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BIOGRAPHICAL MEMOIR

OF

RALPH MODJESKI

1861-1940

BY

W. F. DURAND

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PRESENTED TO THE ACADEMY AT THE AUTUMN MEETING, 1944

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## RALPH MODJESKI

1861-1940

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Ralph Modjeski was born in Cracow, Poland, January 27, 1861, son of Gustav Sinnmayer Modrzejewski and the renowned actress Mme. Helena Opid Modrzejewska. For purposes of American citizenship, the Polish form of the name was later changed to Modjeski (feminine form Modjeska).

There is little information available for the period of his early boyhood. From his own lips we have an account of an adventure with a screwdriver at the age of four years. (See later in connection with the "Washington Award.") Likewise, in his own personal statements and at several points in his mother's *Memories and Impressions*<sup>1</sup> there are references to his living with his grandmother in Cracow for attendance in that city at schools presumably corresponding to our grammar and high school grades.

During these years, 1861-76, his mother was for most of the time occupied with her theatrical engagements. Making her debut in 1861 in Bochnia, some fifty miles east of Cracow, in a benefit performance in aid of sufferers from a mine accident, she was soon the leading lady of a stock traveling dramatic company under the management of her husband. This led later to a life contract with the Warsaw Imperial Theatre, supplemented by incidental theatrical tours in other parts of Poland. During these years life in Poland, torn as it was politically, economically, and socially between Russia, Germany, and Austria, presented many difficulties and much unrest.

In view of these conditions and stimulated by glowing accounts of life in the new world to the west, especially in California, thoughts of the family began to turn to the question of a trip to the United States, at first considered only as a vacation from the exacting roles of the mother at the Imperial

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<sup>1</sup> Macmillan & Co., New York, 1910.

Warsaw Theatre. Thus in her *Memories and Impressions*, referring to the Christmas season of 1875, she says:

“Then one morning during the Christmas holidays my son Rudolphe<sup>2</sup>, whom I had sent to Cracow with my mother in order to place him in a Polish school, came to Warsaw to spend his short vacation with us. He was even then determined to become a civil engineer. The first thing he spoke of was the coming Exposition in America (Centennial 1876), and the lad, looking at maps, declared that some day he would build the Panama Canal.”

This is of interest as showing that even at the age of fourteen years he had set the goal for his life work, although from other evidence it is known that music and a career as a professional musician formed a very strong rival attraction.

Enthusiasm and plans for the trip to the New World grew apace and soon took a definite form. Speaking of her son's keen desire to visit the United States, his mother, in her *Memories and Impressions*, says:

“Rudolphe adored traveling, as all boys do, but little he knew, when he expressed his wish and we half consented to it, what an enormous stride we were undertaking and what effect this little intimate talk was to produce on our lives, on his career and mine. He is now one of the successful civil engineers and bridge builders in America (written about 1908). Even then, in his boyhood, I was proud of him, and I had so much confidence in him that everything he desired seemed reasonable.”

At about the same time, writing to her brother, referring to Rudolphe, she says:<sup>3</sup>

“ \* \* \* he takes at present piano lessons from Mr. Hofmann, and in seven lessons he learned four of Kohler's études by heart and almost the entire sixth sonata of Mozart. Besides this, he studies shorthand writing, languages, takes gymnastic exercises and horseback riding. With all these extra instructions he is always the first in his class and wonderfully strong in mathematics.”

Then finally, with plans matured, a party comprising Mme. Modjeska, her husband and son, with five other young Poles,

<sup>2</sup> See later regarding change of name.

<sup>3</sup> *Memories and Impressions*, p. 246.

sailed in July of 1876 for New York, and after a brief stay for a visit to the Exposition in Philadelphia, pushed on via the Isthmus and by steamer from Panama to San Francisco, and thence to Anaheim in the southern part of California. There a ranch was purchased and plans for orange culture were made. Orange culture in practice, however, proved somewhat different from the anticipation, and the situation shortly resolved itself by the mother and son taking up residence in San Francisco, with the husband (stepfather of Rudolphe) alternating between Anaheim and San Francisco as conditions permitted or required.

