
CONNECTIONS

The EERI Oral History Series

**Henry J.
Brunnier**

**Charles
De Maria**

Frank Killinger
Stanley Scott
Interviewers

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Earthquake Engineering Research Institute

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The EERI Oral History Series

This is the eighth volume in *Connections: The EERI Oral History Series*. The Earthquake Engineering Research Institute initiated this series to preserve the recollections of some of those who have pioneered in earthquake engineering and seismic design. The field of earthquake engineering has undergone significant, even revolutionary, changes since individuals first began thinking about how to design structures that would survive earthquakes.

The engineers who led in making these changes and shaped seismic design theory and practice have fascinating stories. *Connections: The EERI Oral History Series* is a vehicle for transmitting their impressions and experiences, their reflections on the events and individuals that influenced their thinking, their ideas and theories, and their recollections of the ways in which they went about solving problems that advanced the practice of earthquake engineering. These reminiscences are themselves a vital contribution to our understanding of the development of seismic design and earthquake hazards reduction. The Earthquake Engineering Research Institute is proud to have part of that story be told in *Connections*.

The oral history interviews on which *Connections* is based were initiated and are being carried out by Stanley Scott, formerly a research political scientist at the Institute of Governmental Studies at the University of California at Berkeley. Scott has been active in and written on seismic safety policy and earthquake engineering for many years. A member of the Earthquake Engineering Research Institute since 1973, Scott was a commissioner on the California State Seismic Safety Commission for 18 years, from 1975 to 1993. In 1990, Scott received the Alfred E. Alquist Award from the Earthquake Safety Foundation.

Recognizing the historical importance of the work of California's earthquake engineers, Scott began recording oral history interviews with Henry Degenkolb in 1984. Their success let him to consider such interviews with other older engineers. He consulted Willa Baum, Directory of the University of California at Berkeley's Regional Oral History Office, a division of the Bancroft Library. Since its inception in 1954, the Regional Oral History Office has carried out and otherwise promoted oral history interviews on a wide range of major subject areas in science and technology, natural resources and the environment, politics and government, law and jurisprudence, and in many other areas. Scott was encouraged to proceed, and the Regional Oral History Office approved an unfunded interview project on earthquake engineering and seismic safety. Scott's subsequent interviews were begun while he was employed by the Institute of Governmental Studies at U.C. Berkeley.

Following his retirement from the University in 1989, Scott has continued to pursue the oral history project. For a time, some expenses were paid from a small grant from the National Science Foundation, but Scott has done most of the work pro bono.

Scott has attempted to include a selection of senior earthquake engineers who have been active observers of and participants in the earthquake safety effort. In addition, he has included nonengineering professionals in related fields (geology and geophysics) who have made significant contributions to the body of knowledge in earthquake engineering.

The Earthquake Engineering Research Institute learned of Scott’s interview series, and reviewed a number of the early interview transcripts. EERI’s interest in preserving these recollections led to publication of this Oral History Series.

The Earthquake Engineering Research Institute was established in 1949 as a membership organization to encourage research, investigate the effects of destructive earthquakes and the causes of building failures, and bring research scientists and practicing engineers together to solve challenging engineering problems through exchange of information, research results, and theories. In many ways, the development of seismic design is part of the history of EERI.

EERI Oral History Series

Henry J. Degenkolb	1994
John A. Blume	1994
Michael V. Pregnoff and John E. Rinne	1996
George W. Housner	1997
William W. Moore	1998
Robert E. Wallace	1999
Nicholas F. Forell	2000
Henry J. Brunnier and Charles De Maria	2001
Egor P. Popov	2001

Interviews completed or nearing completion include:

Clarence R. Allen	John F. (Jack) Meehan	Earl Schwartz
L. LeRoy Crandall	Joseph P. Nicoletti	George A. (Art) Sedgewick
Roy G. Johnston	Edward O'Connor	James Stratta
Ralph S. McLean	Clarkson W. Pinkham	William T. Wheeler



Foreword

In 1959, Henry Brunnier, an eminent San Francisco structural engineer, consented to several recorded biographical interview sessions with Frank Killinger, head of Hale's Testing Laboratory. Killinger and Brunnier were close personal friends and colleagues of longstanding. Brunnier was 77 years old at the time of the interviews. It is not known whether Killinger intended the interviews to become an oral history or whether he was simply aware that his friend had made engineering history during his lifetime and wanted to preserve some of it. The interviews are conversational, often without benefit of last names, dates, or explanations of who someone was or how they were related to the discussion. Both Killinger and Brunnier knew these details—there was no need for explanation.

