



# Newsletter

The Samuel Knight Chapter

The Society for Industrial Archeology

Issue Number 14

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The Newsletter is published in December, April and August, with special issues when they are needed.

The Chapter web site has been moved to the SIA headquarters site:  
<http://www.sia-web.org/chapters/knight/knight.html>

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# Chapter News

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## Upcoming Event: Southern California Oil Tour, May 3-4 2003

Our chapter is pleased to announce our big Southern California Oil Adventure. Noel Kirshenbaum and Tony Meadow are organizing a weekend tour of the Southern California oil industry. Our goal will be to present an overview of the oil industry in Southern California in general and Kern County in particular. There's a lot of history here! This is one of the biggest events we've put together in some time and we invite you to sign up now!

The tour will take place on Saturday, May 3rd and Sunday, May 4th. This will allow time for everyone to drive in plenty of time. Tour events will run from 10 am to 5 pm on Saturday and 10 am to 2 pm on Sunday, allowing plenty of time for a leisurely drive back home. The exact details will be announced soon, but our plans call for the following:

- (1) Go on a geological field trip of the western side of San Joaquin Valley.

The tour would include the ecology and geology of Wheeler Ridge, White Wolf Fault, Maricopa and McKittrick Brea Pits, Oil Mining (diatomite), Lake View Gusher, Elk Hills Naval Petroleum Reserve and South Belridge oil field are discussed. Includes a display of core at the California Well Sample Repository, California State University, Bakersfield. On this tour we visit the McKittrick brea pits and oil seeps and learn about early development of asphalt resources and paleontological research in Kern County.

- (2) Tour the Kern County Museum <http://www.kcmuseum.org/>

Quoting from their web site:

"The Kern County Museum is proud to present Black Gold: The Oil Experience, a permanent \$4 million science, technology and history exhibition. More than six years in the making, this state-of-the-art, interactive exhibit opened to the public November 23, 2002. A milestone in the Museum's evolution, this world class oil exhibition was designed and fabricated by Museum Arts, Inc. of Dallas Texas, the leading creator of oil industry exhibitions. The 9,640-square foot exhibition surrounds 2.3 acres, presenting a complete overview of how oil is created, different methods of discovery and extraction throughout history, and the changing role of industry workers and their families."

- (3) Tour the West Kern Oil Museum in Taft, California  
<http://www.westkern-oilmuseum.org/>

Fine print: Yes, there will be homework (but no pop quizzes): we'll provide some links to web sites that provide an introduction to the "oil bizness" so you can get the basic questions answered before the tour. We will be driving from one site to another in our own cars. Carpooling is encouraged. There will be some fees for this tour, probably \$25 or less. We will make arrangements with a motel in Bakersfield for anyone wishing to partake of Kern County hospitality on Friday and Saturday nights.

**SIGN UP NOW!**

If you are ready to sign up or want to learn more, please contact Anthony Meadow at 510.834.5387 (work phone), home phone 510.531.3416, or email [tmeadow@sbcglobal.net](mailto:tmeadow@sbcglobal.net).

If you have any interest in attending or know of anyone who might be interested, please contact us!

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## Upcoming Event: Laborfest Boat Trip

We have been in contact with the organizers of Laborfest 2003 about joining their boat trip around the Bay in late July. The narrated trip visits a number of sites with significance to the labor movement. This trip has been a Chapter favorite in the past. Dates are still not firm, but will likely be the last weekend in July. - JM

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## Potential Chapter Project

Lead by Board Member John de Marchi, the Chapter has been in preliminary discussions with the owners of an historic industrial site in the North Bay on a possible project to document the machinery, processes and artisans at the site. It's premature to discuss the specifics until further discussions are completed, but the basic idea would be to conduct a documentation project in concert with a local historical organization. The Historic American Engineering Record (HAER) is the benchmark for such documentation, but full compliance with HAER standards is probably beyond the means of the Chapter.

