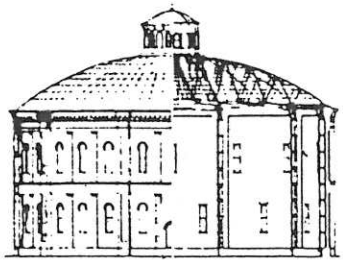

SOCIETY FOR INDUSTRIAL ARCHEOLOGY

ABSTRACTS

12th Annual Conference -- May 12-15, 1983 Saint Paul - Minneapolis, Minnesota

PROGRAM CHAIR: ROBERT M. FRAME III, James J. Hill Papers, James J. Hill Reference Library, St. Paul, Minn.

Session 1. BRIDGES.

Chair: Donald C. Jackson, Historic American Engineering Record, Washington, D.C.

RAILROAD BRIDGE CONSTRUCTION OVER THE MISSISSIPPI AND MISSOURI RIVERS TO IOWA, 1856-1930.

Martha H. Bowers and Hans Muessig, Dennett, Muessig & Associates, Ltd., 631 South Van Buren, Iowa City, IA 52240.

Information about large-scale railroad bridge construction in the 19th and 20th centuries is presented in a study of bridges built over the Mississippi and Missouri rivers to the State of Iowa. Using historic photographs as well as recent views, the authors trace patterns of bridge construction over both rivers, beginning in 1856 on the Mississippi and 1868 on the Missouri. The effect of a 15-20 year lag between bridge construction on the Mississippi and Missouri is illustrated through comparison of truss forms and materials. Also discussed is the increase in rail loading requirements toward the end of the 19th century, which caused the reconstruction or total replacement of most early spans. Illustrations include examples of truss types used at different times, views of construction, and selected drawings. Works of major American bridge engineers, such as George S. Morison, J.A.L. Waddell, and Ralph Modjeski, are also featured.

MONTANA'S MINNEAPOLIS BRIDGE BUILDERS.

Fredric L. Quivik, Architectural Historian, Renewable Technologies, Inc., P.O. Box 4113, Butte, MT 59702.

Each of the states in the American Frontier West is tributary to a different outside economic center. Montana is part of the Minneapolis/St. Paul hinterlands. Thus most of Montana's early bridges were built by Minneapolis bridge builders. As the Twin Cities grew as the economic capital of a large frontier region, the bridge-building business grew as well. And virtually all of the major Minneapolis bridge-building firms that developed between the 1880s and the 1910s were descendants of the brief partnership between Commodore P. Jones and Seth M. Hewett. This paper examines this pattern of business development in the light of Montana bridges built by various of the descendant firms such as The Security Bridge Co., Gillette-Herzog Manufacturing Co., Minneapolis Steel and Machinery Co., and others.

THE GROTON BRIDGE BUILDERS.

Pamela Thurber (Graduate Program in Historic Preservation, Cornell University), 100 Fairview Square 5K, Ithaca, NY 14850.

The Groton Iron Bridge Company of Groton, Tompkins County, New York, was founded in 1877 with the combination of the Groton Iron Works and Perrigo & Avery, a manufacturer of agricultural equipment. In 1887, the firm became the Groton Bridge & Manufacturing Company, the name under which it operated until 1899 when it was purchased by the American Bridge Company. The plant in Groton continued for one year, after which it was closed and the equipment removed. In 1902 Groton interests repurchased the plant and reopened under the name Groton Bridge Company, operating until 1920. Using traveling agents operating from offices in 11 states, the Groton company did business in 27 states and the District of Columbia. In the directories of the American Iron and Steel Association of 1894, 1896, and 1898, the Groton business ranked among the top 25 of the 119 bridge companies reporting their annual production capacity. At least 80 Groton bridges survive in New York State; 16 have so far been identified outside the state.

Session 2. INDUSTRIAL ARCHEOLOGY IN THE RURAL SETTING.

Chair: Edward Rutsch, Historic Conservation & Interpretation, Inc., Newton, N.J.

LOGGING DAMS AS A SAMPLE OF "FOLK TECHNOLOGY" IN A PERIOD OF TECHNOLOGICAL ADVANCEMENT IN THE LAKE STATES LUMBER INDUSTRY.

John N. Vogel (U.S. Forest Service Cultural Resource Survey, Hiawatha National Forest), 301 North 73rd St., Milwaukee, WI 53213.

The last half of the 19th century was a period of rapid technological advancement. In the lake states lumber industry vast changes were realized in the milling and transportation portions of the business. Yet, were it not for logging dams and their ability to insure the timber's arrival at the mills, these improvements would have been useless. Logging dams were not designed or built by engineers. Rather they were the creations of knowledgeable loggers who developed their expertise from experience and precedence. These were men who could build a variety of dams from materials that were readily found around the proposed site, with nothing more than a wheelbarrow and axe as their tools. The lumberjack inspired a folk tradition; he was also involved in a "folk technology." Logging dam construction was not affected by the techno-

logical advances of the time, but the dams were as crucial, if not more so, to the industry as the facets that were affected by the changing technology.

EXCAVATION OF A 19TH CENTURY POTTER'S SHOP IN CONCORD, NEW HAMPSHIRE.

David R. Starbuck, Asst. Professor, Dept. of Science & Technology Studies, Rensselaer Polytechnic Institute, Troy, NY 12181.