In 1986, and after Frank Killinger's death, Henry Degenkolb helped me acquire the Brunnier interview tapes from Mrs. Killinger. Degenkolb also recommended interviewing Charles De Maria, a long-term member of the Brunnier firm, both for his recollections of what it was like to work with Brunnier, and for De Maria's own oral history, which is also part of this volume.

The interview tapes were transcribed at the Institute of Governmental Studies in 1988 and 1989. Herbert Lyell (a former president of H.J. Brunnier Associates) and Charles De Maria then reviewed and corrected the transcript. The Brunnier interviews were compressed to remove repetitive or extraneous observations, while retaining most of Brunnier and Killinger's original language. The material was also reorganized extensively to place it in chronological order. In some cases, historical footnotes were added to explain casual references that are not common knowledge today, 42 years after the interviews and almost 100 years after some of the events under discussion. A small amount of material was left out entirely, notably a few pages where Killinger and Brunnier, both San Francisco lodge members, carried on a personal discussion of Brunnier's work in the Masons. It was hard to follow and would have been of only tangential interest to most of EERI's readership.

Unfortunately, the tapes of one or more sessions that discussed Brunnier's role in the development of structural engineering in the first half of the 1900s have been lost. Consequently, while Brunnier deals with many aspects of his professional life, for the most part he does not explicitly discuss structural engineering as an orga-

nized profession. Even without these discussions, which would have been extremely interesting from a historical viewpoint, we are fortunate to have Brunnier's recollections at all. A many-faceted man with omnivorous interests, Brunnier's remarkable story tells how an Iowa farm boy became one of San Francisco's premier structural engineers in the early decades of the twentieth century and built his own respected and long-lived firm.

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University of California, Berkeley
May 2001



Introduction

The oral histories of Henry J. Brunnier and Charles De Maria together comprise an intimate look at the history and work of H.J. Brunnier Associates, the oldest continuously operated engineering firm in San Francisco. Henry J. Brunnier, who founded the firm in 1908, and Charles De Maria, who went to work for Brunnier in 1941, together offer a narrative that spans almost 80 years and many significant changes in structural design and the engineering profession.

An Iowa farm boy, Henry Brunnier was the first in his town to go to Iowa State College (now Iowa State University). There he attended a lecture on the design of water towers by Professor Anson Marston. When Brunnier found out his hometown of Manning, Iowa was planning to put up the type of water tower Marston had inveighed against, Brunnier sold the city council on the advisability of a different design and asked Marston to design it. Throughout college, Brunnier worked part-time for Marston drafting and drawing details. Marston told him that any freshman who could sell a job could work for him anytime. The two became close friends, as well as mentor and pupil. Years later, in 1941, Marston was honored with a medal in his name, and Henry Brunnier was the first recipient.

After short one-year stints with the American Bridge Company and New York Edison, Henry Brunnier came west as a young engineer, 23½ years old. He and two other engineers from New York Edison were sent out to San Francisco right after the 1906 San Francisco earthquake to help with reconstruction of transportation lines in the city of San Francisco. The three were on loan from New York Edison to Ford, Bacon, and Davis Engineers, doing engineering work for United Railways of San Francisco, which eventually became today's Muni.

Two years later, on June 1, 1908, Henry Brunnier opened his own office in the Monadnock Building (685 Market Street) in San Francisco. He founded his practice on the principle of offering clients independent professional engineering service unencumbered by commercial relationships with materials interests or contractors. Of his competitors in San Francisco in 1908, Brunnier says, "I figured they just were not giving the kind of service that I thought an engineer ought to give. I knew I could give service that was not being given. There was no one representing the owner." He put great store by excellent drafting and detailing, and was an early advocate of tying the structure together, making sure load paths were complete, and that engineering details were specified and followed exactly. He gained a reputation as a man of integrity, professionalism, and technical excellence.¹

Brunnier's early career included structural engineering for the DeYoung Museum in Golden Gate Park (Lewis C. Mulgardt, architect), the San Francisco and Santa Cruz wharf developments, and the Sharon Building, designed by George W. Kelham, a prominent architect. Brunnier moved his offices into the third floor of the Sharon Building when it was completed in 1913. The firm moved upstairs to the sixth floor in 1925 and has been in the same offices ever since. In the late 1920s, Brunnier was responsible for the structural engineering on several new downtown highrises designed by Kelham: the Shell Building, Standard Oil Building, Federal Reserve Bank, Russ Building. Those highrises, along with the Hunter-Dulin Building (Schultze and Weaver, architects), redefined the San Francisco skyline of the late 1920s and 1930s. The Russ Building remained San Francisco's tallest skyscraper until 1964.