It was during this period that the changes in the form of the names, earlier referred to, were brought about. In the case of the mother the change resulted from the objections of the celebrated actor John McCullough, at that time lessee of the California Theatre, San Francisco, to the full Polish form. At that time Madame Modjeska was about to make her American debut in that theatre, and the question of her name in the billing naturally arose. Mr. McCullough objected that the full Polish form would be unpronounceable by an English language tongue. Finally, by the omission of several letters, the Polish form was reduced to Modjeska as an acceptable substitute. It is also of interest to note that her son was first named Rudolphe and is frequently referred to under this name in her *Memories and Impressions*. Thus, relative to the period of their life in San Francisco just previous to the change in her own name, she says, referring to a short absence of her husband from home:

“He left me my son Rudolphe, who became at once my fellow student (English language). He then changed, with our approval, his name to that of Ralph, because, he said, Americans do not like long foreign names.”

Thus, finally, Rudolphe Modrzejewski became Ralph Modjeski.

For about two years of this period of life in San Francisco, young Modjeski attended night school and then returned to Paris to complete his preparation for entrance to the *École des*

Ponts et Chaussées. This marked the turning point in his life. Essentially of an artistic temperament, he had been strongly attracted for a career, to music as well as to engineering and had debated with himself as to which line he should follow for his life work. In fact, when the family came to the United States there was still some thought that he might continue to follow this artistic urge through the medium of the piano, especially as an exponent of Chopin. At one point in her *Memories and Impressions*, his mother speaks of his playing Chopin's nocturnes at home while she, herself, was busy studying her English parts in anticipation of an engagement at the California Theatre in San Francisco. For a career in music he had been competently trained in Poland under Casimir Hofmann, son of the renowned Josef Hofmann, and had also at one time been a fellow student with his later illustrious compatriot Ignace Paderewski. Engineering, however, finally won the day, possibly at a loss to the world of a rival of his great Polish fellow countryman.

Thus finally, with the decision for a career in favor of engineering, he entered the *École des Ponts et Chaussées* in 1881 and graduated in 1885, leading his class, with the degree of Civil Engineer. Shortly after, he returned to the United States, probably with a better educational equipment for a career in engineering than could have been obtained in this country at that time. His first connection was with George S. Morison, the leading bridge builder of his day, and this first contact, extending till 1892, determined the direction taken by his later professional life. His first work with Mr. Morison was in connection with the construction of the Union Pacific Railroad bridge over the Missouri River at Omaha. Following this, 1887 to 1889, he took a turn at mill and shop inspection, followed by design work in the drafting room from 1889 to 1891, where, becoming chief draftsman, he supervised the design of the bridge across the Mississippi River at Memphis, Tennessee, and from 1891 to 1892 served as inspector of work in the shops and as assistant engineer of construction for the superstructure of this bridge.

Ambitious, and with his creative spirit seeking opportunity for more independent expression, Modjeski, as senior member of the firm of Modjeski and Nickerson, next opened a consulting and designing office in Chicago in 1893. The partnership, occupied with small projects, only lasted for a year and was then dissolved. In 1894 Modjeski received his first major project, the design and construction of a seven-span railway and highway bridge over the Mississippi River at Rock Island, Illinois. This bridge was built jointly by the Rock Island Railroad and the United States Government. A little later he developed a set of standard designs for steel bridges for the Northern Pacific Railroad, which remained effective for many years. From the date of this project on for forty-seven years, until his death in 1940, he held to the same specialized line of bridge design and construction, with a prodigious output of work, an output which has spread his name and fame, in this domain of engineering, broadcast over the country from the Atlantic to the Pacific.

The aggregate of this work is very great. The principal items, as a matter of record, are given in collected form as an appendix to this biographical sketch. Some of the more outstanding of these, however, deserve special note.

One of the most important of Modjeski's professional experiences was his collaboration with the late Alfred Noble, a past president of the American Society of Civil Engineers and an acknowledged leader in the United States in the field of bridge engineering. Long a friend of Mr. Noble, they joined forces in 1902 in a form of partnership. While working under this partnership Mr. Modjeski was appointed by the Southern Illinois and Missouri Bridge Company as chief engineer for the double-track railway bridge over the Mississippi River at Thebes, Illinois, and this was but the beginning of a long series of like important appointments.

In 1905, he served as chief engineer of reconstruction of the single-track railway bridge over the Missouri River at Bismarck, North Dakota, for the Northern Pacific Railway Company, and also in like capacity for new double-track rail-

way bridges in Portland, Oregon, over the Columbia and Willamette Rivers, these latter being also known under the name of the Vancouver-Portland Bridges. Then in 1906, he served in the same capacity for a new single-track electric railway bridge over the Illinois River at Peoria, Illinois, for the Central Illinois Construction Company. His next important work was the construction of a double-track railway and highway bridge over the Mississippi River at St. Louis, Missouri, known as the McKinley Bridge.