To begin the next stage of planning, it would be helpful to get an idea of the members who could help in the following areas:

- photography: medium format perspective corrected photos, experience with photographing machinery
- mechanical drawing/CAD
- process and material flow documentation
- oral history collection
- artifact documentation and management practices
- historical research
- project management

If you would be interested in these areas (or just want to get more information), contact Jay McCauley (see the last page of the newsletter). - JM

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## Chapter Web Site Updated

In a bit of "newsletter archeology", the new Chapter web site has been updated to include nearly all of the previous issues of the newsletter. Prior to Issue 11, these newsletters were pasted up manually, so web pages for the older issues do not have images, and in some cases entire articles. Issue 11 and forward are all digital. A PDF version of these newsletters is available, as well as a web version. Although the basic content is the same, the web version will usually have more and more colorful pictures. Newsletters such as this one will appear on the web site shortly after their hardcopy

publication. Special thanks to Don Durfee of SIA Headquarters for his help in getting this update installed. - *JM*

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# Notes and Tidbits

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## B&O Museum Roof Collapse

On February 17, 2003, the roof of B&O Museum in Baltimore, MD, collapsed under the weight of snow and rain. This was one of several roof collapses that weekend, so may not have made the news sources you follow. Several artifacts were damaged, including two priceless Civil War era wooden coaches. Fortunately, the collapse occurred when the building was unoccupied, so no one was injured. Efforts to stabilize the building and protect the artifacts began at once. Details are available at: <http://www.borail.org/roundhouse.asp> A special fund to aid the recovery has been established. The Chapter Board of Directors has authorized a donation of \$100 to the fund. - JM

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## ASCE "Me and My Infrastructure" Exhibit

From a letter sent to ASCE members: In commemoration of the 150<sup>th</sup> anniversary of the American Society of Civil Engineers, the Society plans on bringing their museum-quality exhibit to the San Francisco Bay Area in the spring of 2003. The exhibit, "Me, Myself and Infrastructure; Private Lives and Public Works in America," is a dramatic shift away from traditional presentations of civil engineering, demonstrating how the infrastructure is much more than a network of cables, highways, and buildings. "Me, Myself and Infrastructure" uniquely illustrates how both the civil engineering and general public are intertwined in the construction and maintenance of those systems that are essential for the quality of life and security that Americans expect.

The San Francisco Bay Area was selected as the third and final metropolitan location for the exhibit after successful shows at the New York Historical Society in New York City and the National Building Museum in Washington DC. **The exhibit is scheduled to open in early March 2003 in the concourse at One Market Plaza, San Francisco and run through the second week of April 2003.** The selection of the San Francisco Bay Area as the principal sponsor of the event is an important milestone for our civil engineering community and clearly indicative of the trust our national organization has in the San Francisco Section of ASCE. We will be co-hosting the event with the California Historical Society and the Exploratorium. The exhibit is being underwritten by the American Society of Civil Engineers Foundation, the Elizabeth & Stephen Bechtel, Jr. Foundation, and Charles Pankow Builders Ltd. - JM

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## ASME Historic Sites Brochures Web Site

The ASME (American Society of Mechanical Engineers) is one engineering organization that takes some pride in its history and past. In particular they have a program to commemorate sites and equipment that are significant for the history of mechanical engineering in the US. In many cases they produce a brochure that describes the history and significance of each site. The ASME now makes many of these brochures available as PDF files. Check out your favorite site at <http://www.asme.org/history/brochure.html> - AM

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# Memories of Holyoke

by Robert W. Piwarzyk

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*(This is the first of three articles on the industries of Holyoke, MA. – Jay)*

I was born in Holyoke, Massachusetts, in 1937. As a young boy the Boston & Maine Railroad was a part of my life. We lived on a hillside upstream of the dam on the Connecticut River overlooking "Deadman's Curve", and whenever the whistle blew and the apartment shook, I ran to the back porch to watch the steam engine go by. All I ever wanted out of life was to build a model railroad and be an engineer. You can imagine how exciting it was for me to depart from the Holyoke Depot for a family vacation! We took the train to Boston and after a three hour wait there at South Station, we went on to the lake at Presque Isle, Maine.

In school they taught us three things: Holyoke was the first planned industrial city in America; the second Holyoke Dam (the first, of wood, failed) was the first in the world to cost a million dollars and, therefore, was called (always with pride) "The Million Dollar Dam;" and the canals were very dangerous to swim in due to the risk of being sucked into an inlet to a mill. The result was likened to going through a meat-grinder, then commonly used at home and powered with a hand-crank. Drownings occurred frequently.

When I was older, I would go to the railroad yards and especially liked to watch the engines on the roundtable at the roundhouse. A "shortcut" home along the tracks to the Highlands section of Holyoke took me across the railroad trestle bridges that crossed the two upper canals, past the dam, and to the sand banks. I once hitched a ride on an empty boxcar from the yard in the Flats, and learned that although it looked like the train slowed down on Deadman's Curve, it was still too fast and scary to jump. So I ended up at the papermill in Mt. Tom Junction several miles up the river.

