The Huntington Library's Civil Engineering Treasures and the Trent Dames Fund for the Heritage of Civil Engineering

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Introduction

The Huntington, long known as one the world's great research centers for history and literature, is also a superb location for the study of the history of civil engineering, particularly in the American and British contexts. Given what a broad range of endeavor civil engineering encompasses, it is not hard to imagine that the Huntington would naturally contain much of interest in this field within its large holdings. The realm of railroads alone make civil engineering a viable structure for scholarship, given the especially rich nature of our holdings on the Southern Pacific and the Pacific Electric. Henry Huntington's uncle Collis was one of the Big Four of railroading fame, and Henry Huntington started the Pacific Electric rail system, the largest interurban transportation system in the world by the 1930s. By focusing not just on the history of civil engineering *per se*, but also on its importance in social and cultural history, the significance of the Fund's activities is quite substantial. Henry Huntington collected widely and deeply in early history of science materials. Herbert Hoover, trained as a civil engineer, was also on the library's first Board of Trustees, and probably had some influence on Huntington's collecting sensibilities.

As a critical and invaluable adjunct to the library's existing holdings, the Huntington Fund for the Heritage of Civil Engineering was established in 1994 to enable the Huntington Library to be a pivotal research center in the study of the history of civil engineering and its social and cultural impact. The Fund was created through a generous gift of Trent R. Dames, co-founder of the international environmental and engineering consulting firm, Dames & Moore.

The Fund has a three-pronged mission:

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- To advance the collection, preservation, and access of civil engineering rare books, photographs, drawings, manuscripts, and other significant research material at the Huntington.
- To encourage research use of the Huntington's collections in order to further scholarship in the history of civil engineering and its social impact.
- To increase awareness and understanding of the history and heritage of civil engineering among scholars, civil engineers, and the general public.

The Fund acts as an endowment, the income of which allows the Library to support fellowships for scholars studying the history and impact of civil engineering, to hold various lectures and conferences as well as develop exhibits that promote an understanding of the role and impact of civil engineering, and to preserve and catalog historical civil engineering collections obtained by the Library. An Advisory Board of civil engineers and historians of engineering was established in 1995, and the activities of the Fund for Civil Engineering are managed by the Huntington's Curator for the History of Science, Technology and Transportation.

Civil Engineering History Fellowships

The Fund for the Heritage of Civil Engineering supports a number of fellowships for work in the history of civil engineering. Grantees will be expected to spend their fellowship period in residence at the Huntington working primarily with the Huntington's collections but also using other local archives as appropriate. The fellowship period is usually one month, but significant projects can take up to three months. The history of civil engineering is considered to encompass all traditional areas of the discipline including those dealing with, but not limited to, construction, transportation, hydraulic engineering, power, and public health. Applications for historical research in the cultural and social impact of civil engineering projects are also encouraged. To apply for the Civil Engineering History fellowships, follow the standard procedure for Huntington fellowships and indicate in your cover letter that you wish to be considered for a Civil Engineering History Fellowship. If you need the latest information on how to apply for a Huntington fellowship, you can find it on our Web site or can contact the Huntington's Research Division Office.

Research at the Huntington Library

The Library is part of the Huntington Library, Art Collections, and Botanical Gardens, which includes 130 acres of botanical gardens and two art galleries with notable collections of American and British art. The Huntington is located in San Marino, California, adjacent to Pasadena and one mile from the California Institute of Technology. An average of about 70 scholars work in the Library each day; about

2,000 scholars work in the Library each year. Visiting scholars ("Readers") have the chance to discuss matters of mutual interest with staff members or with other readers, particularly in the "Footnote" lounge, outside by the coffee cart, or in the gardens at the Rose Garden Cafe. More information on registering as a reader at the Huntington can be obtained by writing to our Reader Services Department or by examining our Web site (www.huntington.org). The Reader Services Department will also assist visiting scholars with finding suitable housing during their stay.

