



# NEWSLETTER

Welcome to your third Branch newsletter. Shortly you should also be receiving the main society's newsletter # 80 which is being bulk-mailed to us. Later in the year the 2008 Construction History Journal will be arriving too. These newsletters and the Journal are only being sent to paid-up members.

On that score, we are close to our target of 50 members in the first quarter and are on a continuing membership drive to double that number by the end of the year. Please continue to feed prospects to Harriett and suggest places where we can obtain some publicity. I would like you to take note of the growing list of our Institutional members (see below) and encourage you to persuade your own organization to join this group and demonstrate their support for Construction History.

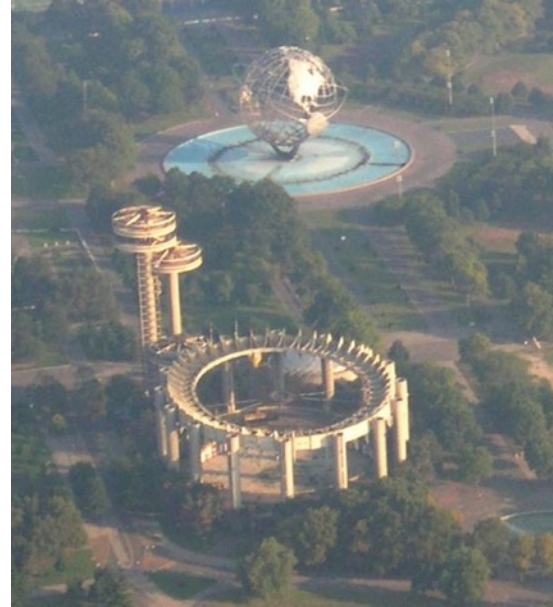
We have now settled on the dates of 6th – 8th November 2008 for our inaugural event which will be at Georgia Tech in Atlanta. The theme will be “Learning from Design and Construction Failures”, with a mixture of submitted papers and invited speakers. The Call for Papers was widely distributed and abstracts are due April 17th. The program will leave time for social interaction, sharing of research interests and discussion of future directions for the Branch.

None of our progress to date would have been possible without the efforts of the Organizing Committee who deserve our thanks. Like every professional organization, we are always looking for volunteers. Let Harriett Groves know if you are willing to help.

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Thanks to our institutional members:

- ★ Auburn University
- ★ Clemson University
- ★ Construction Management Association of America
- ★ Georgia Institute of Technology
- ★ University of Pennsylvania



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## THE MABBS MOTOR COUNTER-BALANCE ELECTRIC ELEVATOR

*Lee E. Gray, Ph.D.*

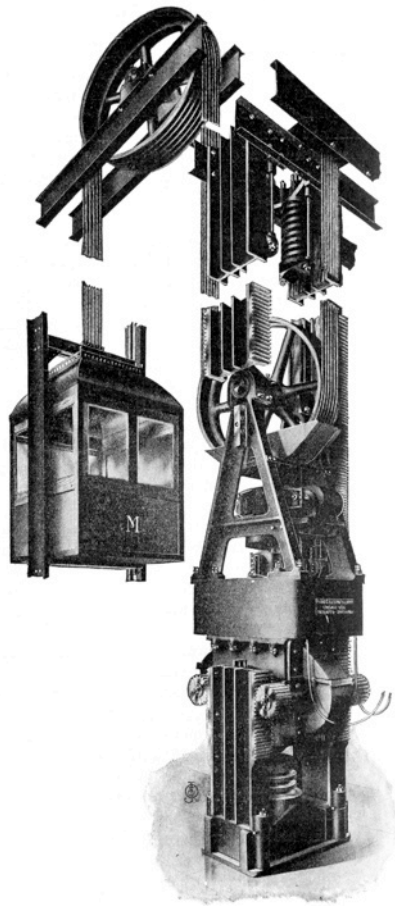
The history the modern electric elevator includes systems that sought to utilize electric power in unique or unusual ways. Chicago engineer John Mabbs (1859–1946) patented one such system in the early 20th century (#657,782, Electric Elevator, September 11, 1900). His goal was to design an “electrically-operated elevator which is simple, economical, and efficient and wherein the motor and its supporting frame and associated parts form a counterbalance for the car.” The elevator’s two-to-one roping scheme was typical for 19th century elevators: the cables passed up from the car, over a sheave at the top of the shaft, down to a sheave located atop the counter weight, and then back up to the beam that carried the upper sheave.