In 1907, the serious failure of the Quebec Bridge, over the St. Lawrence River about nine miles west of Quebec while still in construction, attracted world-wide attention. In 1908, the Dominion authorities appointed a three-man commission to advise regarding the redesign and reconstruction of this great project. Mr. Modjeski was named a member of this commission, representing American engineers, and served in this capacity until the final completion of the bridge in 1918. This bridge, at the time of its design and construction, was and still remains the longest cantilever bridge ever built.

During the span of years 1905-1915, Mr. Modjeski was the chief engineer for a series of bridges for the Oregon Trunk Railway Company between Celilo and Bend, Oregon. These included a single-track railway bridge over the Columbia River at Celilo and the notable 340-foot, two hinged arch spanning the Crooked River at a height of 350 feet above the stream. In 1910, he was also engaged by the City of Portland, Oregon, as chief engineer for the Broadway Bridge over the Willamette River. This structure was a double-track electric railway bridge, including a bascule span with roadways and sidewalks.

Sometime previous to 1912, plans for the bridge over the Maumee River at Toledo, Ohio, known as the Cherry Street Highway Bridge, had been prepared but not executed. Finally, in that year, Mr. Modjeski was engaged to redesign and construct this bridge. This was the first of a later notable series of concrete arch bridges designed by him.

In 1914, he was the designing and supervising engineer for



the construction of the Harahan Bridge, a double-track railway structure over the Mississippi River at Memphis, Tennessee, while at the same time he carried on the construction of a double-deck, single-track railway and highway bridge over the Mississippi River at Keokuk, Iowa.

His next work of importance was as consulting engineer in the preparation of the design for a double-track railway bridge over the Ohio River at Metropolis, Illinois. In this project he worked with the late C. H. Cartlidge and after the death of the latter was made chief engineer of the project. During this same period, two other projects of considerable magnitude were carried on. These were a double-track railway bridge over the Thames River at New London, Connecticut, and the other the reinforcement and the general reconstruction of the Poughkeepsie (N. Y.) railway bridge over the Hudson River.

In 1922, he served as the engineer of design and later as the consulting engineer of construction for the United States Government on the Tanana River Bridge in Alaska—a single-track railway bridge.

During the four years 1920-24, he also carried on the rebuilding of two bridges under traffic. One of these was the double-track electric railway and highway bridge with sidewalks, over the Ohio River at Cincinnati, and the other, the double-track electric and highway bridge over the Missouri River at Omaha, Nebraska. Following these projects, he was engaged as consulting engineer for the reinforcement of the cantilever span of the Columbia River bridge at Wenatchee, Washington.

During the period from 1923 to his death, Mr. Modjeski associated himself with a number of leading engineers, specialists in bridge design and construction. Thus in 1923, he formed a partnership with Frank M. Masters, to which was later added Clement E. Chase, and upon the death of the latter in 1933, his place was taken by Montgomery B. Case.

In connection with these partnerships, it is to be noted that following his connections with Mr. Morison, as noted earlier,

his more intimate business associations were made with members of his staff, younger men who had been trained up in the professional and technical atmosphere of his own office. Thus with Mr. Masters, Mr. Chase and Mr. Case, they were all former employees of Mr. Modjeski, and as time went on and opportunity served, they were taken into the partnership relation. This illustrates the human side of Mr. Modjeski's character and his interest in the advancement of the young men in his professional family. In addition to these more intimate business associations, Mr. Modjeski from time to time entered into temporary business relations with other eminent engineers for the study of special problems and the development of special designs. Thus at about this time he was associated with Mr. Daniel E. Moran, an eminent specialist in substructure and foundation engineering. This period (1923-1940) was one of prodigious output by Mr. Modjeski and his associates. Only the more important need be noted here.

As early as 1920, Mr. Modjeski together with George S. Webster and Laurence A. Ball had been selected by the Delaware River Joint Commission to form a Board of Engineers for the preparation of plans and estimates for the Delaware River Bridge at Philadelphia. The report of the Board was submitted to the Commission the following year and Mr. Modjeski was retained as chief engineer of the Commission, serving in this capacity during the period of construction and until the opening of the bridge to traffic on July 1, 1926. This bridge was Mr. Modjeski's largest and presumably most important single project, carried through primarily on his own responsibility as to engineering features and with the collaboration of the eminent architect Dr. Paul Cret, on architectural design and details. A notable feature in connection with this project is the fact that the date of actual opening to traffic was three days ahead of the date set by Mr. Modjeski in the preliminary report on the project. Also, at the time of its completion in 1926, this bridge had the longest suspension span ever built—1750 feet with a total length of bridge of 9570 feet.

