbs and Black Duck bays. The first oil gusher in Tabbs Bay was the Gulf Production Company No. 4 Stateland, drilled 200 feet out in the bay. The well came in on July 28, 1917, with an estimated flow of 8,000 to 12,000 barrels of oil per day (BOPD).

The building of wooden piers into the bays for drill sites was not reported as anything innovative or a "first" for Texas, probably because Gulf had similar operations in Louisiana's Caddo Lake since 1911. Over–water drilling in the United States occurred as early as 1891 in Grand Lake, Ohio. In 1896, a pier was constructed 300 feet out into the Pacific Ocean in California and a mounted standard cable–tool rig began drilling. The following year, oil production from the Summerland field began. Fourteen additional piers were constructed and many more wells were drilled and completed.

Goose Creek field experienced a tremendous jump in oil production from approximately 600 thousand barrels of oil in 1916, to 7.7 million barrels in 1917, and peaked at 8.9 million barrels in 1918. This increased production was partially due to the expansion of the drilling into the offshore. Many "firsts" occurred at Goose Creek, including the first offshore drilling along the Texas coast (1917), the first test of a 2–cone drilling bit (1909), and perhaps the first comprehensive study of land subsidence linked to oil, gas, and water production (1926). Several scenes from the movie Hellfighters (1969) were filmed in and around Goose Creek. Over 1,500 wells have been drilled in the field and cumulative production exceeds 150 million barrels of oil.

BIO: Jeff Spenser is a geologist with Amromco Energy in Houston, Texas working Romania. He received a Bachelor of Science degree in Geology from the University of Cincinnati and a Master of Science degree in Earth Sciences from the University of New Orleans. Before joining Amromco, he worked primarily the

onshore Gulf Coast and state waters with Midstates Petroleum Company (2010–2013), Black Pool Energy (2005–2010), Osprey Petroleum (2000–2005), Unocal (1998–2000), and Amoco Production Company (1981–1998). He has authored or co–authored more than 30 oilfield history papers. He is co–author of the book *Ohio Oil and Gas* (2008) and he authored *Texas Oil and Gas* (2013); both books on oilfield history through photographs and postcards. Jeff is a Charter Member of the Petroleum History Institute and currently serves as its president. Jeff is also the Historian for the Gulf Coast Association of Geological Societies. He writes a petroleum history blog with emphasis on petroleum ephemera: *https://petroleumhistoryblog.com/*.

Session 3B: Water Matters

The Deepwater Horizon Disaster and the Trial against BP under the Clean Water Act

Fredric L. Quivik (Michigan Technological University, Houghton, MI)

ABSTRACT: The Deepwater Horizon drilling rig experienced a blowout in April 2010 that killed eleven workers and caused the well it was drilling to leak hydrocarbons into the Gulf of Mexico for 87 days. One of the worst industrial disasters in U.S. history, the blowout caused damage to fisheries, shoreline ecosystems, and businesses and communities along the Gulf Coast. As a result, British Peteroleum (BP) and other responsible parties in the drilling operation were tried in federal court for violations of the Clean Water Act. The presenter served as an expert witness for the United States at the Phase 3 trial in New Orleans in January 2015.

This presentation grows out of the work the presenter did as part of those legal proceedings. It is not a normal endeavor in industrial archeology, but it seems appropriate for an SIA meeting in Houston, which is the center of the oil industry in the United States. Indeed, BP's headquarters for its Gulf of Mexico operations is in Houston, and the crews aboard the Deepwater Horizon were based in Houston when the blowout occurred.

The presentation will summarize BP's deepwater operations in the Gulf of Mexico, the Deepwater Horizon Disaster in April 2010, and the ensuing 87–day leak of hydrocarbons into the Gulf of Mexico, with a focus on BP's drilling technologies and organizational structure for engaging in the business of deepwater exploration and production. The presentation will help industrial archeologists appreciate the complexities of the interplay between industrial artifacts, such as a deepwater drilling rig, and the organizational structure of engineers, geologists and geophysicists, tool pushers, and global corporate managers who coordinate in order to make drilling possible in geological formations miles below the surface of the ocean.

BIO: **Fred Quivik** recently retired from teaching in the Department of Social Sciences at Michigan Tech, where he was affiliated with the graduate program in Industrial Heritage and Archaeology. He recently completed a six–year stint as editor of *IA: The Journal of the Society for Industrial Archeology*. He continues working as an expert witness in environmental litigation.