It was the integration of the electric motor with the counter weight that made Mabbs’ design unique. The counterweight consisted of a heavy A-frame that housed an electric motor and a combination worm and rack-and-pinion driving-gear. The motor, mounted in the base of the counterweight, had a vertical armature that was connected to a vertical worm shaft. The worm shaft drove two worm wheels or gears, which were in turn connected to two shafts, both of which had pinion gears at each end. The four pinion gears meshed with vertical racks, which were mounted on the counterweight guide-rail-supports. A simple brake, linked to the motor via a solenoid and composed of a brake wheel and strap mechanism, was connected to the motor’s armature and mounted beneath the counterweight frame.

Mabbs described his design as “exceedingly economical and efficient.” He claimed that: “by suitably proportioning the weight of the counterweight frame and the parts supported thereby to the car and its load only a comparatively small amount of work is required to be done in effecting the hoisting or

lowering of the car.” He also claimed that the arrangement of the two guide-rail-supports with racks on both faces would prevent “lost motion or slipping of the gearing.” These claims of economy and efficiency of operation were directly tied to contemporary debates about the perceived higher cost of electric elevators in comparison to hydraulic machines.

In 1902 Mabbs convinced the Chicago Board of Trade to replace one their existing electric elevators with ones of his design. His elevator was used as an express elevator, serving only the top five floors. It was powered by a four-pole 35 horsepower DC motor, manufactured by the Northern Electric Manufacturing Company of Madison, Wisconsin. The motor featured armature speed control and had one shunt and one series field. It was controlled from the car by a “full magnetic controller” manufactured by J.L. Schureman & Company of Chicago. Mabbs carefully monitored the elevator’s operation in an attempt to prove his claims of efficient operation: in a typical 9-hour day the elevator made 547 round trips at an average speed of 575 feet-per-minute, with a “current consumption” of 3.44 kilowatts per-car-mile.



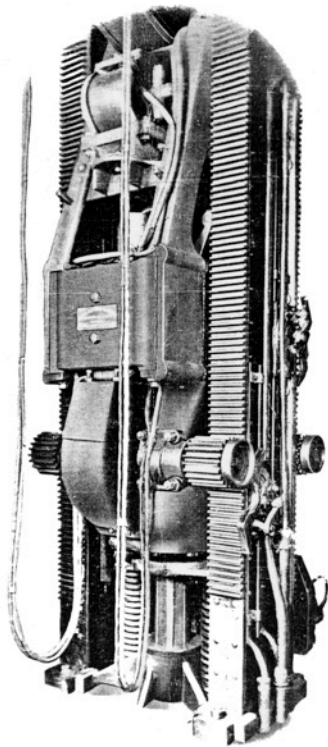
The Mabbs Motor Counter-Balance Electric Elevator, 1907.

lowering of the car.” He also claimed that the arrangement of the two guide-rail-supports with racks on both faces would prevent “lost motion or slipping of the gearing.” These claims of economy and efficiency of operation were directly tied to contemporary debates about the perceived higher cost of electric elevators in comparison to hydraulic machines.

The successful operation of the first elevator led to the agreement to install four additional Mabbs’ machines in the Board of Trade Building: the first two machines were installed in January 1906 and the final two machines were in place by April 1, 1906. The primary difference between these and the first Mabbs’ elevator was the electric motor; the new machines employed DC motors with field speed control and two shunt fields and one series field. Power was