Throughout 1982 excavations were conducted at the site of Joseph Hazeltine's pottery in Concord, New Hampshire. This redware shop (c1842-1880) was in the Millville district of Concord, the location of many early potters, and historical records indicated that the shop operated 4 wheels and had a kiln behind it. Research here was intended to locate the shop, establish its integrity, determine what types of products were being made, and determine how the kiln had been constructed. Excavations located and exposed the foundations for the northern end of the potter's shop, along with great quantities of waste pottery, part of the kiln foundation, and stacking tiles from within the kiln. Vessels are currently undergoing analysis and reconstruction, and the remainder of the shop will be excavated during 1983.

Session 3. MIDWESTERN INDUSTRIES I: POTASH AND PAPER.

Chair: George Green, Associate Professor of History, University of Minnesota, Minneapolis, Minn.

NEBRASKA'S WORLD WAR I POTASH INDUSTRY.

Richard E. Jensen, Nebraska State Historical Society, 1500 R St., P.O. Box 82554, Lincoln, NE 68501.

During World War I Nebraska was the leading potash producing state in the nation. The decline in imports from Europe caused shortages which in turn resulted in inflated prices. Ten major companies were quickly organized and approximately $5 million was spent to construct processing plants. Nearly all of the potash was used as a fertilizer additive in the American Cotton Belt, contrary to the common belief that it was used in the production of gunpowder. After the war these companies were unable to compete with the European producers. Pioneers in the field such as John Shaw and Carl Modessit made substantial profits but most companies ended in bankruptcy. The new industry had no direct prototype and it required both original inventions and selective borrowing from existing technology to devise a system capable of producing up to 100 tons of potash per day.

EARLY MODERN PAPER MILLS OF THE FOX RIVER VALLEY, WISCONSIN--TWO SITES.

Paul P. Abrahams, Associate Professor of Economic History, CC331, University of Wisconsin-Green Bay, Green Bay, WI 54301.

The Fox River Valley of northeast Wisconsin is an important center of specialty paper production. At one time (1890) 22 mills were in operation there at major falls between Lake Winnebago and Green Bay. The Fox River Flour and Paper Company (historical name) was probably the first rag paper mill in the Midwest. The site, at Appleton, consists of three building masses constructed between 1883 and 1893 in response to a growing market demand for rag paper which the company continues to produce (at other locations) to this day. In this respect the site represents a single product operation. Frederick W. Taylor played a part in production planning there.

The second site, ten miles downstream, was started about the same time but developed over a longer period in the course of adapting to the new market of coated papers. The Thilmany Pulp and Paper Company of Kaukauna has been associated with food and other types of packaging since its founding in 1883. Here, gains in production were made, in part, through numerous small additions to the original machine rooms. Production was diversified from the beginning and became more so. Today, Thilmany, a subsidiary of Hammermill Paper Company, produces more than 5000 different paper packaging products.

Section 4. Oil.

Chair: Vance Packard, Director, Drake Well Museum, Titusville, Pa.

OIL SPRINGS PETROLEUM WELLS, ONTARIO, 1860-PRESENT: AN INDUSTRIAL ARCHEOLOGICAL CASE STUDY.

Dianne Newell, Department of History, University of British Columbia, Vancouver, B.C. V6T 1W5, Canada.

Questions concerning the evolution and rate of persistence of specific technological innovations are particularly amenable to industrial archeological investigations. The focus of this study is the innovative power system employed to pump petroleum in the pioneer Canadian fields located in southwestern Ontario. The Ontario oil fields, together with those located in the conterminous territory of Pennsylvania, were the first exploited on a commercial scale in the world, beginning in 1859-60. Within a few years of their discovery and exploitation the oil fields were being worked by means of an ingenious mechanical system ("Jerker system") introduced to pump dozens of petroleum wells with a small-power steam engine. The jerker system had its orgins in the "stangenkunst" of 16th century Europe. Today, approximately 100 wells in the Oil Springs, Ontario, fields continue to be pumped with the same system which has undergone little modification.

TURNER VALLEY OIL FIELD, CANADA, IN THE 1930s AND TODAY: THE ARCHEOLOGICAL POTENTIAL.

David Finch, Graduate Student, Department of History, University of Calgary, 2500 University Drive N.W., Calgara, Alberta T2N 1N4, Canada.

In the southwestern area of Alberta, close to Calgary, the Turner Valley gas and oil field began production on May 14, 1914. Numerous successive booms excited the inhabitants of Calgary, the oil capital of Canada. The early technology utilized wooden cable tool rigs and developed a scrubbing process to render the sulphur-laden gas safe for consumer use in Calgary beginning in the 1920s. Rare film footage of the field during the 1930s shows the cable tool rigs in operation and the brilliant flares wastefully burning excess gas. Archival slides show various scenes of the oil field and modern stills show the pits into which the abandoned cable tool rigs were toppled. Some of this long forgotten machinery may be restored to its original condition for inclusion in a proposed Turner Valley oil field interpretive centre.

Session 5. URBAN AFFAIRS: HISTORY, PRESERVATION, AND PUBLIC POLICY.

Chair: Eric N. DeLony, Principal Architect, Historic American Engineering Record, Washington, D.C.

GRAND CENTRAL AND MIDTOWN: HOW A RAIL TERMINAL RESHAPED MANHATTAN.

Elliot Willensky (Commissioner, New York City Landmarks Preservation Commission), 47 West 34th St. (626), New York, NY 10001.