LILAC: A Bloomin' Industrial Artifact

Mary Habstritt (Lilac Preservation Project, New York, NY)

ABSTRACT: The U.S. Coast Guard Cutter LILAC is the only surviving steam–powered lighthouse tender in America. She was built by Pusey & Jones in Wilmington, Delaware for the U.S. Lighthouse Service, a predecessor to the Coast Guard, and carried supplies to lighthouses and maintained buoys on the lower Delaware River from her launch in 1933

until she was decommissioned in 1972. Her active–duty history ranges from such dramatic moments as when a lighthouse she served was hit by an ore carrier and when two tankers collided and exploded, to the mundane and unheralded task of maintaining the aids to navigation which help other ships to move safely through our waters. The LILAC subsequently served as dormitory and classroom space for merchant mariners–in–training for the Seafarers International Union and was later rented out as a real estate office by a private owner. These passive uses helped preserve her original propulsion engines.

Since 2003, the LILAC has been owned and operated by the non–profit Lilac Preservation Project in New York City. The ship has been open on a regular basis as a pierside museum in the Tribeca neighborhood since 2011, offering ship tours, art and historical exhibits, cultural events and educational activities. Volunteer docents share the ship's history, her vital work, and discuss steam propulsion with visitors. The LILAC is, at the same time, undergoing restoration with the goal of offering educational excursions powered by her two 500–hp triple expansion reciprocating steam engines, something that is a long way off due to the condition of her boilers. Several auxiliaries can now be run on compressed air, however, and, as of last year, the portside engine turned over for the first time since 1972. The Lilac Preservation Project was the recipient of an SIA Industrial Heritage Preservation Grant in 2013 to demolish ducting and electric heat pumps from a 1970s–era forced air heating system and install a new heating boiler and steam radiators to the Ward Room, which served as a dining room for the master of the ship and his officers. All this work draws upon oral history and archival materials–a full set of drawings and equipment manuals were found on board–as well as the evidence found in the marks upon the ship herself. This presentation will use photos and video, both historic and recent, to detail the LILAC's riveting story and all that we are doing to preserve it (including the rivets).

BIO: **Mary Habstritt** is the Museum Director & President of the Lilac Preservation Project. She has worked as a freelance historical consultant researching and interpreting industrial sites and maritime topics. She is the founder of the Historic Ships Coalition and a past president of the North River Historic Ship Society. Mary has served as President of the Society for Industrial Archeology and was, for several years, SIA's Events Coordinator. She has held several positions with the SIA's Roebling Chapter, including Preservation Chair advocating for industrial heritage sites in New York and New Jersey. Her devotion to history and preservation follows a career as an academic librarian, working at such institutions as the University of Minnesota and Pace University. She has a Master's degree from Columbia University's School of Library Service.

Salt and Sweat: The Implementation of Desalination Technologies on Wake Atoll Since 1935

Carrie Cecil (University of Alaska Anchorage, Anchorage, AK)

ABSTRACT: In its most basic form, desalination is the mechanical means by which salt–laden water is made drinkable. During the nineteenth and twentieth centuries, desalination systems evolved to encompass a broad range of designs and applications. Among them, desalination came to undergird the habitation of marginal and water–scarce environments.

Wake Atoll is one such case. Before the development of modern desalination technologies, this small, low lying Pacific atoll had seen limited occupation as its coral substrate contained only a brackish lens of fresh water. Wake's geographic position halfway between Hawaii and the Philippines nevertheless made the atoll desirable for commercial and military purposes. Desalination systems allowed this strategic use to be realized. In the 1930s, Pan American Airlines developed facilities in service of the company's newly minted Pacific routes. The U.S. military constructed an airbase on Wake in the months leading to World War II, and the atoll was occupied by the Japanese military for much of the war. After 1945, both commercial and U.S. military interests returned to Wake. Each of these efforts saw the implementation and modification of desalination systems.