Brunnier was a consultant for the San Francisco-Oakland Bay Bridge in the early 1930s. The five-man consulting board supervised design of the bridge, and each one of the five had a caisson named after him. The Brunnier caisson is beneath the second suspension tower from Yerba Buena Island on the San Francisco side.²

Henry Brunnier was the quintessential "organization man." Says De Maria of Brunnier, "[He] knew the public relations and political values of being effectively organized. He knew how to set up an organization, and how to get people to work together. He understood the benefits of fair and honest competition, and was deeply imbued with the principle of fellowship." He had a gift for leadership and for organizing people to work together for a common, beneficial goal. In fact, it was his ability to address audiences and gain public support for projects, as well as his engineering expertise, that won him the appointment to the San Francisco-Oakland Bay Bridge consulting board.

Brunnier was one of the early forces behind engineers in northern California organizing into the Structural Engineers Association of Northern California (SEAONC), and served as its

1. See also Chapter 12 "Charles De Maria's Recollections of H.J. Brunnier."

2. The Bay Bridge Board of consulting engineers was appointed September 1931. The members were: Charles H. Purcell (Chief Engineer), H.J. Brunnier, Ralph Modjeski, Leon S. Moisseiff, and Charles H. Derleth, Jr. A caisson was named for each board member. See page 109 for a photo of the Brunnier caisson.

first president. Charles De Maria said of Brunnier's involvement in SEAONC, "I think it was the force of his character that brought them together and kept them together, because in those days engineers were jealous of each other. They thought other people were trying to steal their jobs and their secrets... He thought the engineers should be more cooperative, should set standards and put them high enough so that everyone could make a decent living out of it... Some engineers were suspicious of Brunnier's motives in getting the organization going. They were concerned that his urging them to provide better service and to raise their fees was designed to put them at a disadvantage in competing for work against Brunnier, who always charged higher fees. But there was nothing underhanded about Brunnier, and he had no ulterior motives. Of course he would benefit if structural engineering became more professional and if public awareness of the value of engineering increased. But the other engineers would also benefit, as would the general public." Brunnier believed that good engineering demanded a good fee and that engineering and engineers needed to be recognized as specialized professionals.

Brunnier was one of three members of the original board that licensed professional engineers, the California State Board of Registration for Civil Engineers. The three board members drew lots for the first licenses, and Brunnier's license number was 3. He was the impetus behind the creation of a special license for structural engineers, and at his insistence, no one was grandfathered in when the requirements became law. It was his fundamental philosophy that the public had a right to know about an engineer's qualifications.

Brunnier participated extensively in civic and professional activities. He was a charter member of club number 2, the Rotary Club of San Francisco. He served as president at both the local and international levels of Rotary, and traveled all over the world. He was an early and influential force in the California State Automobile Association and served on its Board of Directors for 52 years. In the early 1920s, Brunnier conducted studies of asphalt versus concrete roadbeds and spearheaded a campaign to base road construction on sound engineering principles. He eventually served as president of the California State Automobile Association (CSAA) and its national counterpart, the American Automobile Association (AAA). He was an active member of the Masons as well. He was president of the local and state Chamber of Commerce, the Engineers Club of San Francisco, the San Francisco section of the American Society of Civil Engineers, and the Pacific Association of Consulting

Engineers. As De Maria remembers, “It was Brunnier’s philosophy that you should not confine yourself to engineering. You should take part in the broad workings of society, join organizations, and be a leader in other things besides engineering. It was a very strong point with him.” In 1952, in his speech accepting the presidency of Rotary International, Brunnier said, “Things do not just happen in a community. To get things done requires leadership.”

In his extensive travels around the world for Rotary, California State Automobile Association, and the American Automobile Association, Brunnier and his wife began what would become an extensive decorative arts collection. Ann Brunnier, who accompanied her husband in all his travels, had a passion for dolls and later developed interests in other arts such as glass, ceramics, enamels, snuff boxes, carved ivories, and jade figurines and bowls. The Brunniers gave the collection to Iowa State University, Henry’s alma mater, in 1969. What had started as a small collection was delivered to Iowa State in two semi trailers and took nine months to unpack.