A Summary of the strengths of the Huntington's civil engineering materials:

Early printed works

The Huntington, long known as a great research center for history and literature, is also a superb location for the study of the history of civil engineering, particularly in the American and British contexts. The Huntington's collection of early printed books contains a number of titles related to engineering and technology, including works by Roberto Valturio (*De Re Militari*, 1472), Vitruvius Pollio (*De Architectura*, 1495 and subsequent editions), Georgius Agricola (*De Re Metallica*, 1556), Agostino Ramelli (*Le Diverse et Artificiose Machine*, 1588), Domenico Fontana (*Della Trasportatione dell'Obelisco Vaticano*, 1590), Giovanni Branca (*Le Machine*, 1629) and Giovanni Battista Piranesi (*Le Antichità Romane*, 1756). The rare book collection also includes many works relating to early English and American surveying and to the construction of British and American transportation systems including classics such as Nicholas Wood's *Practical Treatise on Rail-Roads* of 1825.

Early English and American surveying books and manuscripts

The Library's early English book collection includes most of the key initial works dealing with land surveying and surveyors' practices. Researchers interested in the history of the art are well aware of the collection, and we occasionally have professional surveyors who come to examine the books. They are particularly relevant to the Huntington because they document how the British oversaw and managed their own lands and those of the ever-expanding American colonies. These are several examples: Leonard Digges, A geometrical and practical treatise named pantometria, 1591. Henry Briggs, *Logarithmicall arithmetike*, 1631. John Norden, *The surveyors dialogue*, 1607. John Napier, *Mirifici logarithmus*, 1607.

The Library also has a number of early surveying items in manuscript of great significance. Foremost among these are more than a dozen of George Washington's original surveys of eastern lands, drafted in his hand. Included in this group is Washington's own large survey drawing of Mt. Vernon and the "Five Farms."

18th-19th-century American and English engineering materials

The engineering advancements in this period played no small part in propelling the Industrial Revolution. John Smeaton (1724-1792), the first to call himself a civil engineer, and others led the way with the rebuilding and construction of British and American transportation systems--roads, canals, tunnels, harbors, bridges, etc.--and the redesign of more efficient hydraulic/steam power systems. The Huntington's collection is rich but spotty. We have a good collection of Smeaton's publications and a variety of materials related to fen drainage, canal companies, sanitation, bridge building, city planning, and other fields where civil engineering has played a big part. Huntington printed engineering materials in this period deal less with the technological advancement of civil engineering and more with its social and economic impact. This area of collecting is one we would hope to greatly expand once we have better assessed the strengths and weaknesses within our collections.

Maritime technology and engineering

In 1986 Professor John Haskell Kemble of Pomona College gave to the Huntington one of the great private collections related to maritime history including ship design and construction. The Kemble Collection has, for example, original 19th-century ship engineering drawings, coastal surveys, publications of the shipbuilding industry, many books dealing with the world's harbors, and technical studies on ship construction. The collection also includes much of Kemble's early correspondence and drafts in manuscript of his books on a transisthmian canal route. Professor Kemble died in 1990, and in his estate he provided for funds to acquire books to supplement his collection and to bring scholars to the Huntington. We are still in the process of cataloging his collection. The first Kemble Lecture dedicated to maritime history was given in November 1993.

19th-20th century railroad books and records

This is one of the areas where the Library holds major collections that are frequently consulted. Because of Henry E. Huntington's involvement in the Pacific Electric and Los Angeles Railway system we have his personal and business papers as well as Pacific Electric engineering records, which recently were donated by the Southern Pacific Company. The engineering records include valuations, maps, bridge designs, and station drawings. The Southern Pacific also has given us the engineering files for

its Southern District, which is a major source for the study of how railroad civil engineers from 1867 to 1940 built and transformed transportation in the American Southwest. The Library's printed collections and map files also document early railroads in Britain (1840-1870), eastern American railroads before the Civil War, railroads in the American Civil War, the railroad surveys of the trans-Mississippi West, the building of the transcontinental routes, the selling of the American West to tourists and settlers, and the major railroads of California, Arizona, and Nevada.