During the period 1927-1929, four bridges of some note were built: a highway bridge over the Delaware River between Tacony, Pennsylvania, and Palmyra, New Jersey; the Ambassador Bridge crossing the Detroit River between Detroit, Michigan, and Sandwich, Ontario; a single-track railway bridge for the Texas and Pacific Railway Company over the Atchafalaya River at Melville, Louisiana; and a cantilever highway bridge over the Ohio River between Louisville, Kentucky, and Jeffersonville, Indiana. During the same general period Mr. Modjeski and his associates, together with Mr. Moran, designed and erected the Mid-Hudson Bridge at Poughkeepsie, New York, for the State of New York. This structure has been specially noted for the harmony of its Gothic design.

Then followed a wide variety of projects of varying magnitude and importance, spread wide over the country from Philadelphia, Pennsylvania, to Portland, Oregon, and from the Ohio River bordering Indiana to the Mississippi River at New Orleans. The latter structure (The Huey P. Long Bridge) deserves more than a mere mention of the name. The project had been under consideration and study over a long period of years. The foundation conditions under the Mississippi River at New Orleans had been considered as almost or quite beyond the reach of successful engineering treatment. Finally the problem was brought to Mr. Modjeski, studies were made and designs were prepared, but there was long delay in financing the project and the advancing years and failing health of Mr. Modjeski prevented him from taking as active a part in the work as was his normal habit. However, his engineering concept of the type of structure suitable for this most difficult river crossing was correct, was carried to a successful conclusion, and still stands as an example of a brilliant piece of engineering design and construction carried through under especially difficult conditions.

Mr. Modjeski's professional life was chiefly notable for the design and construction of large bridges. At the same time he was often called in as a consultant on projects with which his name may have had no official connection. Thus, in 1916 he was

appointed by the Public Service Corporation of New Jersey a member of a commission of three to report on the feasibility of a vehicular tunnel under the Hudson River, including preliminary plans and estimates; and again in 1925 he was engaged by the Western Electric Company to examine and check plans and specifications for their various industrial buildings. In 1909 in New York City he was called on to review and report on the design and construction of the Manhattan Suspension Bridge between Manhattan and Brooklyn, and also as supervising engineer for a part of the construction. Also, he was called on for a report on the contract plans and specifications for the major part of the Tri-borough Bridge over the East River, and report was made during the years 1930-1934. Still later, in 1935, he made a report to the Union of Soviet Socialist Republics on plans for the projected Palace of the Soviets in Moscow.

The last and the largest bridge project with which Mr. Modjeski was associated was the San Francisco-Oakland Bay Bridge. He was appointed in 1931, Chairman of a Board of Consulting Engineers for this undertaking, the longest major highway and electric railway bridge in the world, extending with its approaches over a length of eight and one-quarter miles. It was in Mr. Modjeski's office and under his guidance and inspiration that the preliminary plans were developed, including the adopted plan for the central concrete tower anchorage between the two suspension spans for the west bay crossing. Because of failing health, he was forced to make his permanent home in California from 1936 in order that he might be near the work on this great project. Due to increasing weakness, however, he was forced to become comparatively inactive during the last years of his life which came to an end June 26, 1940.

Thus passed a great engineer, a pronounced positive personality with a well deserved reputation as one among the greatest of the world's leading bridge engineers.

Mr. Modjeski's writings for publication were limited to numerous papers and reports on various phases of bridge en-

gineering, a list of the more important of which is given in the bibliography at the end of this memoir.

Reference has been made earlier to the rivalry between music and engineering as a career for Mr. Modjeski, and while engineering won out in the end, music still held for him an important place in his life. In spite of his intense absorption in his professional work, he found time to keep up his piano practice nearly every evening, and often for several hours on Sundays. The combination of a brilliant engineer with music on a professional plane is surely unique in the United States.

In personal character Mr. Modjeski was inclined to be reserved rather than expansive and did not readily make close friendships. Nevertheless, he did take a generous and deep interest in his associates and in the members of the engineering profession broadly. The existence of the Engineers Club of Chicago is attributed to his initiative resulting from his interest in engineering activities, his fellow engineers and their welfare.