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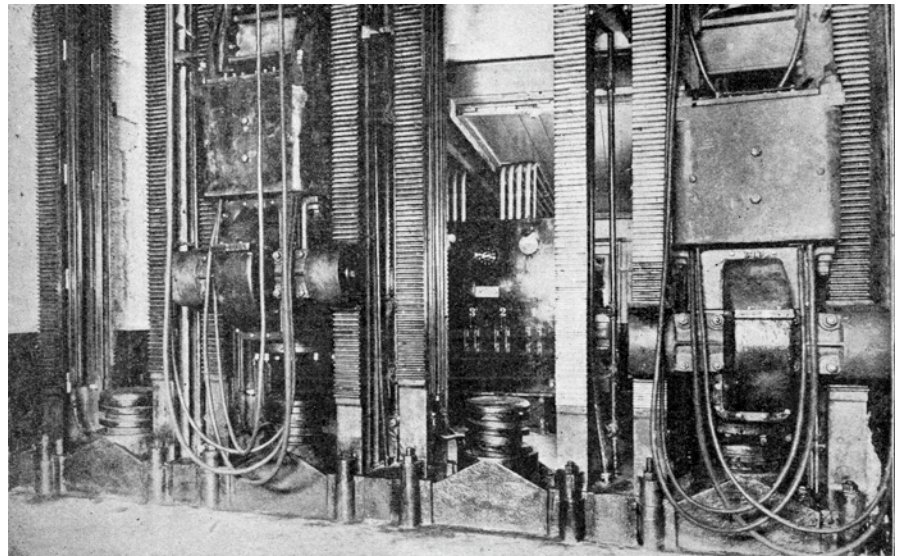
vertical racks on the cast iron I-shaped guide-support columns. Mabbs' use of the term trolley rails references the fact that the use of the electric motor in buildings was seen as analogous to its use in motorized urban transportation systems, which had served as the primary setting for the initial development of the electric motor.



First Mabbs' Elevator Installation,  
Chicago Board of Trade Building, October 1902.

The electric motor and gearing was housed in an "oil tight" cast iron case, which was "filled with oil to a point just below the horizontal (pinion) shafts." According to Mabbs "the rotation of the worm wheels and worm lubricate every part of it perfectly, including the bearings of the horizontal shafts." Thus, "all of the parts are automatically lubricated with the exception of the upper bearing and idler; these are supplied with grease cups and require attention about once a week." He noted that the first machine, installed in 1902, "ran two-and-one-half years on the first charge of oil without attention." This system of lubrication, coupled with the "cut steel" racks and pinions, also permitted "almost noiseless" operation, with the "most noise coming from ... the hum of the commutator."

The elevators built for the Board of Trade Building were, however, the only Mabbs' elevators ever constructed. John Jallings, in his 1919 book on elevator operation noted that, while the elevators were very economical to operate: "as designed they were too expensive to build." Thus, although these elevators remained in service until the Board of Trade Building was demolished in 1929, the Mabbs' elevator system vanished almost as quickly as it had appeared. None-the-less it serves as an important reminder of the dynamic nature of elevator invention and production in the early 20th century, as engineers sought to design the perfect electric passenger elevator.



Detail: Mabbs' Elevators, Chicago Board of Trade Building, 1906.



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## TEACHING THE HISTORY OF BUILDING CONSTRUCTION/TECHNOLOGY

*Karen L. Rogers, Ph.D., AIA, FAPT*

University courses dealing with the history of architecture have traditionally focused almost exclusively on the formal characteristics of buildings. And, although in recent decades the study of architectural history has expanded to include an increasing array of social issues, the history of how buildings are physically assembled has been largely ignored. It was therefore encouraging to find that one of the sessions of the 25th Annual Meeting of the Southeast Chapter of the Society of Architectural Historians SESAHS (held in October 2007 in Nashville) was dedicated to the topic of teaching the history of building construction and technology. During this session, which was moderated by Anat Geva, presentations made by Linda Cain Ruth and Brian Bowen dealt with courses taught at Auburn University and the Georgia Institute of Technology, respectively. A third presentation by Donald Friedman, an independent scholar from NY City, addressed the issue of the importance of construction history for design practitioners; and finally, in a separate session on structure, technology and construction, Dr. Geva presented her own course-related work at Texas A&M University.

It is noteworthy that all three case studies were generated at universities where architecture and construction programs are housed in the same college. This proximity seems to have contributed to the recognition of the

need for research and teaching related to the history of building construction, as well as having facilitated the development of these courses. The three courses, although differing in terms of specific content and method, have many compelling objectives in common. Among these is the recognition of the increasing importance of collaborative practice. For example, Bowen's course was developed in response to increasing demands from the construction industry for professionals trained in collaborative project delivery, and as a specific strategy for the integration of faculty, students and curricula in the programs of architecture, construction, engineering and planning. Another common factor was that each of the courses also addressed the importance of increasing the students' awareness of the complexity of issues facing the construction industry today by teaching how the same issues were faced in the past. Bowen and Ruth, for example, use specific issues to create an analytical framework that overlays the chronological content of their courses (these issues include, among others, project financing, costs, scheduling, risk management, quality control, materials and assembly, structures and technology, and labor).