In 1963, Henry Brunnier incorporated the firm as H.J. Brunnier Associates and gave all the stock in the company to six long-time engineers, four of whom had begun work for Brunnier on the Panama job. Brunnier kept no stock, but remained as president of the firm. Henry Brunnier never retired. He died at his desk at age 89 in the same office he had occupied since 1925, when the firm moved upstairs from the third floor.

Charles De Maria, following his graduation from the University of California at Berkeley in 1941, went to work for Henry Brunnier. De Maria was hired by Henry Powers, then Chief Engineer and in charge of office management, and sent to work on a submarine base the firm was designing for the U.S. Navy in Panama. It was in Panama that De Maria first encountered Brunnier, who would have been almost 60 years old at that time. “Down there in Panama we did not treat him with the deference that his old-time crews had. We were in a tent camp out at the edge of the jungle. It was hot and miserable, and we just didn’t give a damn. It was such an unpleasant spot that we didn’t care if they sent us home.” In fact, the job site was so disagreeable that Brunnier had a hard time getting experienced engineers to go. The recent graduates recruited for the job—De Maria, Herbert Lyell, Stanley Teixeira, and Andrew Stevens—would later form the nucleus of the next generation of the H.J. Brunnier firm.

After wartime service (1943-1946) in the U.S. Navy Seabees, De Maria rejoined the Brunnier firm and made his career there. De Maria was the first of this new generation of engineers to get his structural license, which called him favorably to the attention of Brunnier. Post-war, the firm probably numbered about 20.

De Maria went on to become a principal in the firm and design many seminal buildings of the post-war period, including the 22-story Crown Zellerbach Building, the 22-story addition to the Standard Oil Building at 225 Bush (designed by Brunnier in 1923), and the 52-story Bank of America World Headquarters. De Maria also designed the award-winning Blythe Sports Arena at Squaw Valley for the 1960 Winter Olympics. He retired in 1983 and became active in Atherton civic affairs and served on several planning committees. In 2001, De Maria still plays tennis and is active in his Atherton community.

Of Brunnier, De Maria concludes, “The practice of structural engineering has undergone huge changes since Brunnier began his practice, and continues to evolve at an ever-increasing rate. Despite all these changes, many problems Brunnier sought to eliminate still remain, and many of his goals for the profession have not been fully achieved. To cite a few, they include his efforts to educate the public about the values of the structural engineering profession; to bring remuneration for engineering services more in line with that of other learned professions; to maintain the highest technical and ethical standards; and to participate widely in public affairs other than engineering. I believe that if Brunnier were alive and in practice today, through his leadership abilities, strength of character, and willingness to accept beneficial innovation, he would still be a leader of the profession, and still at work on its problems.”

Gail H. Shea
EERI Oral History Series Editor

CONNECTIONS

The EERI Oral History Series

Henry J. Brunnier

Chapter 1

Through College

When you stand still, you're going backwards.

Killinger: Start at the beginning. Where were you born?

Brunnier: I was born November 26, 1882, on an Iowa farm near a place now called Manning. As a matter of fact, Manning was born the same year I was born. It is in the western part of Iowa, about halfway between Council Bluffs and Sioux City.

Killinger: Were your folks born there, or did they come from some other part of the country?

Brunnier: My father originally came from out of state. His father was a Frenchman and his mother was a German. She brought him over here when he was about a year old, and he was raised in Davenport, Iowa. My mother was of Danish descent, and she was born in Illinois. Somewhere along the line, my parents met and got married and homesteaded the farmland out there in western Iowa.

Killinger: Did you have any brothers and sisters?

Brunnier: I have a sister who is living and a brother who died in childhood. I went to a one-room country school, and later went to Manning High School. From there I went to Iowa State College.³

Killinger: When you were in high school, did you know then that you would go to college, or did this come later?

Brunnier: No, that came to me about the time I got through high school.⁴ I was working for a contractor there who wasn't very well educated. I thought that if I could go to college and learn something about being a contractor, I could become a millionaire in no time, because he was one of the wealthiest men in town. I'm still looking for that million.

Killinger: You worked for this contractor during summer vacation, I presume?

Brunnier: Yes.