It wasn't until I was at the University of Massachusetts studying to be an engineer of another sort, that I learned about the Industrial Heritage of my hometown. In my Hydraulics class a documentary film made in Germany extolled the genius of the dam and the three levels of canals that served the industries of the day – mostly paper and textile mills. The site was on a bend in the river and the dam diverted water along three levels of canals stepped on the hillside at different elevations. The upper, or Third Level Canal, served mills on the downhill side of the canal. The outlets went into the next lowest canal which served more downhill mills, and so on until the last outlets rejoined the Connecticut River.

This system was developed by the Hadley Falls Company which was founded in 1849 along with the Town of Holyoke and was bought out by the Holyoke Water Power Company in 1859. They laid out the mill sites, workers apartments, and downtown commercial and government areas. They controlled most of it including land sales and mill construction, and city utilities (gas, electric, water, and railroad). Irish, Polish, Italian, French-Canadian, German, and Portuguese laborers came to work in the mills. They settled in the "blocks," or tenement housing in wards that had their respective churches as focal points, along with their social clubs, bars, bakeries, and markets.

One such club was the Polish Falcons, an athletic group that took delight in stacking their bodies into pyramids and other shapes. My mother, a Falconette, met my father at a meet. Later my dad was the New England Re-

gional Secretary. Mother was a bobbin girl in a textile mill, and dad was a dyer. When I discovered this on my Birth Certificate (first needed for my driver's license) I remember asking them what kind of jobs they did. Dad told me he left the Farr Alpaca Company when a fellow worker fell into a boiling-hot vat of dye. The board that straddled the vat, on which they walked out on to stir the vat with a long wooden paddle, broke. Had it been my father's turn to stir, I would not be here to write this!

I remember walking by the mills on hot summer days and seeing sweaty workers seeking a breeze at the open windows. And I remember the overwhelming clacking noise of the looms above the background hum of the belts and pulleys. And the bad smells. I studied hard. The incentive was always, "Do you want to end up working in the mills?" I certainly did not. Seems like everyone did. Neighbors, uncles and aunts. Hampden, National, Nonotuck, Valley, Whiting, Riverside and Parsons Paper Companies; plus Holyoke Envelope Company, and American Writing Paper Company. No wonder it was called the Paper City. Lyman Textile Mills, Skinner Silks & Satins, Merrick Thread Company; Worthington Pump, Acme Chain; and (for those willing to drive) Stanley Tools in Westfield and Hamilton Standard or Pratt & Whitney down the river in Connecticut.

But as I got closer to working age there were fewer mills. Holyoke was drying up. Gone were the days of cheap pulp wood which was now grown quickly on high yield tree farms in the South. Air conditioning became a reality, and the textile mills closed, one by one, and moved to the South to be closer to the cotton. Stores were boarded up and windows smashed in the vacant mills. Many buildings were burned. Holyoke looked devastated. And so I became an engineer (airplanes instead of trains) and off to California I went.

On one trip home I discovered the answer to a question I'd asked long ago. As kids we walked the river bed below the dam in summer. On the South Hadley Falls end of the dam there was a fish ladder. It never worked, but it sure was fun to walk up. Below, running along the bank was a trench. All I could ever find out was that it was an old canal. Then, while out for a drive, I happened on a new park with a plaque that gave an explanation. Before the dam was constructed, this section of the river had rapids which dropped 53 feet in a couple of miles. Goods were transported around this barrier by wagon. In 1792 authorization was given to construct the 2-1/2 mile long South Hadley Canal, the first navigable canal in the United States. It featured an Inclined Plane; a long, stone ramp which had rails with a carriage (a tramway) to hold the flat bottom boats, which plied the river, level. This was all pulled up by a winch, powered by an undershoot water wheel, to the upper canal which joined the river above the rapids. In 1803, hydraulic locks were built and the river was navigable to Bellows Falls, Vermont, by steamboats 75 feet long and 14 feet wide with a 2 foot draft.

Commerce on the river ended when the Connecticut River Railroad was built. Trains were faster than canal boats and could operate all winter. The canal was forced to shut down from the competition in 1893. The city built its own Westfield Railroad to connect with the Hartford Northampton Railroad. This was done to avoid the high rates of the monopolistic CRRR. The city railroad still operates today and connects the Boston & Albany and the Boston & Maine railroads.