At that point along the world's first street railway route, beyond which the "loathsome" steam locomotive was forbidden to pass, was opened in 1870 a "grand central depot" for railroad passengers entering New York City. Built amidst cattle pens, locomotive sheds, and freight houses in what was then an area remote from the city center, 45 minutes to the south, Cornelius Vanderbilt's Grand Central Depot quickly became a magnet for a variety of local transit systems and another center of urban development.

The city grew, traffic increased, and the Depot at today's Park Avenue and 42nd Street was enlarged, rebuilt, demolished, and built again. At first, its vast, smoky, smelly rail yards interrupted the city's progress northward. Later, with the coming of electric propulsion, the trackage was depressed below Manhattan's street level and, beginning in 1913, provided air rights sites for an exclusive high-rise hotel, club, and residential district. Then, with the culmination of World War II, much of that district was demolished and rebuilt as the site of the even taller buildings that comprise the steel and glass canyons of Park Avenue and environs. The Grand Central rail terminal had spawned New York City's second business district, Midtown.

URBAN RENEWAL AND THE INDUSTRIAL ARCHEOLOGY OF DETROIT: SOME LESSONS OF THE PAST FEW YEARS.

Charles K. Hyde, Department of History, Wayne State University, Detroit, MI 48202.

Significant segments of Detroit's industrial heritage have come under the wrecking ball in recent years, part of an urban renewal process aimed at replacing Detroit's "obsolete" industrial facilities with new construction. For the most part, urban renewal has also brought drastic changes in land use because most of the new developments consist of non-industrial uses. Detroit's riverfront district will undergo a drastic change in land usage by 1985, shedding its historic role as an industrial and warehouse district in favor of one dominated by residences, offices, cultural and recreational facilities, and retail shops.

This paper will address several interrelated issues. First, what problems and/or opportunities have these developments created for industrial archeologists? Second, have the options of rehabilitation and reuse been fully examined and why are demolition and new construction so attractive to almost everyone involved? Third, how well has the environmental review process, including the input from the State Historic Preservation Office, worked in practice?

Session 6. MIDWESTERN INDUSTRIES II: BEET SUGAR.

Chair: A. C. Bloomquist, Vice President, American Crystal Sugar Company, Moorhead, Minn.

THE BEET SUGAR INDUSTRY IN NEBRASKA.

William F. Rapp, 430 Ivy Ave., Crete, NB 68333.

In 1887 Henry Koenig of Grand Island, a German immigrant familiar with the beet sugar industry in Europe, began a study of the possibility of growing sugar beets in Nebraska. These studies indicated that Nebraska could produce sugar beets which would make the manufacturing of beet sugar economical. In 1889, it was decided to construct a sugar factory at Grand Island. A defunct factory was found in Canada; H. F. Oxnard was hired to supervise the construction and to be the general manager. Production started in the fall of 1890. With the success at Grand Island the Oxnard Brothers erected a factory at Norfolk in 1891. In 1905 the factory was abandoned. In 1899 the Standard Beet Sugar Company constructed a plant near Ames. In 1910 the factory was sold and moved to Scottsbluff. Great Western Sugar Company started their Nebraska operations at Scottsbluff in 1910 and by 1927 had plants at: Gering, Bayard, Mitchell, Minitare and Lyman.

AMERICAN CRYSTAL SUGAR COMPANY IN THE EARLY 20th CENTURY: THE OXNARD ERA.

James E. Fogerty, Deputy State Archivist, Minnesota Historical Society, 1500 Mississippi St., St. Paul, MN 55101

American Crystal Sugar was born in 1899 as American Beet Sugar Company, and quickly became one of the most powerful entities in the sugar industry. Founded by Robert, Henry, Benjamin, and James Oxnard, ABS did battle with Claus Speckels (the "Sugar King"), and with Henry O. Havemeyer's Sugar Trust. Involved in all aspects of the sugar business, the Oxnards became one of the most powerful forces in American agricultural policy circles during the early 20th century, and were closely involved in the construction of tariffs to protect American sugar from foreign competition. Although less well remembered by posterity than some of their more flamboyant contemporaries, the Oxnard brothers helped shape the course of United States sugar policy.

Session 7. NORTHERN IA: REGIONAL WORK-IN-PROGRESS REPORTS.

Chair: Robert A. Britton, Associate Director, Geography Department, The Science Museum of Minnesota, St. Paul, Minn.

A TALE OF TWO TOWERS: LOCATION AND ENGINEERING ASPECTS OF THE WASHBURN PARK WATER TOWERS IN MINNEAPOLIS.

Tom Balcom (Environmental Planning Director, Minnesota Department of Natural Resources), Mill City History Associates, 5129 Garfield Ave. So., Minneapolis, MN 55419.

The residential area in south Minneapolis known as Washburn Park got its start nearly 100 years ago. In 1886, an orphanage was constructed and the area surrounding it was platted as a residential neighborhood called Washburn Park. The plat map narrative stated that, "With Minnetonka, Calhoun, and Harriet as a source of supply, Minnehaha Creek as the aqueduct and the reservoir that is to be built on the high hill near the center of the park for a local head, Washburn Park will have a complete system of water works." The original Washburn Water

Tower, constructed in 1893, was designed by William De La Barre, chief engineer of the water power works at St. Anthony Falls on the Mississippi River. As urban residential development progressed south from downtown and into the neighborhood, the city of Minneapolis purchased and improved the Washburn Water Tower and connected it to the city water system in 1915. The water tower proved to be inadequate to serve the Washburn Park neighborhood as it developed to urban residential density standards, so it was torn down in 1931 to make way for a new water tower with almost ten times greater water capacity. The new Washburn Water Tower was designed by architect Harry W. Jones, and was constructed by engineer William S. Hewett, considered a pioneer in reinforced concrete construction. Ornamental eagles and guardians of health, surrounding the dome of the tower and its base, respectively, were fashioned by sculptor John K. Daniels. After more than 50 years it still serves as a local head for water supply to the surrounding neighborhood in the summer months. The Washburn Park Water Tower has been designated as a city landmark and is currently being considered for nomination to the National Register of Historic Places.