Killinger: So contracting was your first thought, rather than engineering?

Brunnier: That's right.

Killinger: You decided then on getting a further education to become a smarter contractor. Was it quite a step in those days for a boy to go to college?

Brunnier: Very few from our town ever went to college, and I was the first one from there to go to Iowa State.

Killinger: What business was your dad in?

Brunnier: My dad and his brothers were in the general merchandising business. In those days a family name meant something, and when the younger brother got into financial difficulties, the older brothers sold their farms, came to town, took over the business and paid the debts and so forth. Then they stayed in town and opened a general merchandising store.

3. Iowa State College of Agriculture and Mechanical Arts, Ames, Iowa; in 1959, it became Iowa State University.

4. Brunnier graduated from high school in spring 1900 and entered Iowa State that fall.

Going to College

Killinger: Regarding your heading for college; your family was in agreement with this decision and you went off to Iowa State?

Brunnier: Yes.

Killinger: In those days tuition was no doubt much lower than today.

Brunnier: There was no tuition in those days [1900].

Killinger: So all you had to pay were your living expenses. When you first went to college, did you have your living expenses paid for you, or had you saved your money from working summers for the contractor?

Brunnier: I saved the money to start with.

Killinger: While you were in college, did you change your ideas about going into the contracting business?

Brunnier: No, they didn't change till later. I did do some designing at college for Dean Anson Marston.⁵ He used to lecture every fall and the upper classmen would tip you off that if you expected to graduate, you'd better attend Marston's lectures. He lectured on standpipe water tanks versus elevated tanks. You see, Iowa is pretty level, and Marston was one of the pioneers in the hemispherical bottom type of elevated tank.⁶

5. Dr. Anson Marston was the first Dean of the College of Engineering at Iowa State. Though Marston did not officially become Dean until 1904, the year Henry Brunnier graduated, most undergraduates referred to Marston as "Dean" for several years before his official appointment.

He illustrated the disadvantages of the standpipe—you had to have it high and there was no volume of water—the standpipe did nothing but provide pressure. Then he gave an example of a standpipe that had collapsed. One winter, the water in the tank froze. Meanwhile, they drew water from down below, but the water up on top was frozen, so it left a space. Then when the sun started shining, the steel started to expand, and the ice began to melt. So this hunk of ice dropped down and the tank burst.

Getting Practical Experience With Dean Anson Marston

Brunnier: When I went home from college for the summer vacation [following his freshman year], I found that the town council of Manning was planning on building a tall water standpipe. They were going to contract with some blacksmith, who was going to build them a standpipe. I immediately went to the mayor, a banker, who was a great friend of the family, and told him that wasn't the thing to do.

I just repeated the Marston lecture—I didn't know anything about design. That story about the water tank failure excited him, because the standpipe accident in Marston's illustration had happened in the town he was raised in, but he had forgotten about it. So he said, "Will you meet with the council tonight and tell them the story?" I said I would.

So I went that night, and they wanted to know if I'd take the job and design a tank tower for them. You can imagine my situation—just out of the freshman year and not knowing anything about design. I did some quick thinking and said, "I could get Dean Marston to come here—he's a pioneer in this." I thought I could get him to come and do it. So they asked me if I would try to get him to take the job. He was tickled to death to do the job, so he came to Manning and designed the tank, and I made the drawings.

Those were my first drawings—I still have the blueprints in the files someplace. Of course, that kind of got me interested in design. From that time on in college, I never had to worry about any work—any spare time I had available I could work for the Dean. He said, "Any freshman who could go out and sell an engineering job can work for me anytime."

I remember another experience in working for him that was interesting. Up at Webster City, Iowa, somebody had designed and built an elevated tank, but didn't understand the principles of design, because there was no horizontal girder where the columns joined the tank. Whenever they filled the tank, the legs would start to push into the tank, because there was nothing to resist or take the load off the incline of the legs. So they could never use all of it—they could never fill the tank up.

Marston had been there some years previously and told them that nothing could be done about it—that they couldn't very well stiffen the thing after the condition it was in. Well, later a new council came in and again wanted Marston to come up. He sent me up. I was a junior by then, maybe even a senior. Anyway,

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6. In 1897 Marston designed the first elevated steel water tower west of the Mississippi. It served the Iowa State campus until 1978, and still stands near Marston Hall (formerly Engineering Hall). The Marston Water Tower is now on the Register for National Historic Places.

by then I had done quite a bit of work for him in school.