This presentation examines the complex history of desalination system design, construction, and use on Wake Atoll since 1935. Over the past eight decades, at least 11 different desalination facilities and four different types of desalination processes have been used on the atoll. Of particular interest is how the systems changed over time and the rationale behind these changes. Documentary records are combined with the results of an archaeological survey of water systems on Wake. The survey conducted in May 2016 mapped and inventoried the material remains and existing conditions of the atoll's historic water system features. This research reveals that while most shifts in desalination system design and use on the atoll can be attributed to considerations of improving cost–efficiencies and output capacities, there are several instances where the needs and wants of the atoll's residents and administering agencies outweighed the standard economic and mechanical assessments guiding system selection and implementation. In doing so, it acknowledges the importance of social input in desalination system design. Furthermore, this examination of Wake's desalination plants points to significant local variation in the history of desalination technology.

BIO: **Carrie Cecil** is enrolled in the Master's Program in Anthropology at the University of Alaska Anchorage. She is conducting her thesis research on the design, construction, and implementation of desalination technologies on Wake Atoll in the mid–Pacific and the impact that this technology had on social interactions and community development on the atoll. She has a Bachelor of Arts desgree in Anthropology from Whitman College in Walla Walla, Washington and worked as a crew chief for Metcalf Archaeological Consultants, Inc. in Bismarck, North Dakota from 2013 to 2015. She plans to graduate later this summer (2017) and pursue a career in cultural resource management.

Session 4B: (Sub)Urbanity

Prestressed Concrete in Postwar Suburbia: Minnesota's story

Robert M. Frame *(Mead & Hunt, Inc., Minneapolis, MN)*

ABSTRACT: Post–World War II suburban communities needed infrastructure––schools, stadiums, churches– in addition to houses. For commerce, developers created shopping centers and industrial parks with expansive low–rise buildings. The limited–access Interstate Highway System, launched in 1956, required thousands of bridges of standardized design and size. Architects, engineers, and contractors stressed speed, economy, and efficiency of construction over complex and unique architectural styles. Prestressed–concrete components, new on the market, provided one solution. Not only was a prestressed–concrete beam stronger, longer, and lighter than its reinforced– concrete counterpart, it was the product of off–site, assembly–line manufacturing, resulting in reduced costs and faster production. Faced with a nationwide steel shortage in the early 1950s, engineers turned to prestressed concrete components for availability and lower cost.

Largely developed in Europe, postwar prestressed–concrete technology arrived in the U.S. in the form of Philadelphia's Walnut Lane Bridge, a precast, post–tensioned beam bridge completed in 1950. At the same time, another significant but short–lived model was the post–tensioned block–beam bridge of engineers Bryan and Dozier in Tennessee. Their simple technique required minimal plant infrastructure and provided the model for early prestressed bridges and structures in several states, including Minnesota.

In the decade after Walnut Lane, individual states followed various routes to implementation of prestressed concrete in bridge construction, especially for Interstate bridges. Meanwhile, other firms developed prestressed–concrete components adapted for buildings and structures. Engineers in Florida and Colorado pioneered double–tees and other structural members. Entrepreneurs sold proprietary systems for prestressed–concrete planks, along with licensed extrusion machines to cast them. The precasting plants themselves were often built in areas soon to become suburban industrial parks and, in many cases, their own buildings were the first structures built with their own prestressed products. Advertising and marketing, largely unnecessary for bridge–beam providers, proved essential for plants producing building components to persuade architects and contractors of the advantages of prestressed–concrete.

By the 1960s the manufacture and use of prestressed components was widespread for structures as well as bridges.

BIO: **Bob Frame** is a senior historian with the Minneapolis office of Mead & Hunt, Inc., a national engineering firm. He specializes in collaborative projects with engineers to rehabilitate historic bridges and co–authored a chapter on historian–engineer collaboration in *Historic Bridges: Evaluation, Preservation, and Management* (2008). He also works with the survey and evaluation of historic bridges and has conducted statewide bridge surveys in many states, including Minnesota, Indiana, Texas, and Louisiana. Bob has PhD and Master of Arts degrees in American Studies from the University of Minnesota and an Masters of Public Administration degree from Harvard's Kennedy School. He is a past editor of the *SIA Newsletter*.

Industrial Heritage Renaissance in the Historic Urban Landscape of San Antonio, Texas: Toward New City Identities

Angela Lombardi *(University of Texas at San Antonio)*

ABSTRACT: The cultural landscape of San Antonio, Texas is usually associated with the famous 'Riverwalk' and with the five nineteenth century Franciscan Missions, recently designated UNESCO World Heritage site. However, during the nineteenth and twentieth centuries, along the San Antonio water sources the city industiral activities were developed, which gave prosperity and a modern identity to the old agricultural Spanish Colonial village.