An intimate personal friend of long standing has been quoted as saying that to understand him it must be appreciated that he inherited the temperament of an artist—not the artistic bias which is sometimes urged as the excuse for irrational behavior, but the delicate intuitive perception which insures balanced good taste and harmony in its outward expression, whether in music, art, architecture or engineering structures. In his professional work Mr. Modjeski always insisted on simplicity of treatment, with emphasis on function and purpose.

In this connection, the author of the biographical sketch prepared for the occasion of the award to Mr. Modjeski of the John Fritz Medal says: "Mr. Modjeski's engineering designs are characterized by sincerity, which is the basis of true art. The gracefully sweeping lines of the Delaware Bridge, the Gothic treatment of the Poughkeepsie Suspension Bridge towers demonstrate the beauty which is inherent in steel construction, when freed from attempts at embellishment or concealment by means of masonry and concrete. His work will serve to lead others away from ill-considered attempts to adapt architectural tradition blindly to the treatment of steel struc-

tures without recognizing the fundamental artistic values arising from straightforward expression of the action of forces and the manner of their resistance.”

Mr. Modjeski's professional work has received notable recognition throughout the engineering world by way of honorary degrees, medals and prizes. Three times he received the honorary degree of Doctor of Engineering—in 1911, from the University of Illinois at Urbana, Illinois; in 1927, from the Pennsylvania Military College at Chester, Pennsylvania; and in 1931, from the Polytechnic Institute of Lwow, Poland; also, in 1931, the Washington Award jointly by the Western Society of Engineers, the American Institute of Mining and Metallurgical Engineers, the American Society of Mechanical Engineers, and the American Institute of Electrical Engineers. In 1914, he received the Howard N. Potts Gold Medal; in 1922, the Franklin Medal; in 1924, the John Scott Medal (Franklin Institute); and in 1930, the John Fritz Medal.

Then in 1930, he was the recipient of two honors, the Grand Prize by the Polish Government at the Exposition of Industry and Science at Posen, Poland, and selection as a representative of the United States at the World Engineering Congress in Japan.

In 1926, the Republic of France made him a Knight of the Legion of Honor—a recognition in which he modestly but properly took great satisfaction.

On the occasion of the Washington Award in 1931, Mr. Modjeski made a brief acknowledgment which may be quoted here in full as giving his own statement of some features of his early life and of the conditions which led to the choice of engineering for his life work.

“Mr. President, Mr. Chairman, Ladies and Gentlemen: It is not fitting on this great occasion to speak very much about myself. I will only add to the brief outline that the Chairman has given of my life by saying how I became an engineer and why.

“When I was four years old I got hold of a screwdriver. This gave me an idea. I immediately investigated what this screwdriver was for and practiced on a door lock of the draw-

ing room of the house we lived in and took it all apart. I could not put it together again, and my father said, 'You will be an engineer.'

"I persisted in that until, as the Chairman said, I failed in the examination for entrance to the *École des Ponts et Chaussées*, where there were 25 places and 100 candidates. Then for about six months I practiced music six and eight hours a day. After six months I began to think, and at the end of nine months had thought out my problem and joined the preparatory school, then, three months later, I passed the examination into the *École des Ponts et Chaussées*.

"This is a great honor. I do not know how to express my gratitude to all the gentlemen who have awarded it to me. I prize it very highly; I prize it higher than any award I have received heretofore; and, ladies and gentlemen, I thank you."

Dr. Modjeski was naturalized an American citizen on August 7, 1887. He married first Felicie Benda on October 25, 1885, and following her death, Virginia Mary Giblyn, July 7, 1931. His children by the first marriage were: Felix Bozenta, Marylka Stuart, and Charles Emmanuel John.

He became during his lifetime a member of many technical and scientific societies, organizations and clubs. The more important of these are given in the Appendix. Of these various societies and organizations, the American Society of Civil Engineers represented his chief professional interest. Of this society he became a junior member December 1, 1886, an associate member July 1, 1891, and a member March 3, 1897, serving a term (1904-1906) as director or member of the governing body. In his earlier years with the society he contributed from time to time to its Proceedings by way of technical papers and discussions; but, with advancing years and more complete absorption in his consulting and field work, these contributions became less frequent.

Poland has given much to the world and much to the United States. From Kosciuszko on, down through the years, she has added to the debt we owe to her of genius and of service. The name of Ralph Modjeski takes its place properly on this scroll of honor.