One of the most worrisome points brought up in the presentations was the difficulty encountered in finding suitable textbooks and sources, and in assembling support material in a way that was both useful and meaningful to the students. Ruth tackled this problem head-on by designing a course with a study-abroad component, where the students are

directly responsible for the in-depth investigation and analysis of the construction processes of specific historical structures. The course, beside teaching her students valuable research methods, will produce material for the development of a much-needed textbook on the history of building construction. Geva, on the other hand, used her course as a vehicle for developing the systematic, visual organization of information and images on a website that permits students to navigate the material according to various criteria (chronologically, by topic, by region, etc.), and at the same time encourages them to explore the buildings' links to their social, political and cultural context.

Finally, Friedman's presentation, delivered from the perspective of professional practice, decisively argued the pressing need for both designers and builders to be exposed to the history of building construction and technology during the course of their professional education. The presentation of the three case studies by Ruth, Bowen and Geva provided encouraging examples of how this is being accomplished. The courses that they have developed illustrate the effectiveness of this relatively unexplored area of teaching as a vital tool for creating increased awareness of the relevance of construction history to contemporary practice, of the necessarily close relation between design and construction, and of the complexity of the processes, professions and practices that unite them.



Karen L. Rogers, Ph.D.  
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## CONSTRUCTION HISTORY—THE VALUE OF KNOWLEDGE

*Ronald D. Staley, Hon. AIA, FAPT*

The business of historic preservation for a commercial general contractor and construction manager is very challenging. The risks of hidden conditions and project delay due to discovery once the project is underway are issues that commonly keep contractors from working on older buildings. Every project is a learning opportunity to view construction of years, decades and centuries past. The opportunity is for us all to use history to minimize risk.

Building technology, materials and the methods of construction have changed in the United States since the first Europeans began building log buildings in Virginia over 300 years ago. The 20th century was the period in which most commercial building construction developed away from the masonry load bearing wall to steel and concrete frame with veneer or curtain wall systems. Understanding how buildings were constructed during specific time periods, materials and methods utilized, and details of specific craftsmanship or regional uniqueness are key components of knowledge which can help minimize the risk of doing commercial historic preservation work.

Working on historic buildings, while always a learning opportunity, allows for craftsmen at all levels to demonstrate understanding of something not constructed in our lifetime. For example, work several years ago during the restoration of the University of Notre Dame's circa 1875 Administration Building (the Golden Dome) required new structural steel to be installed in the rotunda area to allow floor capacity to meet current code. Two levels of walnut railing existed which were called to be completely disassembled and then reinstalled after the new steel and floor were installed. Working with the carpenters, as CM, we were able to determine the entire assembly could be lifted in a single section without disassembly. While supported from the structure above during installation of the new floor system, this method saved the owner over \$100,000 in labor costs, saved weeks of time, and as importantly minimized the risk of damage to the historic fabric during multiple assembly processes. Many other stories from this project and its differing structural systems from wing to wing (all thought to have been built at the same time) could be another case study.

Some construction projects require close coordination working with specialized trades such as archeologists. This work is hard to coordinate due to the truly hidden nature of the work. The time required is compounded by the amount of findings. The work can also be very weather sensitive. For stabilization at Fort Mackinac on Mackinaw Island, Michigan the foundation work to stabilize walls could not occur until archeologists "cleared" the area of artifacts from the fort's history dating back to the War of 1812. At the Old Governor's Mansion in Milledgeville, Georgia, archeologists were required to clearly document old foundations before the new education and support buildings were constructed. These trades, while exciting to see unearth the unknown, can drive a construction schedule.

Using history to understand the building can allow us to understand why failures occur on certain buildings, how to incorporate new technology successfully, and manage risk of cost and schedule.

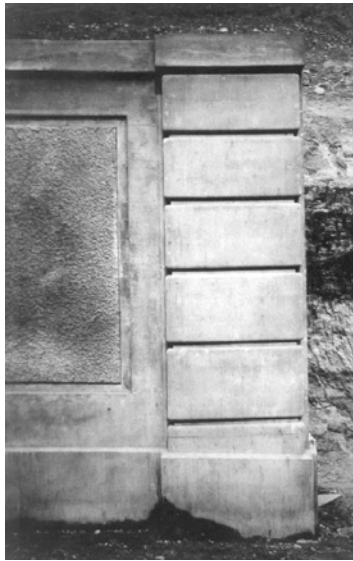


Ron Staley is Vice President of The Christman Company, a Lansing, Michigan / Washington, DC based Construction Manager originally founded in 1894. Ron started Christman's Historic Preservation Group and has lead over \$500 million in high profile projects across the United States since 1988.