The river, outside the 'Riverwalk', was mainly used as a ditch by industrial activities and after the 1954 channelization project. Several industrial buildings were subsequently abandoned, transforming the river banks in an underutilized, shallow landscape.

This presentation analyzes strategies for the city sustainable regeneration through the city industrial heritage adaptive reuse and valorization, as the first redevelopment of the nineteenth century "Lone Star Brewery" (today the San Antonio Museum of Art, the main city museum); the "Pearl Brewery" regeneration, including the construction of a whole neighborhood which has the sophisticated Hotel Emma at its core; the "Blue Star complex", as art district; the recently approved project of the redevelopment of the Lone Star brewery complex, and others.

The 2001-2014 San Antonio River Improvement Project (SARIP) ecologically restored 13 miles of the River, also involving, as a consequence, the city industrial heritage. The presentation will also investigate the potential reuse of still vacant industrial heritage sites, and future transformations of the 'light industry district' along historic South Flores. City dynamics are changing, with a vast relocation of population and resources and a re-discovery of the historic core of the city.

This presentation analyzes the impact on the architectural community of this phenomenon: a new "industrial aesthetic" is underway, celebrating the industrial character of the buildings under transformation, their materials, their rusted machines, keeping intact their patina of time. The research also tackles an analysis at urban scale, to identify a holistic strategy for the rehabilitation of the city industrial heritage to be integrated with SARIP. This could be a unique opportunity for the city to better manage unpredictable changes in the city's transformation, which might destroy the new river ecology as well as to mediate between new compatible uses and original industrial uses, still in place, the latter contributing to the authenticity of the place.

BIO: **Angela Lombardi** is Assistant Professor in the College of Architecture, University of Texas at San Antonio, Texas, since 2012. She holds a Master of Architecure (2000), a Ph.D. in Urban Heritage Regeneration (2008) from the University of Rome Sapienza, and a School of Specialization in Architectural Heritage and Landscape Conservation (2009). She also holds a Post–master Diploma in Integrated New Technologies for Seismic Protection of Historic Heritage (2004). Her research in historic preservation focuses on management of the historic built heritage and archaeology within contemporary urban landscapes in international context and on material conservation. Since 2009, she has been researching on Latin American urban heritage and is one of the editors of the book *LIMA, Historic Center. Analysis and Restoration* (Rome: Gangemi, 2012). Since 2013, she has worked on investigating cultural

landscape conservation issues, with an in–depht analysis of San Antonio historic urban landscape and its water resources. She has ten years of experience on traditional construction techniques, stone masonry conservation, and heritage documentation

Documenting Houston's Urban Trash Dumps as Evidence of Municipal Waste Management Practices and Socioeconomic Discrimination

Jason W. Barrett (TxDOT, Houston, TX) and Doug Boyd

ABSTRACT: Large deposits of trash in urban settings are often ignored as having little or no research value. This may be true when an individual deposit is viewed in isolation, but these sites can make important contributions to urban archeological research. When viewed in a broader geographic, temporal, and socioeconomic context, these urban deposits reflect the evolution of waste management policies in any given city. Recent and past findings of large deposits of incinerated trash fill near Houston's Frost Town neighborhood are described as an example.

Frost Town is an eight–block area representing Houston's first working–class neighborhood. It was first settled beginning in the 1830s, and remained occupied continuously through the mid–1950s when all but a few of its domestic structures were removed for expansion of the city's transportation infrastructure. European immigrants (primarily Germans) were the dominant group among Frost Town's early settlers, but census data show major periods of demographic transition through time. African Americans made up nearly 50 percent of the neighborhood's residents by the 1890s. By the 1920s, the neighborhood, then better known as El Barrio del Alacran (Scorpion Neighborhood) among the majority, lower–income Hispanics residents, had become one of the poorest areas in Houston.

New waste management solutions were required in Houston by the late 19th–century as the city's population grew to become one of the largest in the nation. Invariably, low–income areas like Frost Town experienced the negative effects of the ensuing changes to a disproportionate degree.

Beginning in the 1890's, large urban centers increasingly relied on "garbage crematories" to handle their waste needs. Houston's first municipal incinerator began operation in 1899, and the city became increasingly reliant on incineration as a method for disposing of urban waste over the first decade of the twentieth century. By 1920, incineration emerged as the primary method of trash disposal, with the city maintaining six garbage incinerators and multiple landfills.