IRON AND STEEL TRUSS BRIDGES IN EASTERN IOWA.

James N. Hippen, Associate Professor of History, Luther College, Decorah, IA 52101.

This presentation concerns the relatively large number of surviving late 19th and early 20th century truss bridges in the Decorah area. The work is based on surveys in Winneshiek County conducted between 1971 and 1981, and a summer 1981 survey of older bridges in 18 counties of southeastern Iowa which was funded by a grant from University House, University of Iowa. Fundamental questions asked include: what types of bridges were built, who built them, and what was/is their cultural context. Based on data from existing structures, tentative conclusions will be drawn.

C.A.P. TURNER AND THE CONSTRUCTION OF THE NORTHWESTERN KNITTING MILL WAREHOUSE, MINNEAPOLIS.

Jeffrey A. Hess, Historian, 215 Grain Exchange Building, Minneapolis, MN 55415.

The Minneapolis engineer C.A.P. Turner is generally credited with having revolutionized American building technology with his introduction, in 1905, of the flat-slab, or "mushroom," system of reinforced-concrete construction. Turner first came to national attention in 1904, by designing a reinforced-concrete warehouse in Minneapolis for the Northwestern Knitting Company, the predecessor firm of the Munsingwear Corporation. The first "pure" reinforced-concrete building in the Twin Cities, the Northwestern Knitting warehouse utilized a streamlined column-girder-slab arrangement that presaged the economy and simplicity of the mushroom system. In 1911 the warehouse received an extensive addition that expanded the original floor space with mushroom construction. The building therefore offers the observer a unique opportunity to examine, within the confines of one structure, the evolution of Turner's engineering art.

THE NORTHERN PACIFIC RAILWAY'S COMO SHOPS.

Nancy Tracy, Historian, 934 Portland Ave., St. Paul, MN 55104.

A selection from the abundant archives of the Northern Pacific Railway, located at the Minnesota Historical Society, will document the several construction periods of the Como Shops. From 1884 are two plans, one showing the earliest concept for the shops complex and the other reflecting the extensive reworking of these ideas into a more centralized and efficient plant. Other plans, maps, and views will illustrate the finished shops complex (1885), the expansion between 1900-1920, and, finally, the shops as they appear today.

THE GREAT NORTHERN RAILWAY'S JACKSON STREET SHOPS.

Frank P. Bifulk (Executive Vice President, Minnesota Transportation Museum), 2255 Cedar Ave., White Bear Lake, MN 55110.

In 1879, James J. Hill and associates acquired the St. Paul and Pacific Railroad, renaming it the St. Paul, Minneapolis and Manitoba (later to become the Great Northern Railway). In 1882, Hill built the present day Jackson Street Shop complex north of the State Capitol. It consisted of a blacksmith/boiler shop, machine shop, storehouse, pattern shop, wood shop, car shop, and full-circle roundhouse (1881). Colonel C.C. Smith, the road's Chief Engineer, designed the shops, and Captain C.C. Renshaw, Maintenance-of-Way Engineer, built them. Fairbanks, Morse & Company, who became one of the largest scale manufacturers, built the two water towers, rolling mill scales, and track scales. The capacity and diversity of Jackson Street Shops, the utilization of the best materials and construction techniques, and the provision of the newest and most modern equipment, exemplified the philosophy by which the "Manitoba Road" would build and prosper.

Session 8. MINING I: ARCHEOLOGY, PRESERVATION, AND GEOGRAPHY.

Chair: Peter M. Molloy, Director, Western Museum of Mining and Industry, Colorado Springs, Colo.

THE RECORDING AND RECOVERY OF TWO STEAM-POWERED ROTARY CORE DRILLS FROM AN EARLY MINING SITE IN NORTHERN SASKATCHEWAN.

David Neufeld, D. Neufeld Consulting & Research, Box 7707, Saskatoon, Saskatchewan S7K 4R4, Canada.

This paper describes the first major industrial archeology project undertaken in Saskatchewan, Canada. The interdisciplinary nature of industrial archeology was clearly outlined as documentary, artifactual and graphic evidence were all considered in piecing together an early chapter in Saskatchewan's mining history. Two steam-powered Davis-Calyx shot drills and vertical boilers were recorded on-site and recovered for a future museum display. Documentary research uncovered the story of the H. V. Dardier nickel prospecting expedition that carried the drills up to Lake Athabasca, Saskatchewan, in 1915. The archeological and historic findings were combined to gain insights into early investment in Canadian mining, life on a northern frontier, the transportation network of the pre-aviation north, and the development of drilling technology and techniques.

STUDIES IN THE REHABILITATION OF A LEAD CONCENTRATING MILL: MISSOURI MINES STATE HISTORIC SITE, FLAT RIVER, MISSOURI.

Gary Walrath, Region II Assistant Supervisor, History, Division of Parks and Historic Preservation, Missouri Dept. of Natural Resources, Rt. 4, Box 177, Festus, MO 63028.