THE DEVELOPMENT OF PRE-CAST EXPOSED AGGREGATE CONCRETE CLADDING:  
THE LEGACY OF JOHN J. EARLEY AND THE IMPLICATIONS FOR PRESERVATION PHILOSOPHY

*Jenna Cellini*

The past decades have seen the emerging crusade for the preservation of the modern movement - its materials, designs and construction techniques. However, in order to determine the necessary and appropriate conservation efforts with respect to a particular structure, one must



understand the way in which the building components were produced and assembled.

Therefore, this thesis seeks to examine the evolution in material understanding and techniques of a particular twentieth century material: pre-cast exposed aggregate concrete cladding. Tested, refined and later patented by craftsmen John J. Earley, the precise

process of creating precast exposed aggregate concrete cladding (today known as the Mo-Sai technique) holds unique implications for its preservation.

Although the idea did not originate with him, John J. Earley was the man truly responsible for developing exposed concrete as a decorative architectural feature. In 1940 he patented his process for producing these pre-cast elements and coined it "Mo-Sai" - an interesting term that recognizes the artistic, craftsman-quality of this product. With this first step, Earley set three standards. First of all, coining his technique in reference to the art of producing mosaics, Earley added a unique facet to his material that many people outside the field would simply call "concrete;" he immediately recognized the modern movement's idea of "playing" with building materials and experimenting with their ability to express an architect's desired aesthetics. Secondly, in patenting and later publishing and sharing his work, Earley initiated the professionalization and standardization of producing and applying pre-cast exposed aggregate concrete. Today, this material, as well as other modern materials, is mass-

produced within a framework of standards under provisions of professional organizations such as Portland Cement Association and the American Concrete Institute (of which John J. Earley was president in 1938). Finally, Earley was one of the few men to lead the field's revolutionary approach to material studies and design; it was through his continual efforts that architects of the AIA and material scientists of the AIC formed a mutual cooperative to develop and fashion building construction that would later dictate the latter part of the twentieth century in America.

By examining how much was known about the material throughout the years, it can be determined if durability of the material was an essential characteristic in Earley's technique, aiding in its preservation. Analyzing what was understood with regards to the material's properties will determine whether the material's evolved production has preservation implications inherent to the process. Finally, detailing the evolution of Earley's process will identify how Earley's empirical approach to testing became the basis for how all modern materials were developed during the twentieth century - separating these materials from their traditional predecessors and thus, potentially affecting how preservationists view all modern materials as they ready themselves for the future of their work.



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## AMERICAN ARCHITECT &amp; BUILDING NEWS 1908

*Brian Bowen.*

In 1908 this magazine was already celebrating its 32nd anniversary. It was owned by the Swetland family and published weekly in New York at a subscription of \$6.00 per year. Their offices were in the Flatiron building. The architectural component included beautiful plates of completed or proposed buildings and articles of interest to the profession. The building section covered listings of proposed projects by state, product information, design competitions and the like. There were no advertisements. What follows is a review of some of the subjects and projects addressed in the first six months of that year.

January 11th: The Equitable Life building in New York is to be demolished to make way for a more modern and efficient building. It was built in 1888 and is eleven stories high.

January 29th: Includes a brief note bemoaning the shortage of architects in the South.

February 5th: Has an editorial commenting on how many architects were specializing in a particular

building type and how this was bound to lead to repetitive boring designs.

February 26th: A new hand camera is recommended for architects. Also includes an article about architectural competitions, a constant source of comment and complaint at this time.

March 4th: A long article on the report of the AIA Committee on Registration (i.e. licensing). It notes that only three states (Illinois, New Jersey & California) and one province (Quebec) have licensing laws, which have been challenged but upheld. The purpose is to protect the public against acts of incompetence or dishonesty by architects which might endanger the community. The report is clearly sympathetic towards licensing, but recommends that the AIA stay out of endorsing the issue for fear this will be seen as a conflict of interest.