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# The Carquinez Bridges

by Jay McCauley

## The Ferries

In 1854, Captain Oliver C. Coffin and his brother purchased the ferry *Carquinez* from an eastern shipyard. It was a double paddle wheel steam ferry, patterned after the New York – Brooklyn ferries. It was shipped as ballast in a sailing ship around Cape Horn. This ferry operated every 30 minutes between Benicia and Martinez at the eastern end of the Carquinez Straights. Ferry service continued to expand over the years.

In 1917, Aven Hanford, a Vallejo grocery store owner and Oscar Klatt a wholesale grocery salesman from San Francisco opened a ferry service between Vallejo and Crockett. It was quite successful, by 1922 over 400,000 vehicles per year were using the ferry. However, it was becoming clear that ferry service at the Carquinez Straits could not handle the anticipated growth.

## The First Vallejo/Crockett Bridge

Hanford and Klatt felt that a private toll bridge would create even more traffic, so in 1925 commenced construction on the first Vallejo/Crockett bridge. Hanford and Klatt had formed the American Toll-Bridge Company that engaged U.C. Berkeley engineering professor Charles Derleth, Jr. as the Chief Engineer for the project. D.B. Steinman was the Design Engineer for the bridge. Construction would take 25 months, with the bridge opening on May 21, 1927, only a few hours after Charles Lindbergh landed in Paris.

The bridge is 0.8 miles long (1619.8 meters) with a channel span of 1,100 feet and a vertical clearance of 148 feet. The bridge is a cantilever design, in which a center cantilever section is supported from both sides. Such a design allows a wide channel, which was important for this busy waterway. It made use of what were, at the time, advanced materials such as high strength steel. Large sections of the bridge were fabricated off site, and raised approximately 150 feet using a system of counterweights. This both saved money over field construction techniques and minimized the time the channel would be blocked by construction activities. A section could be raised in approximately 15 minutes. The currents in the straits can be quite strong, so the lifts had to be matched to the tides. One of the largest of these prefabricated sections was the middle cantilever section of the bridge weighing over 700 tons.

At the time of its construction, the bridge was the largest cantilever bridge in the US. It was also the first bridge to be designed to meet earthquake safety requirements.

The 1927 bridge cost was \$8,000,000, which would be approximately \$82,500,000 in today's funds. It was financed by bonds to be repaid from tolls. Financial reports from the American Toll-Bridge Company suggest that the operation was successful financially, but encountered unexpected costs such as State-required rock filled buffers around the bridges supports to protect them from collisions with ships. The State of California purchased the bridge in 1940. Tolls were gradually reduced until, in 1945 the tolls were eliminated as the last of the bonds were retired.

## Eastbound Bridge

As part of the interstate highway system, the State designed and constructed a second bridge to handle the eastbound lanes of the upgrading of



US 40 to become Interstate Highway 80. Construction started in 1955 and the new bridge was opened on November 25, 1958.

The eastbound bridge was similar in design to 1927 bridge (also a cantilever), but used more modern materials and techniques so the structure is much lighter. The truss sections are made from welded T-1 steel (vs. riveted on the 1927 bridge). T-1 steel is approximately three times stronger than the steel typically used in bridge construction. High strength bolts were used for field connections.

### **The New Westbound Bridge and 1958 Bridge Retrofit**

Although the 1927 bridge met the standards of the day for seismic safety, the intervening years increased the engineering community's understanding of the forces in an earthquake. Much tougher standards were mandated to ensure that critical infrastructure components such as these bridges would survive a major quake. The need for critical infrastructure seismic safety was vividly emphasized with the collapse of the Cypress Structure in Oakland, and the collapse of a section of the Bay Bridge in the 1989 Loma Prieta earthquake. These tragic events had long lasting effects on the entire region.

The intricate structure of the 1927 bridge made a seismic retrofit extremely difficult, particularly with the requirement that the bridge remain in operation during the retrofit. The years had also taken their toll, as some of the 1927 bridge's structure had deteriorated. In 1988 the voters passed legislation increasing the tolls on Bay Area bridges with the extra funds going into seismic retrofits and new bridges. A replacement for the 1927 bridge was one of the projects specifically designated in this measure.

It was determined that the 1958 bridge could be economically retrofitted to meet the seismic standards, but that the 1927 bridge would be too costly to retrofit, and should be replaced. In June 1998 a contract for approximately \$62,000,000 was awarded for the seismic retrofit of the 1958 bridge. Work was completed in 2001.