The placement of incinerated trash deposits, and the placement of the trash incinerators themselves, was not random in Houston. Historical and archeological evidence indicates that municipal garbage incinerators, and the dumps of burned garbage they produced, were concentrated in lower income, predominantly African American and Hispanic neighborhoods. When studied together as integrated parts of a complex social process, the distribution of waste disposal infrastructure and trash deposits can reveal telling evidence of socioeconomic and ethnic discrimination in municipal waste management practices.

Houston operated 14 incinerators and landfill locations from the late 1920s to the mid–1970s. All of them were in lower income neighborhoods, and 12 of the 14 incinerator sites were in predominantly black neighborhoods. However, this pattern of racial discrimination in the placement of municipal waste facilities is not unique to Houston. Rather, it is a consistent pattern repeated to varying degrees across the United States. Minority and low–income communities bear a disproportionate burden of environmental hazards. For these types of sites to provide useful data, a basic and consistent level of archeological documentation is suggested for urban trash dumps.

BIO: **Jason W. Barrett** received his doctoral degree from Texas A&M University in 2004, and he has been an archeologist with the Texas Department of Transportation's Environmental Affairs Division since 2005. His archeological experience includes complex regulatory and research–based projects in Texas, Belize, Guatemala, Mexico, American Samoa, and New England. Barrett directed the Texas Archeological Society's Annual Field School for the past three years, and he serves as professional advisor to the Houston Archeological Society. He has taught multiple courses in archeology and cultural anthropology at Texas A&M University, Baylor University, Rice University, and Blinn College, and has authored numerous peer–reviewed journal articles, book chapters, and technical research reports. His research interests include political ecology, landscape archaeology, structural inequality, lithic technology and resource use in Texas prehistory and among the Maya, and mechanisms of social change.

Doug Boyd has a wide range of archeological experience, covering a variety of project types. His extensive survey, testing, and data recovery background includes projects in the western and northern parts of Texas and in adjacent portions of New Mexico, Oklahoma, and Kansas. Mr. Boyd is responsible for the planning and management of a range of projects for a variety of clients, in both the private and public sectors. His research interests include prehistoric, protohistoric, and historic cultures of the southern plains; Native American rock art of the southern plains; southwestern influence in the Great Plains; and plains/pueblo interaction and bison/man relationships. He earned a Master's degree in Anthropology from Texas A&M University, and a Bachelor of Arts in Anthropology from West Texas State University.

Posters

The Origins of Atom–Smashing: A Brief History of Particle Accelerators

Marni Blake Walter (Consulting Archeologist, Editor, SIA Newsletter*)*

ABSTRACT: Although scientists and philosophers had debated the nature of the atom for decades, if not centuries, it was in 1919 that the field of nuclear physics made a major leap, and essentially a new field of scientific inquiry was started. In that year, Ernest Rutherford, working in the Cavendish Laboratory in Cambridge, achieved the first artificial transmutation of an element. His experiment also revealed the idea that the nucleus of the atom was a storehouse of energy. These significant steps would later lead to the discovery of nuclear fission and thus to the development of the atomic bomb, but before all that would be possible, Rutherford's experiments started a wave of "atom smashing" in physics laboratories around the world in the 1930s and 1940s. During this time universities and a few private companies eagerly joined the race to understand the behavior of atoms and atomic structure.

New types of machinery–particle accelerators or "atom smashers"–quickly developed as researchers sought ever more powerful ways to test atomic theories. By the early 1930s, three types of particle accelerators were being built for atomic research: the "Cockroft–Walton machine"; the cyclotron, first used at Berkeley; and the Van de Graaff generator, first used in Round Hill, Mass., for the Massachusetts Institute of Technology. Ernest Lawrence's cyclotron type accelerator became standard laboratory equipment for nuclear physics, with models at several universities. A number of laboratories built accelerators of the Van de Graaff type, including the Carnegie Institution of Washington, the University of Wisconsin, and the Marriottghouse Research Laboratories in Forest Hills, Pa. In the 1940s physicists developed additional types of particle accelerators, including the betatron and synchrocyclotron. By the 1950s, however, these pioneering machines that sought the fundamental truths of nuclear physics were pushed into obsolescence by new accelerators of exponentially greater power and enormity.