Located in Missouri's St. Francois Mountains, the Federal Mill (#3) Complex stands as the physical manifestation of 275 years of lead mining history. Constructed by the St. Louis Smelting and Refining Company beginning in 1907-08 the complex was purchased in 1923 in the continuing consolidation of "lead belt" mining companies by St. Joe Lead Company. St. Joe made the Federal #3 mill its major concentrating plant for its Leadbelt operation.

The 25-acre, 27-structure Federal Mill Complex was used by St. Joe Mineral Corporation until 1972 when St. Joe moved its operations to the Viburnum Trend (Missouri). St. Joe donated 8,500 acres including the complex to the

State of Missouri, Department of Natural Resources, Division of Parks and Historic Preservation in 1976. Rehabilitation of the complex's powerhouse to use as an interpretive center began in 1981 with the designation of the complex as the Missouri Mines State Historic Site.

TIME EXPOSURES: A CENTURY OF CHANGE IN ARIZONA'S WARREN MINING DISTRICT (BISBEE) AS DEPICTED IN FIVE MAPS.

Richard V. Francaviglia (Program Manager, SouthEastern Arizona Governments Organization), P.O. Box 1653, Bisbee, AZ 85603.

The evolution of the Warren mining district is herein illustrated through the use of five maps depicting salient features developed at periods in the district's history (1885, 1905, 1912, 1934, 1974). It is suggested that the methodology used, and specific features selected, such as tailings, leaching operations, overburden, railroad lines and settlement features, can be applied to other mining districts, thereby enabling effective comparisons and contrasts to be made by district, state and region.

Session 9. INDUSTRIAL ARCHEOLOGY THEORY AND METHOD.

Chair: Dianne Newell, Department of History, University of British Columbia, Vancouver, B.C.

MANUFACTURING METHODS DEDUCED FROM THE STUDY OF INDUSTRIAL ARTIFACTS.

Robert B. Gordon, Professor of Geophysics and Applied Mechanics, Yale University, Kline Geology Laboratory, Box 6666, New Haven, CT 06511.

The use of laboratory examination to determine the methods used in the manufacture of metal products is illustrated by analysis of artifacts from the Collins axe works and the Whitney Armory. Between 1836 and 1842 E. K. Root patented methods of forming axe polls on power-driven machinery. Analysis of a recently found poll from the Collins works shows how these methods were realized in the factory. The double convex shape of the poll was formed with partially-closed dies attached to oscillating rolls. Examination of tumblers from Whitney musket locks made in 1820 and 1851 shows limited use of machine tools and reliance on filing to attain final dimensions; it also shows a marked improvement in the quality of this hand work in the 30-year interval. The sources of some of the iron used at the Whitney and Springfield Armories has been ascertained by analysis of the structure and composition of the slag inclusions in it. Innovations in the use of steel in place of iron are shown by metallographic examination of artifacts from the Whitney Armory site.

THE BUILDING AS DOCUMENT: IDENTIFYING THE WORKERS' HABITS.

Ann M. Matthews, Site Administrator, Watkins Woolen Mill State Historic Site, Rt. 2, Box 270M, Lawson, MO 64062.

Watkins Woolen Mill was built in 1860 by Waltus L. Watkins on his 3600-acre farm in western Missouri. Although the mill was closed in the 1890s, it was never scrapped-out and stands today with nearly all of its equipment still in position. This paper will look not at the machinery itself but at the wear and use marks associated with it. Although none of the Watkins workers left journals or diaries describing their work they did leave wear patterns, stains, tally marks, and other indicators of what they did and how they did it. By carefully recording, mapping and analyzing these marks we have been able to learn a great deal about the workers, their jobs, work habits, and even personal preferences. This presentation covers that study, how we did it, what we found, and our analysis of those findings.

Session 10. STEAM ENGINE RESTORATION: PRACTICE AND PROJECTS.

Chair: Matthew Roth, Historic Resources Consultants, Hartford, Conn.

THE PRACTICE OF HISTORIC PRESERVATION OF THE RECIPROCATING STEAM ENGINE: TWO PROJECTS.

Gerald G. Parker (Steam Engineer), 1324 23rd St. So., Fargo, ND 58103.

Two restoration projects involving agricultural steam engines that were undertaken by members of the Western Minnesota Steam Thresher's Reunion located near Fargo, North Dakota, are discussed and illustrated with slides. These two projects are a large M. Rumley Company plowing engine and a 110-horsepower Case traction engine. Both of the projects are treated according to the documentation available for the project, the problems involved in restoration, and the use that each is put to today.

STEAM RESTORATION PROJECTS AT THE MINNESOTA TRANSPORTATION MUSEUM: NORTHERN PACIFIC LOCOMOTIVES 328 AND 2156.

William J. Graham (Past President, Minnesota Transportation Museum), 5818 Knox Ave. So., Minneapolis, MN 55419.

The Museum collection includes Dan Patch No. 100, America's oldest internal combustion-electric locomotive; Northern Pacific No. 2156, a Q-3 Pacific type (Alco-1909); and Northern Pacific No. 328, an S-10 Ten-Wheeler (Alco-1905). Engines 100 and 328 are overhauled and operable.

In 1976 No. 328 was brought from a St. Paul city park to a building provided by Burlington Northern Railroad. The restoration took five years, $75,000 and 14,000 manhours to complete. The boiler and mechanical systems were torn down and re-assembled. Modern replacement parts and methods were used, consistent with the engine's historical appearance. No. 328 meets Federal Railroad Administration and ASME standards. To date, museum members have operated it over 1,000 miles in revenue service over four major railroads, carrying about 50,000 people.