Preliminary CalTrans (California Department of Transportation) studies determined that the new bridge would be located to the west of the 1927 bridge, which would be demolished after the new bridge was completed. The piers of the 1927 bridge would be left in place as additional protection for the 1958 and new bridges. The Crockett interchange for I-80 would also be replaced to align with the new bridge. A fairly wide range of alternatives was considered for the new bridge. These included: cable-stayed, basket-handle arch (an example of which can be seen in the new pedestrian bridge over I-80 in Berkeley, CA), cantilever, and suspension.

In the end, a "classic" three span suspension bridge was chosen. This would be the first major suspension bridge constructed in the US in over 20 years. In early 2000, a contract for approximately \$187,000,000 was awarded to FCI Constructors Inc./Cleveland Bridge. Originally the project was estimated to require 1000 working days, although revisions for unforeseen problems have increased the duration and contract value. There are substantial penalties (\$50,000/day!) for not meeting the amended schedule.

As with the 30+ year gap between the 1927 and 1958 bridges, advances in materials and construction techniques mean that the new bridge would be quite a bit different from the 1958 bridge, and from the other suspension bridges in the Bay Area. One of the most obvious differences is that the towers of the new bridge are concrete vs. the steel towers found on the other bridges. These towers were constructed remarkably quickly using slip-form techniques and tower cranes to lift the material and forms.

The new bridge would utilize the technique of “air spun” cables, as is common in suspension bridges since the earliest days. The main suspension cables are created in mid-air by passing a wire carrier back and forth between the cable anchorages on each end of the bridge. The cables hang in a catenary curve; one of the beautiful things about a suspension bridge. According to one of the workers, this is boring to work on, but it is quite dramatic to watch. Part of the impetus for this article was seeing the cables being spun above our heads as the S.S. Jeremiah O'Brien made its leisurely journey to Sacramento (see Issue 13). As the cables are spun, 232 wires are bundled together into a strand, 13 strands are bound to form one of the two main suspension cables. Approximately 13 miles of high strength steel wire went into the main suspension cables. Suspender cables were then hung from these cables.

The deck sections of the new bridge are also quite different from the other local suspension bridges. The most obvious difference is that the new bridge deck is made from enclosed box section (orthotropic) members vs. the truss work in the other bridges. Such structures are more economical and lighter than traditional truss work. The deck construction also features improved aerodynamics, and resistance to the flutter mode vibrations that caused the destruction of the Tacoma Narrows bridge in 1940. Extensive aerodynamic studies were performed to validate the design including scale model wind tunnel testing. These deck sections were fabricated in Japan. They are lifted into place directly off the transport vessel using “cable crawlers” rather than the system of counterweights used in the 1927 bridge. Lifts take about four hours to complete. Sections range from 75 to 163 feet long. The deck is 95 feet wide. Sections weigh an average of 600 tons. A total of 24 deck sections will be lifted into place. A special system of cables is used to lift and maneuver the sections on the ends of the bridge that are not over water sufficiently deep for the transport vessels.

The new bridge will be named the Alfred Zampa Memorial Bridge after a Bay Area ironworker who worked on the first Carquinez Bridge, the Bay Bridge, the Golden Gate Bridge, and the second Carquinez Bridge. Mr. Zampa was present at the groundbreaking on March 3, 2000, but passed away a few months later.

Most of the drivers in the over 100,000 vehicles per day that pass over the two bridges probably don't give much thought to the historical significance of the site. For at least the next two to three years (until demolition of the 1927 bridge is complete), one can see over 75 years of bridge engineering technology.

## Resources

<http://www.lib.berkeley.edu/Exhibits/Bridge/carquin.html> A virtual exhibit of the history of the Bay Area's major bridges. Many of the items pictured are from the University's Derleth collection.

<http://www.dot.ca.gov/hq/esc/tollbridge/Carquin/Carquinez.html> Official CalTrans web pages for the Carquinez bridge projects.

<http://c-bridge.home.attbi.com/> Among other things, a web cam (updates every five minutes) focused on the new bridge from Crockett, CA.

<http://www.dot.ca.gov/dist4/route80r.htm#carquinez> Another CalTrans site.

<http://www.ketchum.org/carquinez.html> Mark Ketchum, Ph.D. is a consulting engineer with an impressive record of bridge design and analysis. His firm suggested a suspension bridge for the Carquinez bridge, and was a member of the design team for the new bridge. He is also the designer of the new basket-handle pedestrian bridge in Berkeley, CA. The site has a wealth of material on the Carquinez bridge and other projects.

<http://www.ironmc.com/main.htm> Construction of the new bridge from the perspective of one of the ironworkers. This site has a detailed log of the activities in the construction.