Historical photograph collection

The Photo Archive at the Library contains approximately 250,000 prints and negatives which deal primarily with the history and growth of the American West with an emphasis on Southern California. The images are used for research by historians, in historical publications, and more frequently in documentary television and video tapes. Because the Archive concentrates on the settlement, building, and commercial growth of the West, many of the photographs visually chronicle the influence of civil engineering and important engineering projects in this region. The themes that are predominant in the history of the American West deal directly with engineering issues--transportation, mining, water and its transport, agriculture, and the growth of residential and manufacturing centers. These are well-documented in the Photo Archive.

California and the American West: mining, geology, architecture, and civil engineering papers

For research potential in the field of civil engineering, the papers of engineers who worked in California and the West are the most significant of all the Huntington's engineering holdings. But there are other related collections that should be noted. Because of the influence of Rodman Paul of Caltech and probably President Herbert Hoover, who once sat on the Huntington's Board of Trustees, the Library can claim to be one of the largest depositories of materials related to mining and exploratory geology in the United States. For example, Professor Paul brought the papers of geologist James D. Hague to the Library. This collection included the notebooks of Clarence King, famed geologist and surveyor for the U.S. Geological Survey. In the Manuscripts Department are papers and records related to virtually every mining district in the West. In lesser number but still of no little importance are papers related to petroleum engineering and the oil industry. In 1978 at the prodding and with the guidance of the University of Southern California School of Architecture we began to collect papers and drawings of major Southern California architectural offices. Thus

far we have saved the files of the office of Morgan, Walls, and Clements; Wallace Neff; Sam Lunden; James Dolena; and others. These archives have been consulted frequently by restoration architects, historians, and engineers building the Metro Rail. Despite the fact that the Huntington is not an engineering library (but more broadly a center for the study of British and American history and literature), it has accumulated an amazing selection of papers of influential engineers. The following list gives an idea of the breadth and scope of the Huntington's holdings. The list does not reflect one of the most fascinating civil engineering projects in the American West -- the building of the Colorado River aqueducts, particularly the Colorado River-Los Angeles Gravity Flow Aqueduct.

OTHER KEY MANUSCRIPT COLLECTIONS AT THE HUNTINGTON LIBRARY DEALING WITH CIVIL ENGINEERING AND RELATED FIELDS:

JOHN HENRY DOCKWEILER COLLECTION: This small but important collection (69 pieces) relates to the work of Dockweiler (1864-1930<). Dockweiler was a civil engineer who was employed in the office of Los Angeles City Surveyor on railroad surveys from 1880 to 1887. He served as Los Angeles City Engineer for three terms (1891-1899) and in this position was instrumental in the development of the Los Angeles water-supply system. From 1899 to 1904 Dockweiler was a consultant in engineering, water projects, and the investigation of Western mining properties. From 1904 to 1916 he was a consulting engineer for the cities of San Francisco and Oakland but by 1925 had returned to Southern California and continued consulting on irrigation and other engineering projects.

ALBERT BACON FALL COLLECTION: Fall (1861-1944) was a senator from New Mexico (1912-1921) and secretary of the interior (1921-1923) under President Harding. As secretary of the interior, Fall concentrated his efforts on problems relating to the development of the nation's resources. Important issues included the building of Boulder Dam (now Hoover Dam) and various reclamation projects (including the Colorado River Project and Elephant Butte Dam). (Approximately 55,000 pieces).

REGINALDO FRANCISCO DEL VALLE COLLECTION: Valle (1854-1938), a legislator and civic leader, was a director of the Metropolitan Water District of Southern California (1927-1929). The collection contains materials relating to California water resources, the Owens Valley, and the St. Francis Dam disaster. (371 pieces.)

FRANK HINCKLEY COLLECTION: Hinckley (1838-1890) began work as a civil engineer for the government in San Francisco in 1863. He then served as a surveyor for the Western Pacific Railroad in and around the Bay Area until 1872. (221 pieces.)

MILO HOADLEY COLLECTION: Hoadley (1809-1887) served as assistant and deputy county surveyor and was elected state surveyor general in 1851. Hoadley was involved in negotiations for the water supply of the city of San Francisco, served as president of the San Francisco City Board of Civil Engineers (1862-1863), and later practiced privately as a civil engineer. (65 pieces.)