APPENDICES \*

*I. Professional Papers and Reports Published By Ralph Modjeski*

REPORT on Reconstruction of Rock Island Bridge over Mississippi River  
     Western Society of Engineers.....1897

PAPER, •Erection of the Draw Span of the New Rock Island Bridge  
     Western Society of Engineers .....1897

PAPER, Northern Pacific Railroad Standard Bridge Plans  
     Western Society of Engineers.....1901

REPORT to the Mayor and City Council with Plans and Estimates  
     for the Proposed Bridge across the Willamette River at Portland,  
     Oregon .....1908

PAPER, The Celilo Bridge over the Columbia River  
     Western Society of Engineers.....1912

REPORT to the Joint Pacific Highway, Columbia Bridge Committee  
     of Portland and Vancouver Commercial Clubs, for the Proposed  
     Bridge across the Columbia River between Portland, Oregon,  
     and Vancouver, Washington.....1912

SUPPLEMENTAL REPORT to the foregoing.....1913

PAPER, Design of Large Bridges with Special Reference to the  
     Quebec Bridge  
     Franklin Institute of the State of Pennsylvania.....1913

PAPER, The Harahan Bridge over the Mississippi River at Memphis,  
     Tennessee  
     Franklin Institute of the State of Pennsylvania.....1917

PAPER, The Metropolis Bridge over the Ohio River at Metropolis,  
     Illinois  
     Western Society of Engineers.....1918

The Delaware River Bridge  
     Journal of Western Society of Engineers.....1923

Special Problems in Bridge Design and Construction  
     *Aldred Lecture*, Massachusetts Institute of Technology.....1924

Unusual Problems in the Design and Construction of Large Bridges  
     Franklin Institute of the State of Pennsylvania  
     (Centenary Lecture) .....1925

PAPER, High Level Fixed Bridges over Navigable Waters  
     The American Association of Port Authorities.....1926

PAPER, Structural Steel and Reinforced Concrete in Engineering  
     American Institute of Steel Construction, Inc.....1927

PAPER, Suspension Bridges with Special Reference to the Philadelphia-  
     Camden Bridge, U.S.A.....1929  
     (World Engineering Congress, Japan)

\*The material for these appendices has been drawn from data which were furnished by Dr. Modjeski for the files of the National Academy of Sciences



II. *List of Memberships in Learned and Technical Societies*

American Association for the Advancement of Science.....	Fellow
American Institute of Architects.....	Member
American Institute of Consulting Engineers.....	Member and Past Member of Council
American Philosophical Society.....	Member
American Railway Engineering Association.....	Charter Member
American Society of Civil Engineers.....	Member and Past Director
American Society of French Legion of Honor.....	Member
American Society for Steel Treating.....	Member
American Society for Testing Materials.....	Member
Art Institute of Chicago.....	Life Member
Association of Engineers (Former Students of L'École des Ponts et Chaussées of France).....	Member
British Institution of Civil Engineers.....	Member
Engineering Institute of Canada.....	Member
Engineers Club of Philadelphia.....	Honorary Member
The Franklin Institute of the State of Pennsylvania...	Honorary Member
Metropolitan Museum of Art, New York City.....	Member
National Academy of Sciences.....	Member
New York State Society of Professional Engineers and Land Surveyors .....	Director
Polish Institute of Arts and Letters.....	Member
Princeton Engineering Association.....	Brackett Member
Western Society of Engineers.....	Past President and Honorary Member

*Clubs*

The Century Association of New York.....	Member
The Chicago Engineers' Club.....	Past President
Engineers' Club of New York.....	Member
Engineers' and Architects' Club, Louisville, Kentucky..	Honorary Member
Union League Club of Chicago.....	Member

III. *Chronological Record of Work*

- 1885- —After graduation came to America in early summer  
 First engagement, summer 1885 with Geo. S. Morison, C. E.,  
 as Assistant Engineer, Union Pacific Bridge, Omaha, Ne-  
 braska; Remained with Geo. S. Morison, C. E., from 1885  
 to 1892 in various capacities, as follows:
- 1885-1887—Assistant Engineer, Union Pacific Bridge, Omaha, Nebraska  
 1887-1889—Inspector in shops for bridge work, Athens, Pennsylvania  
 1889-1891—Chief Draftsman in office (during this time in charge of de-  
 sign of Mississippi River Bridge, Memphis, Tennessee)  
 1891-1892—Chief Inspector at shops for Memphis Bridge superstructure  
 1892 —Assistant Engineer of Construction, Memphis Bridge