<http://alzbridge.com/> A site honoring the extraordinary career of Albert Zampa, a Bay Area ironworker who worked on all of the major Bay Area bridges. Several of Al's children and grandchildren are also ironworkers.

[http://www.parsons.com/about/press\\_rm/potm/10-2002/](http://www.parsons.com/about/press_rm/potm/10-2002/) A press release from Parsons Transportation Group Inc. covering many technical details of the new bridge. Parsons was a primary consultant on the design.

<http://www.dot.ca.gov/hq/esc/tollbridge/Carquin/NewBridge/Planshts.html> Excerpts from the plans for the new bridge. Unfortunately, they are small and just barely readable, but you do get an idea of the overall project.

<http://www.construction.com/NewsCenter/Headlines/ENR/20011219c.asp> An article from Construction News giving a number of technical details about the design and construction of the new bridge.

<http://www.franklinnewbridge.org/> A suburb site documenting the progress on the bridge. The site was created by (then) students of the Franklin Middle School in Vallejo. Lots of excellent photographs of the construction and detailed discussions. These students (now in high school) have done an excellent job in documenting the project.

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# Review of Shell Refinery Tour, January 2, 2003

by Tony Meadow

Our chapter got a tour of the Shell Oil refinery in Martinez, CA on January 2nd. A few more than a dozen of our members and friends climbed aboard a bus generously provided by the Shell Alumni Association to get an insider's look at this historic refinery.



**Entrance to the Alumni Museum. The plaque reads "Shell Oil Company Alumni Museum. Dedicated to employees past, present, and future. September 22, 1990. First barrel of crude oil processed here at 10:15 a.m. on January 16, 1916."**

In 1913 Royal Dutch Shell Oil Company was distributing imported gasoline to Northern California from its terminal on Carquinez Strait. Increasing demand for gasoline and other petroleum products lead to the construction of a refinery. In 1914 Shell purchased 368 acres of grazing land at Martinez, located both on navigable water and accessible from the San Joaquin oil fields. Construction began on the refinery in 1914 and, in parallel, on a 172 mile pipeline to Coalinga. Shell's first American refinery began operation in late 1915.

After many additions and modifications it is only a medium sized plant by today's standards. It is an impressive, but somewhat bewildering, place with many units interconnected by miles and miles of pipes. Although the refinery is historic, there is no historic equipment at the refinery (although Shell has donated some older pieces of equipment to the museum).

Our guides offered explanations of each unit and information on changes in the industry and how those have affected the plant. They use an interesting process to remove sulfur from petroleum so that the sulfur becomes a by-product which is also sold. The tour guides spoke with some pride about the work that they did and the products that they produce. In addition to touring the refinery, we also saw the units that process the water used in the refinery so that it is clean when released.

Following the two hour tour, our hosts treated us to lunch (chili dogs and chips!) back at the museum. Then we wandered through the two buildings that make up the museum. One building contains numerous photographs, maps and charts, as well as smaller pieces of tools and equipment. The second building contains various pieces of equipment from the refinery. Just outside under a canopy were a large pump and a Shell delivery truck. It was an excellent tour and we are grateful to our hosts for their generosity.

Tours are offered to groups only, although the museum is open for a few hours each week. For more information call the Shell Oil Company Alumni Museum at 925.313.3598.



**Pump 511. Installed in 1921. Pumped fuel oil to Tracy and used as a ram pump on the Valley Pipe when the line became clogged**

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## Review of “A Flier in Oil”

Anthony Kirk, *A Flier in Oil: Adolph B. Spreckels and the Rise of the California Petroleum Industry*, California Historical Society, 2000. Price \$38 (\$26 for CHS members).

Mr. Kirk has created another wonderfully written book on a topic of interest to our members. This book covers the early history of the California petroleum industry and the role that the Spreckels family played in developing it. Our upcoming tour will present us with many opportunities to see some of the locations described in the book. Numerous illustrations, photographs and maps complement the text. Highly recommended. – AM

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**Address Correction Requested**

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Membership in the Samuel Knight Chapter is available in the following categories:

Individual	\$25	
Couple	\$30	One copy of newsletter
Student	\$10	Please send copy of current ID
Senior	\$10	Age 65 or older
Contributing	\$60	
Institutional	\$30	
Sustaining	\$125	
Corporate	\$100	Includes 4 memberships - please list names

To join the Chapter, please send a check or money order (made out to the Samuel Knight Chapter) to the Chapter Treasurer. We'd also love to know about your interests, skills, etc. that might be part of a future Chapter event. We encourage Chapter members to join the National SIA.