A TURN FOR THE BETTER: THE REACTIVATION OF THE ARMINGTON & SIMS STEAM-POWERED MACHINE SHOP AND FOUNDRY AT GREENFIELD VILLAGE.

John Bowditch, Curator, Power and Shop Machinery, Henry Ford Museum, P.O. Box 1970, Dearborn, MI 48121.

In 1928 Henry Ford began the construction of a large brick machine shop as a part of the Edison Institute which he was building in honor of Thomas Edison. The shop was intended to serve dual functions as a training center and as an exhibit of a late 19th century machine shop. The facility was named the "Armington and Sims Machine Shop" in honor of Pardon Armington and Gardiner C. Sims. Machinery in the shop was all powered by a c.1885 C. H. Brown steam engine.

The shop was active throughout the 1930s and 1940s but had fallen largely into disuse by 1950. In 1981 the museum was given a grant to reactivate the shop. This paper will document efforts made in 1982 to restore the shop to full operation. Particular emphasis will be placed on restoration of the engine room. It is hoped that experience gained in this project and shared through this paper will assist others contemplating steam operation of shops.

Session 11. MINING II: PERSPECTIVES ON COPPER.

Chair: Larry D. Lankton, Associate Professor of Science, Technology and Society, Michigan Technological University, Houghton, Mich.

FROM LIMERICK TO SWEDETOWN: RESIDENTIAL LOCATIONS IN THE SUPERIOR COPPER DISTRICT.

Patrick E. Martin, Department of Social Sciences, Michigan Technological University, Houghton, MI 49931.

Surviving remnants of housing stock provided by Lake Superior copper mining companies for their workers offer an opportunity to examine some of the spatial, ethnic, and social dimensions of this important industry. The presence of numerous standing structures, as well as strictly archeological examples, has stimulated inquiry which concentrates on the "locations," or residential neighborhoods, as the focus of interest. Labeled with colorful and evocative names, the locations were clusters of structures placed in close proximity to the mines. These neighborhoods concentrated the work force near their job sites, and served other purposes for the companies, as well.

This presentation describes the past and present conditions of some residential locations established by the Quincy Mining Company during the late 19th and early 20th centuries. Both documentary and archeological evidence are utilized in an exploration of the material manifestations of social life, with particular emphasis on questions relating to ethnicity.

THE ANACONDA COMPANY SMELTERS AT ANACONDA AND GREAT FALLS.

Fredric L. Quivik, Architectural Historian, Renewable Technologies, Inc., P.O. Box 4113, Butte, MT 59702.

In September 1980, ARCO, the recent owner of the once great Anaconda Copper Mining Company, announced the closure of the smelter at Anaconda (built in 1902) and the refinery in Great Falls (built in 1892). Shortly thereafter, ARCO announced that both facilities would be completely demolished, thus removing from the earth all physical traces of two of the great centers of metallurgical advancement in the processing of copper and zinc. This paper will describe the development of the two plants and highlight the contributions they made to the history of mineral processing technology such as blast and reverberatory furnaces, converters, electrolytic refining, and tall stack construction. The paper will conclude by briefly touching on points of significance broader than the direct connections to metallurgical development.

RESEARCH POTENTIAL OF THE ANACONDA COPPER MINING COMPANY RECORDS.

Ellen H. Arguimbau, Archivist, Montana Historical Society, 225 North Roberts, Helena, MT 59620.

During the period 1979-81 the Montana Historical Society Archives received from the Anaconda Copper Mining Company, and its successor, ARCO, a large percentage of the records of the company's operations at Butte, Anaconda, Great Falls and elsewhere, from the late 19th century through the 1960s. During this same period (1979-81) the company was closing down and selling for salvage its entire physical plants at Great Falls and Anaconda. Since this was a conscious dismantling for salvage purposes, there will be less left on the sites than under a simple abandonment.

Fortunately the company had previously made a conscientious effort to document the physical plant and its operations through an extensive photographic program and through preservation of its financial and operational records. Much of this photographic and paper documentation is now owned by the Montana Historical Society and is available to researchers. This paper will outline the types of records we have and will explore some of the kinds of research which should be possible, using them.

Session 12. IA SOFT-WARE: ROPE, CLOTH, GRAIN.

Chair: David H. Shayt, Division of Mechanical and Civil Engineering, National Museum of American History, Smithsonian Institution, Washington, D.C.

AT THE END OF THEIR ROPE IN CHATHAM DOCKYARD.

Carolyn C. Cooper (Ph.D. Candidate, History of Science, Yale University), 239 Everit St., New Haven, CT 06511.

The Ropery at Chatham Dockyard, England, is among several significant industrial archeological sites owned by the Royal Navy, which early in the 19th century adopted industrial innovations and long retained them after their replacement elsewhere. Traditional ropemaking, necessitating a long rope-walk in which to spin and lay out the full lengths of yarn to be countertwisted into strands and ropes, was rehoused at Chatham around 1790 in a brick rope-house extant today. Equipment patented by Joseph Huddart in 1792 much increased rope strength by equalizing the tension of inner and outer yarns; it was embodied in rope-driven machinery by Henry Maudslay in 1811, which was still working at Chatham in autumn 1982. Similar American machinery, on nonoperating display since 1951 at Mystic (Conn.) Seaport Museum in part of the 1824 ropewalk of the Plymouth (Mass.) Cordage Co., was more quickly rendered obsolescent in the late 19th century by "house machines" that continuously reel up the rope during twisting.