- 1893 —Early in year, opened office in Chicago as Civil Engineer in independent practice.
- 1894-1895—Engaged by Chicago Rock Island and Pacific Railway Company to design a double track railway and highway bridge over Mississippi River at Rock Island, Illinois.
- 1894-1896—Chief Engineer of Construction of the above bridge for the Ordnance Department of the United States Army.
- 1898-1900—Prepared standard designs for steel bridges, (Spans 10 ft. to 250 ft. in length) for the Northern Pacific Railway Co.
- 1903 —Design and construction of fireproof warehouse for arsenal for the United States Government at Rock Island, Illinois
- 1902-1905—Thebes Bridge over Mississippi River, Thebes, Illinois. For the Southern Illinois and Missouri Bridge Company, new double track railway bridge, Chief Engineer (Built under firm name of Noble and Modjeski).
- 1905 —Bismarck Bridge over the Missouri River, Bismarck, North Dakota, for the Northern Pacific Railway Company, reconstruction of single track railway bridge, Chief Engineer.
- 1906 —Peoria Bridge over Illinois River, Peoria, Illinois, for the Central Illinois Construction Company (Illinois Traction System) new single track electric railway bridge, Chief Engineer.
- 1905-1908—Columbia River Bridge }  
 Willamette River Bridge } both in Portland, Oregon  
 Commonly called the Vancouver-Portland Bridges, between Vancouver, Washington and Portland, Oregon, for the Spokane, Portland and Seattle Railway Company, new double track railway bridges, Chief Engineer.
- 1907-1910—McKinley Bridge over Mississippi, St. Louis, Missouri, for the St. Louis Electric Bridge Company (Illinois Traction System) new double track railway and highway bridge, Chief Engineer.
- 1910-1911—Celilo Bridge over Columbia River, Celilo, Oregon, for the Oregon Trunk Railway Company, new single track railway bridge, Chief Engineer. Also, during this period all bridges for the Oregon Trunk Railway Company between Celilo and Bend, Oregon, including a 340 ft. arch over Crooked River.
- 1910-1912—Broadway Bridge over Willamette River, Portland, Oregon, for the city of Portland, Oregon, new double track electric railway bridge, including a bascule span, with roadways and sidewalks, Chief Engineer.
- 1912 —Cherry Street Bridge over Maumee River, Toledo, Ohio, for the city of Toledo, Ohio, new concrete arch structure for highway traffic (Plans previously prepared by other parties and redesigned by Chief Engineer), Chief Engineer.

RALPH MODJESKI—DURAND

- 1914-1916—Harahan Bridge over Mississippi River, Memphis, Tennessee, for the Arkansas and Memphis Railway Bridge and Terminal Company, new double track railway bridge with wagon roadways, Chief Engineer.
- 1914-1916—Keokuk Bridge over Mississippi River, Keokuk, Iowa, for the Keokuk and Hamilton Bridge Company, double deck single track railway and highway bridge. Reconstruction, Chief Engineer.
- 1917 —Metropolis Bridge over Ohio River, Metropolis, Illinois, for the Paducah and Illinois Railroad Company (Chicago, Burlington and Quincy Railroad Company), new double track railway bridge. Consulting Engineer in preparation of designs in conjunction with the late C. H. Cartlidge; after his death Chief Engineer of Construction.
- 1917 —Thames River Bridge over Thames River, New London, Connecticut, for the New York, New Haven & Hartford Railroad Company, new double track railway bridge, Chief Engineer.
- 1917 —Poughkeepsie Bridge over Hudson River, Poughkeepsie, New York, for the Central New England Railway Company (New York, New Haven and Hartford Railway Company), single track railway structure—extensively reinforced—Chief Engineer in charge of reinforcement.
- 1908-1918—Quebec Bridge over St. Lawrence River, Quebec, Canada, for the Dominion Government of Canada, new double track railway bridge. Member (since formation in 1908) of Board of Engineers appointed by the Dominion Government of Canada, as representing the engineers of the United States, for the reconstruction of Quebec Bridge (longest truss span in the world). Served until completion.
- 1920-1922—Cincinnati Bridge over Ohio River, Cincinnati, Ohio, for the (Cincinnati, New Orleans and Texas Pacific Railroad Company), the Cincinnati Southern Railway Company, double track railway bridge with sidewalks (Old bridge rebuilt under traffic without falsework) Chief Engineer.
- 1922 —Tanana River Bridge over Tanana River, Nenana, Alaska, for the United States Government, single track railway bridge, Engineer of Design and Consulting Engineer on construction.
- 1922-1924—Omaha Bridge over Missouri River, Omaha, Nebraska, for the Omaha and Council Bluffs Railway and Bridge Company, double track electric railway and highway bridge with sidewalks, rebuilt under traffic, Chief Engineer.