March 11th: 170 children killed in a school fire at Collingwood, Ohio. Again a common subject of this period is the fireproofing of buildings.

April 15th: Article by Ernest Flagg, a prominent architect of the period,

recommending limits on height (100 ft suggested) and scale of new buildings in New York, which apparently had no such regulations at this time.

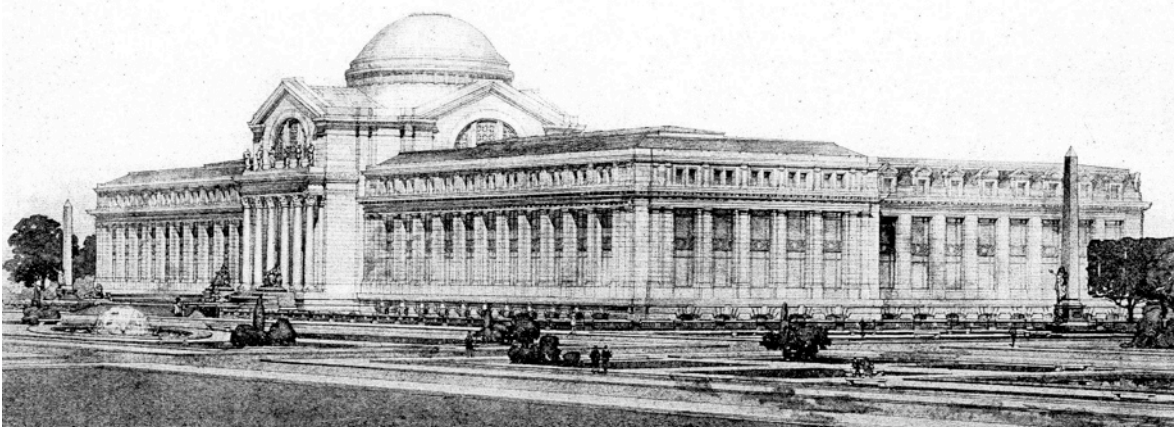
April 22nd: Story on life at the Ecole des Beaux Arts in Paris, still clearly *de rigueur* for serious American architects.

May 13th: First subway connection between Manhattan and Brooklyn opens.

June 3rd: Editorial bemoaning the quality and quantity of lumber available on the market, which “.. taken in conjunction with the enormous fire losses. . due largely to an over-generous use of wood in construction, renders the consideration of materials proposed as a substitute of first importance.”

June 24th: Carries an article and rendering (below) of the new building for the National Museum then under construction in Washington, DC at a cost of \$3,500,000 or about \$8.00 sq ft! The architect was Hornblower & Marshall.

*...continued, next page*



## AMERICAN ARCHITECT &amp; BUILDING NEWS 1908

June 10th issue The Kaiser as an Architect – Emperor Wilhelm Memorial Church, Berlin

“The architect, Franz Schwechten brought the plans to him, and the Kaiser scratched out what he didn’t like and made such additions as he fancied before he gave them the imperial O.K. There was to be a big gilt cross on the spire, and it appeared in its proper place. But, much to the general astonishment when the cross was put up, a large many pointed golden star was raised above it on a heavy rod. The Berliners could not understand the star. They inquired. The architect said the Kaiser had added the star to the plans.

The plans were examined. Then it was found in revising them, The Kaiser had let fall a drop of ink from his pen which hit the paper above the cross. The architect studied a long time of this blot of ink. His Teutonic mind grappled with the

problem for weeks. There was no appeal. There could be no inquiries. He finally decided the blot of ink signified a star above the cross, and he put the star there, making it correspond as near as possible with the outlines of the blot. The star is still there.”

We suspect the story may be apocryphal – a contemporary photograph from 1900 shows no star. Maybe it was removed?? The old church sadly was bombed during the war and the remaining ruins are attached to an adjoining new church.



## RECENT BOOK OF NOTE

Corrugated Iron: Building on the Frontier, Adam Mornement & Simon Holloway, Francis Lincoln Limited, 2007

From the invention of corrugated iron in 1829, the authors move on to its use in portable buildings shipped from Europe to the newly developing world of the 19th century and on to its use in contemporary architecture.

We are compiling a list of any courses being taught that touch on any aspect of construction history, other than history or architectural design. If you are involved in, or are aware of, any such course, would you please bring it to the attention of Dr. Anat Geva ([anatgeva@archone.tamu.edu](mailto:anatgeva@archone.tamu.edu)). Thank you!