TEXTILE FACTORIES IN CHINA: A CONTEMPORARY LOOK.

Marcia G. Anderson, Curator of Museum Collections, Minnesota Historical Society, 1500 Mississippi St., St. Paul, MN 55101.

This presentation is based on observations made in textile factories in the People's Republic of China, May 1982, and is illustrated with slides. Facilities included are a wool carpet factory, a cotton and polyester spinning and weaving factory, and an embroidered-cloth factory in Beijing; silk embroidery research institute and silk spinning factory in Suzhou; and silk printing and weaving factories in Shanghai. Working conditions and production statistics are those provided by China Travel Service interpreters.

THE RISE AND DECLINE OF THE WOODEN GRAIN ELEVATOR.

T. Robert Talbot, Vice President, National Agra Underwriters, 1104 Fernwood Ave., Camp Hill, PA 17011; and Robert Talbot, RFD 2, Laconia, NH 03246.

Grain elevators as we know them today bring to mind a battery of concrete silos with a neatly enclosed elevator ready to unload endless loads of grain. Go back a century and you would find the forests furnishing the building materials, with design and construction techniques evolving through trial and error. As grain farming and elevators moved westward away from the eastern canals the railroads became the mode of transportation but still wood construction remained unchanged and accepted by the owners as the basic material for the new elevators. The westward movement continued creating ever increasing distances over which the dressed lumber had to be hauled, but keeping pace was the eternal enemy of the grain farmer and elevator owner--fire.

Session 13. MILL PROJECT REPORTS: INVESTIGATION, INTERPRETATION, RESTORATION.

Chair: Charles Howell, Resident Millwright and Master Miller, Philipsburg Manor, Upper Mills, Sleepy Hollow Restorations, Tarrytown, NY

MINNEAPOLIS'S WEST SIDE MILLING DISTRICT AND THE CATARACT MILL SITE: A PROPOSAL FOR INDUSTRIAL ARCHEOLOGY.

Jerilee A. Richtman (Graduate Student, Program in American Studies, University of Minnesota), 2214 22nd Ave. So., Minneapolis, MN 55404.

During the summer of 1982, intensive historical research was conducted to document the development of the Minneapolis flour-milling district in the 19th century. Located at St. Anthony Falls, the former flour-manufacturing district comprised three square blocks between Fifth and Eighth avenues along the Mississippi River. The purpose of the study was to investigate the feasibility of industrial archeological excavation in this district. The area of study focused on a strip of vacant land lying on the river side of First Street South which was found to contain 13 millsites, among them the site of the earliest merchant flour mill to operate in Minneapolis, the Cataract Mill. The report concludes that the area of study offers great potential for archeological excavation. The site of the Cataract Mill is proposed to serve as a test of the area. It is expected that an archeological excavation at this site will provide information and artifacts that will begin to elucidate the evolution of this riverfront area into the nation's flour manufacturing capital.

INVESTIGATING THE SEPPMANN-HEGLEY WINDMILL RUINS: UNDERSTANDING THE ENGINEERING AND THE CONSTRUCTION OF A THREE-DIMENSIONAL INTERPRETIVE MODEL.

Kenneth Sander (Artist Preparator, Science Museum of Minnesota), 9421 Frederick Ave., St. Louis Park, MN 55426.

This presentation reports on the internal engineering of the 1884 Seppmann-Hegley "Dutch" windmill as it involved the Minnesota State Parks stabilization project of the late 1960s under the supervision of Sig Lervaag. Reconstruction, in scale model, was made possible by examining the numerous mill drive parts remaining in the crumbling original structure. The mill had been stripped and altered by the 1930s, but sufficient clues to location remained, along with oral legend, to allow reasonably accurate reconstruction of the main features of the wind-powered drive train. The three-dimensional scale model resulting from this investigation remains as the single best guide for any possible on-site restoration. The mill is located in Minneopa State Park, four miles southwest of Mankato, Minnesota.

Session 14. THE INDUSTRIAL HOUSE: A ROUNDTABLE ON APPROACHES AND EXAMPLES.

Chair: Michael J. Crosbie, Associate Editor, AIA Journal, 1735 New York Ave., N.W., Washington D.C. 20006.

PREFABS FOR THE PRAIRIES.

Thomas Harvey (Department of Geography, University of Minnesota), 1916 Drew Ave. So., Minneapolis, MN 55416.

The rapid expansion of settlement into the western prairies after 1860 led to a demand for quickly constructed dwellings that could not be met with local building materials. Mass-production industrial firms in Chicago and other Midwestern cities -- where labor was plentiful, sources of lumber were near at hand, and railroads provided transportation west -- filled this need with prefabricated, balloon-frame houses, schools and stores.

One of the principal and most widely noted manufacturers of ready-made buildings was the Chicago firm of Lyman Bridges, which in the 1860s and 1870s worked directly with westward-reaching railroads to provide houses for settlers. Bridges' close affiliation with several railroads shows the co-operative hinterland development practiced by urban-centered companies. This urban-rural relationship continued well into the 20th century as firms including Sears-Roebuck of Chicago and the George Barber Company of Knoxville provided prefabricated houses and architectural features and mail-order stock plans to local builders. As a result, from the earliest years of settlement, prairie houses developed with a homogeneity of style seldom seen in other regions of the country.