EUGENE CLYDE LARUE COLLECTION: LaRue (1879-1947) was employed by the U.S. Geological Survey making field examinations for power sites and reporting on irrigation projects, first as district engineer for the Great Basin District headquartered in Salt Lake City (1907-1911), and then in the Water Resources Branch (1911-1927). After this time LaRue entered a private civil engineering partnership in Los Angeles. Some of the projects in which he was involved include the Colorado River-Los Angeles Gravity Flow Aqueduct, the Klamath Lake Project in Oregon, the Merced Irrigation District in California, and the San Juan River, Little Colorado, and Verde Projects in Arizona. (2,543 pieces.)

SAMUEL BROOKS MORRIS COLLECTION: Morris (1890-1962) served as Chief Engineer for the Pasadena Water Department from 1913 to 1935. While at the Pasadena Water Department he designed and built the Pine Canyon Dam that was later renamed in his honor as Morris Dam. In September 1935 he became a professor in the Engineering Department of Stanford University. Morris was then appointed the General Manager and Chief Engineer of the Los Angeles Department of Water and Power in 1944, remaining in that position until his retirement in 1955. He also engaged widely in consulting activities for other organizations throughout his professional career. (Approximately 20,000 pieces.)

WILLIAM MOORE COLLECTION: Moore (1827-1891<), Los Angeles surveyor, worked for the Los Angeles city surveyor's office with George Hansen in the 1850s. Moore served as Los Angeles county surveyor and as Los Angeles city surveyor. Moore was given a contract in 1878 to build a tunnel in central Los Angeles to supply irrigation water (the tunnel was never built). (Approximately 100 pieces.)

CHARLES F. AND ISAAC B. POTTER COLLECTION: The Potter brothers were lawyers with offices in Los Angeles and San Francisco. Their clients included water and power companies in the southwestern U.S. The collection contains many engineering reports, agreements, and surveys for California, Nevada, and Arizona, mainly related to water and power. (Approximately 5,000 pieces.)

RAILROAD (INTERNATIONAL) COLLECTION: This collection consists of material pertaining to various railroads, especially Australian and British. It includes material on the activities of the civil engineer Isambard Kingdom Brunel from 1842 to 1851; the civil engineer Thomas Sopwith's work on railroads from about 1835 to about 1870; bridges and other structures planned for London and Birmingham

Railway by the civil engineer Robert Stephenson; the building of a bridge over the Seine at Maisons for the Paris and Rouen Railway. (Approximately 40 pieces, primarily consisting of large bound manuscript volumes).

HENRY HARBISON SINCLAIR COLLECTION: Sinclair (d. 1914), a hydro-electrical engineer, was instrumental in the development of hydro-electric power in Southern California and helped organize the Redlands Electric Light and Power Company, which was franchised in 1892. He later became director of the California Power Company (formed to build an electric plant on the Kern River), general manager of the Edison Electric Company, and a director of the Southern California Edison Company and various other corporations. (Approximately 1,300 pieces.)

SOLANO-REEVE COLLECTION: Alfred Solano became associated with George Hansen, assisting him in the making of surveys of various tracts in Los Angeles County and in other parts of Southern California. Hansen's records were left to Solano and form part of this collection. (Approximately 1,400 pieces, primarily consisting of maps and surveys made by Hansen, Solano and others of the city of Los Angeles.)

NATHAN W. STOWELL COLLECTION: Stowell (most active between 1903 and 1906) was associated with the hydro-electrical engineer George Chaffey in land and water development in the Cucamonga area and in the Imperial Valley. Stowell was vice-president of the California Development Company and president of the Imperial Water Company Number 1 in 1902. Both companies were involved in the development of the Imperial Valley Irrigation Project. (Approximately 150 pieces.)

GEORGE CLINTON WARD COLLECTION: Ward (1863-1933) began his career in railroad engineering and in 1905 became general manager (GM) for the Huntington Land and Improvement Company. He was later GM for the Pacific Light and Power Company, where he was in charge of the Big Creek hydro-electric generating project. He was made vice-president of the Southern California Edison Company in 1917 and president in 1932. (Approximately 680 pieces.)

For more information on the Fund's activities and on the Huntington's civil engineering holdings generally, including new acquisitions, contact Dan Lewis at the address noted on the first page of this paper.