## CALENDAR OF EVENTS

April 28–29, 2008

8th Historic Bridges Conference—Ohio State University, Columbus, Ohio: [adeli@osu.edu](mailto:adeli@osu.edu)

May 28–31, 2008

11th US Icomos International Symposium: Developing a comprehensive approach to US participation in the Global Heritage Community—Washington, D.C.: [www.icomos.org/usicomos/](http://www.icomos.org/usicomos/)

September 11–14, 2008

Preserving the Historic Road—Albuquerque, New Mexico: [www.historicroads.org](http://www.historicroads.org)

October 11–14, 2008 The Society for the History of Technology will hold its annual meeting in Lisbon, to continue the celebration of the 50th anniversary of the founding of the Society.

November 6–8, 2008

Construction History Society of America Inaugural Meeting, Georgia Tech, Atlanta, Georgia: [hgroves3@mail.gatech.edu](mailto:hgroves3@mail.gatech.edu)

May 20–24, 2009

Third International Congress of the Construction History Society, Cottbus, Germany: [www.ch2009.de](http://www.ch2009.de)

## THE ART OF BUILDING

*Reviewed by Brian Bowen.*

David Yeomans, a CHS member, wrote this lead article for *Newsletter No. 92 (Autumn 2007) of The Society of Architectural Historians of Great Britain*.

Yeoman's article makes a strong case for construction history as a necessary field of study and discusses how it interrelates with architectural and engineering history. He points out that architectural historians are, in fact, historians of the "art of building," since what architects wish to build is constrained by what they are able to build and he implies that a knowledge of the evolution of the

process of construction and its technologies is a missing component in architectural education, for the most part.

He explores the barriers that exist between the training of historians and of architects and engineers. He concludes by stating that much construction history is being researched and written by amateur historians with engineering and technical backgrounds and that they might benefit from collaboration with professional historians!



FROM THE NY TIMES, APRIL 7, 2008

Frank Matero is digging in the dirt at Flushing Meadows (see page 1 photo). He and a few of his graduate students are conserving four of the more than five hundred Terrazzo tiles that constituted the New York state road map at the 1964–5 World's Fair.

See [Back on the Map: January 27 - May 4 2008, Queens Museum of Art](#)

## WHO WE ARE

The Society is dedicated to the study of the history and evolution of all aspects of the built environment—its creation, maintenance and management. It is a forum for scholars and professionals in the field to share, meet and exchange ideas and research. Membership is open to a wide range of construction related disciplines involved in the planning, development, design and construction of buildings and engineering infrastructure, in addition to those concerned with their operation and preservation. Members share a passion for examining how our existing structures were planned, designed and built, with the purpose of using this knowledge to better preserve what we have and to guide us in determining future directions.

The US branch of the Construction History Society is a distinct entity catering to the historical studies and interests of its members here in America. Membership in the US branch includes full benefits in CHS at large, including receipt of the Society's Journal and newsletter and links to scholars in the field worldwide.

THANKS TO GEORGIA TECH  
COLLEGE OF ARCHITECTURE

We are indebted to and grateful for the financial support we are receiving from the College of Architecture at Georgia Tech. Their support will carry us for a few more months, but beyond that we will be on our own. Please help us lay our own sound financial footing by joining CHS now.

**Construction History Society  
Organizing Committee****Brian Bowen**

*Georgia Tech  
Atlanta, Georgia*

**Dr. John Ochsendorf**

*MIT  
Cambridge, Massachusetts*

**Jeff Beard**

*American Council of Engineering Companies (ACEC)  
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**Donald Friedman**

*Old Structures Engineering  
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**Dr. Anat Geva**

*Texas A&M University  
College Station, Texas*

**Tom Leslie**

*Iowa State University  
Ames, Iowa*

**Frank Matero**

*University of Pennsylvania  
Philadelphia, Pennsylvania*

This is your newsletter and the only vehicle we have to keep in touch with one another. So please use this to let us know:

- ★ your interests in construction history, your current research, précis of recent lectures, etc.
- ★ books, texts & articles that your fellow readers should know about
- ★ names and e-addresses of colleagues and friends that we can include on our mailing list
- ★ if you are willing to write a brief article for us.

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