This poster focuses mainly on the particle accelerators built in the first two decades of atom smashing, for a short span just before and after World War II. These machines operated in a drastically changing social context, which began with the optimistic quest for fundamental discoveries but soon gave way to the push to create an atomic bomb. In the wake of WWII there was a need to address the reality of the bomb by seeking peaceful uses for atomic research. The particle accelerators shown here tell the story of some critical scientific discoveries of the mid–twentieth century.

BIO: Marni Blake Walter is a consulting archaeologist (RPA) based in the northeastern U.S. and is the editor of the *SIA Newsletter*. She holds an Master of Arts degree and PhD from Boston University in archaeology, specializing in heritage management, and a Bachelor of Arts degree in professional writing from Carnegie Mellon University. Her dissertation focused on the UNESCO World Heritage Convention and the conflicts between international and local demands placed on archaeological World Heritage sites. She has served as the editor of the *American Journal of Archaeology* and Journal Fellow of the *Journal of Field Archaeology*. Her research interests include archaeology and heritage management in New England and Pennsylvania, public archaeology and outreach, and the Marriottghouse atom smasher.

The Industrial Archaeology and Heritage of Pullman, IL

Timothy J. Scarlett, with Steven A. Walton, Don Lafreniere, Sarah Scarlett, Laura Rouleau, and the GIS lab at Michigan Tech (all Michigan Technological University, Houghton, MI)

ABSTRACT: Michigan Tech has been awarded a 3–year project grant to develop an archeological overview and assessment for the newly–created NPS Pullman National Monument in the Pullman Historic District on the south side of Chicago. As part of that project, we will be using the planned community as a touchstone for all the best practices in industrial archaeology, landscape studies, history of technology, and community–engaged research. This poster sets out the history and bounds of the town and its contribution to American industrial history, as well as proposing a more broadly inclusive view for methods and disciplines that can inform IA on larger projects such as this. Contact: pullmanheritage@mtu.edu or http://ss.sites.mtu.edu/pullman.

BIO: **Tim Scarlett** is an anthropologist and archaeologist at Michigan Tech University who is interested in how people deploy and grow creativity at work. Interested in may things as an eclectic scholar., he finds Pullman a compelling place where the new monument has a chance to become a space where people can contemplate the interconnections of building things and relations in industrial and 'post–industrial' society. A committed collaborator, he considers himself a scientist and a humanist and always tries to foreground students in his work. Scarlett has used archaeology to explore hardrock and dredge mining, foundries and furnace sites, potteries, mills, and many other types of sites, communities, and landscapes. Tim Scarlett is part of a multi–disciplainry team of archaeologists, historians, and geographers working on developing an enunciation of best practices in IA, using the town of Pullman, IL as their case study.

Putting People in Places: A Semi–Automated Approach to Parsing and Geocoding City Directories

Garand Spikberg,[A] Ankitha Pille,[A] Robert Pastel, [A] and Don Lafreniere[B] (all Michigan Technological University, Houghton, MI)[1]

The Copper Country Historical Spatial Data Infrastructure (known publicly as the *Keweenaw Time Traveler*), is recreating the historical built and social environments for a once thriving Copper mining region from 1850–1950 in a publicly accessible GIS. The social environment includes the mapping of the entire historical population at each decennial census year to their specific residential location. One of the sources that have been widely used by historical GIS scholars are city directories. While useful for their high–resolution data on past addresses workplaces and occupations, they are very difficult to digitize, often requiring researchers to manually transcribe their contents into a database. Here we present a semi–automated approach, combining optical character recognition, manual text cleaning, and automated text parsing. Applying a semi–automated method of geocoding using the parsed directories has also helped to efficiently put people in the places that they lived during the time periods that the directories were created. In the future, further linking this geocoded information to census data will help to provide even more information to the Time Traveler. This poster details the entire workflow for digitizing, parsing, and geocoding city directories

[1] A: Department of Computer Science; B: Department of Social Sciences.

to a spatial database, along with reference images that will help to give a visual representation to the workflow.

Garand Spikberg is a fourth–year Computer Science major at Michigan Tech, an active member of Delta Upsilon International Fraternity, and has been working as a research associate on the Copper Country Historical Spatial Data Infrastructure (*AKA* the *Keweenaw Time Traveler*) for the last year. In his time there, he has worked on city digitization, mentoring GRACE interns, and parsing city directories.