- 1923-1925—Clark's Ferry Bridge over the Susquehanna River near Harrisburg, Pennsylvania, for the Clark's Ferry Bridge Company, concrete arch highway bridge, Consulting Engineer (F. M. Masters, Chief Engineer).
- 1923-1928—Market Street Bridge, over Susquehanna River, Harrisburg, Pennsylvania, for the Harrisburg Bridge Company, stone-faced arch highway bridge (In partnership with F. M. Masters).
- 1925 —Columbia River Bridge over Columbia River, Wenatchee, Washington, for the Great Northern Railway Company, single track railway bridge—Reinforcing cantilever span, Consulting Engineer.
- 1921-1927—Delaware River Bridge over Delaware River between Philadelphia, Pennsylvania and Camden, New Jersey, for the commonwealth of New Jersey and the City of Philadelphia, new highway suspension bridge with rapid transit and footwalks, Chief Engineer and Chairman of the Board of Engineers.
- 1927-1929—Tacony-Palmyra Bridge over Delaware River, between Tacony (Philadelphia), Pennsylvania, and Palmyra, New Jersey, for Tacony-Palmyra Bridge Company, highway bridge, Chief Engineer (Partnership with Modjeski, Masters and Chase).
- 1927-1929—Ambassador Bridge over Detroit River between Detroit, Michigan and Sandwich, Ontario, Canada, for Detroit International Bridge Company, highway bridge, Consulting Engineer for Owners (In partnership with C. E. Chase).
- 1927-1929—Atchafalaya Bridge over Atchafalaya River, Melville, Louisiana, for Texas and Pacific Railway Company, single track railway bridge, Chief Engineer.
- 1928-1929—Louisville Bridge over Ohio River, between Louisville, Kentucky and Jeffersonville, Indiana, for the Louisville Bridge Commission, highway bridge, cantilever type (In partnership with F. M. Masters).
- 1923-1930—Mid-Hudson Bridge over Hudson River, Poughkeepsie, New York, for the State of New York, vehicular and foot bridge, suspension type (In partnership with D. E. Moran).
- 1927-1931—Henry Avenue Bridge over Reading Tracks, Philadelphia, Pennsylvania, for Department of Public Works, City of Philadelphia, Pennsylvania, highway bridge (In partnership with C. E. Chase).
- 1927-1932—Henry Avenue Bridge over Wissahickon Creek, Philadelphia, Pennsylvania for Department of Public Works, City of

- Philadelphia, Pennsylvania, stone and concrete arch highway bridge (In partnership with C. E. Chase).
- 1928-1931—Evansville Bridge over Ohio River at Evansville, Indiana, for Indiana State Highway Commission, cantilever highway bridge (In partnership with F. M. Masters).
- 1928-1931—Maysville Bridge over Ohio River at Maysville, Kentucky, for Kentucky State Highway Commission, highway suspension bridge (In partnership with F. M. Masters).
- 1929 —St. Charles Bridge over Wabash River, for Wabash Railway Company, Cantilever Bridge, Consulting Engineer.
- 1928-1931—Kentucky State Highway Bridges at Smithland over Cumberland River, Paducah, over Tennessee River (In partnership with F. M. Masters).
- 1931 —San Francisco-Oakland Bay Bridge (Trans Bay) for the State of California, highway bridge, Chairman, Board of Consulting Engineers.

*Also Consulting Engineer as Follows:*

- 1909 —Engaged by the City of New York as Consulting Engineer to report on design and construction, also to supervise part of the construction of the Manhattan Bridge, New York, N. Y.
- 1916 —Appointed by Public Service Corporation of New Jersey as Member of the Commission of three, to report on feasibility of a vehicular tunnel under Hudson River, including preliminary plans and estimates.
- 1925 —Engaged by the Western Electric Company to check plans, etc., for industrial buildings of their various plants.
- 1930 —Engaged by the City of New York Department of Plants and Structures to report on proposed contract plans and specifications of the Tri-Borough Bridge over the East River, New York, N. Y.