HIGH ART AND MASS PRODUCTION IN TURN-OF-THE-CENTURY BUILDING TECHNOLOGY.

Paul Clifford Larson, Architectural Historian, 458 Linden Ave., Long Lake, MN 55356.

Many vanguard architects became closely associated with replicable building units and modules technology at the turn of the century. This paper examines a number of prominent Midwestern examples connected to the work of Frank Lloyd Wright and the late Louis Sullivan. In the first decade of the century, in a stage of high optimism, the architects' new design concepts generated new products and even spawned new companies, such as Robert Spencer's Casement Hardware Company in Chicago. In the second stage, precipitated by a conservative backlash and a crash in the building economy, architects joined hands with manufacturers simply to survive. Between 1913 and 1917 Wright produced a prefab portfolio for the Richards Company in Milwaukee, C. S. Elwood packaged Wrightian designs into ship-by-rail units for the Gordon van Tyne Company in Davenport, and skilled designer-builders, such as Irwin Goldstein in Minneapolis, developed their own "American Home-Building Systems." This short-lived trend united architect and mass-production technology in an attempt to survive without a loss of either architectural "seriousness" or economic viability.

SOME POST-WORLD WAR I EXAMPLES OF BUILDING BY THE AMERICAN ARTSTONE COMPANY OF NEW ULM, MINNESOTA.

Dennis A. Gimmestad, Assistant State Historic Preservation Officer, Minnesota Historical Society, Fort Snelling History Center, St. Paul, MN 55111.

The Saffert Construction Company (later the American Artstone Company) of New Ulm, Minnesota, is an example of a firm that not only manufactured building materials but designed and constructed houses and other types of buildings as well. This presentation will illustrate several examples of the company's concrete buildings, many utilizing a distinctive rainbow-colored block, which were constructed in southwestern Minnesota from the late teens through the 1930s.

VERNACULAR HOUSES AS IA ARTIFACTS.

Herbert Gottfried (Professor of Design Studies and Associate Dean, College of Design, Iowa State University), 3430 Oakland, Ames, IA 50010.

This paper has developed out of research into vernacular building and design, especially that kind of structure that evolves from the use of industrially produced architectural materials. This kind of architecture makes up the bulk of housing, commercial, and light industrial

buildings in the United States.

In this paper, two examples of house types are compared. The first is a 1926 Sears-Roebuck house built in Scotia, New York. Preliminary research materials for the house include the shipping invoices from Sears' warehouses and the instruction manual with on-site notes of the carpenter who assembled the house. The second example is a 1936 colonial imitation of a 19th century revival house type in Ames, Iowa, that was adapted from a pattern book. The original plans are available. In both houses materials, design, finishes, house history (what happened to both houses over time), and a brief social history of residents are included. A comparative siting analysis completes the paper.

In summary, the paper argues that American vernacular housing is industrially inspired, as distinct from folk housing which is incidentally related to industry, and that house types are excellent artifacts for studying industrial archeology.

Of regional note, architectural products such as millwork were manufactured in the Mississippi River corridor. The largest millwork plant in America in the 1910-40 period was the Curtis facility in Clinton, Iowa. The firm used green timber and cured lumber from Minnesota and Wisconsin and shipped, by rail, to all parts of the country. Curtis maintained offices throughout the country including a business office in the Empire State Building in New York City.

FROM PROFESSIONAL TO AMATEUR: CHANGING DESIGN IN TOOLS FOR HOME BUILDING.

Michael J. Crosbie, Associate Editor, AIA Journal, 1735 New York Ave. N.W., Washington, D.C. 20006.

In 1980, 20 percent of all privately-owned, single-family homes were owner-built, while 70 percent of America's households engaged in home improvement, resulting in billions of dollars in sales for manufacturers of building materials and tools. Accordingly, the manufacturers have responded. The variety of tools and materials for the amateur has expanded. To the extent that a tool or building material compensates for the lack of skill or professional expertise, it thus responds to the needs of the amateur. The very form of a tool can either liberate or frustrate the creative energies of amateur builders. Professional tools and building materials have undergone transformations, making them responsive to amateurs. These transformations, examples of which are presented, fall into six categories: change in tool material; change in tool manufacture; redesign of professional tool; entirely new tools for amateurs; tool attachments; and repackaging and/or provision of tool information.

SESSION SCHEDULE

Saturday May 14	LANDMARK CENTER: Weyerhaeuser Auditorium		Ramsey County Room (317)	Sanborn Room (408)
	8:30 – 10:00	Session 1. BRIDGES	Session 2. IA IN RURAL SETTING	Session 3. MIDWESTERN INDUSTRIES I
	--Break--			
	10:30 – 12:00	Session 4. OIL	Session 5. URBAN AFFAIRS	Session 6. MIDWESTERN INDUSTRIES II
	--Lunch, followed by Annual Business Meeting--			
Sunday May 15	RADISSON SAINT PAUL HOTEL: Pioneer Suite		Senate Suite	Indian Suite
	8:30 – 10:00	Session 7. NORTHERN IA	Session 8. MINING I	Session 9. IA THEORY & METHOD
	--Break--			
	10:30 – 12:00	Session 10. STEAM ENGINES	Session 11. MINING II	Session 12. IA SOFT-WARE
	--Lunch--			
	1:30 – 3:00	Session 13. MILL PROJECTS		Session 14. INDUSTRIAL HOUSE