Before sending me up, he said, “Don’t tell them the thing will fail tomorrow or something like that, because you never know how long these things will or won’t stand. Just tell them they should never fill that tank, because someday it will collapse. It is a hazard at all times.” So when I got up there, I made them take out half the water before I’d go up and take a look at it. I was afraid to go up there otherwise. The tower was a hundred feet high and the tank was on top of that.

So I went up and looked at it, just to be able to say I had made an inspection, although of course I already knew the answer. Because the tower was located right near the railroad station, when talking with the mayor afterward I said, “Someday this tank is going to fail. When it does, if it should fall towards the railroad station and a train is in the station, the town could be in financial difficulties.”

The mayor agreed with me, but they didn’t do anything about it. Probably about a year later, after I was out of college and working with the American Bridge Company, the mayor wrote me a letter to say that the tank did fail. Fortunately, it didn’t fall toward the station, since a train was in the station at the time.

Of course, I did the drafting and Dean Marston did the designing. Most of it was for sanitary sewerage systems and drainage. My job was to sell the idea of setting money aside to build a sewerage disposal plant someday, because the time was coming when they would not be allowed to dump sewage into cesspools like they were doing [at the turn of the 20th cen-

ture]. Also, Marston designed and I worked on the calculations for a concrete arch bridge in Des Moines. That was done about 1903-1904.

Value of College

Killinger: After you graduated in 1904 and began working, did you find that there were things you should have taken in college, but had not?

Brunnier: No. My personal belief is that you go to college to learn that certain things exist, not to become proficient at doing things. Then when you meet a similar problem in the field, you know you can go back to some textbook or source and find out how to do it.

I can give an illustration of that. When I was with the American Bridge Company, they got the job of building steel barges for the Union Sand Company in St. Louis, and our squad got assigned the detailing. The scows are round across the front and have a rounded corner with a big radius at the top and zero at the bottom. That is so they can take anything that might hit them and it doesn’t dent them up.

Scott Ross came to me and said “You’re the freshest one out of college, you make out the dies to make these bent plates.” I worked on it all day and wasn’t getting anywhere, until I realized it was a problem in descriptive geometry. I happened to have my descriptive geometry book with me at the Bridge Company, and that night I reviewed a little bit. By eleven o’clock at night, I knew how to approach the problem. So the next day I started to work—established the ordinates.

That also brings up an interesting incident. There was a German checker who didn’t like

the young fellows—Russ was his name. He used to mark up their drawings and make them look as though there was nothing right. It was quite embarrassing. Unfortunately, he did too many of them in blue pencil, and the marks were hard to get off the tracings. When they made prints, there'd be little faint lines. So an order came down not to mark drawings up unnecessarily in checking them, and not to use blue pencil.

When this barge job came down to him to check, he wasn't a college man and did not know anything about descriptive geometry at all. But he couldn't resist the temptation to make an arrow with a long arm pointing to a place on the drawing. Then off in the corner he wrote "Why the hell don't you throw on a radius?" I went back to Russ and said, "This thing has no radius, these are all ordinates that you project to make a die in which the plate can be bent." "Oh," he said.

Then he wanted to rub his marking out. And I said, "Nix—you leave this. I'm going to show the boss. I'm sick and tired of having my drawings marked up the way you are doing." I was a lot bigger than he was, and he started to take the drawing, and I just took it and held on to it. I said, "I'll drive a bargain with you—if you agree never to mark my drawings up unnecessarily, I won't take this to the boss. But sure as hell if you do mark them up, I'll beat the hell out of you." So he agreed. Pretty soon some of the fellows came up and said, "You're getting good, aren't you?" They didn't know of the bargain we had made.

Killinger: Going back to college again, is there any particular thing that stands regarding

your college training that might be passed on to those beginning college?

Brunnier: First, I would say that they should develop a tremendous curiosity about everything. What I meant is, don't try to be a proficient engineer right when you graduate from college, but to do a smattering of things. For instance, we had to take a course one semester on electricity and magnetism, and it was taught by a professor in electrical engineering. He took us into the deep theory of electricity and magnetism, which we couldn't understand at all.

Anyway, I know the Dean [Marston] recommended, or concurred anyway, that they teach us a little bit about electric street car systems, electric car houses, just a smattering, so we knew what was in a powerhouse and what it did. Not how to design one, because we'd never be expected to design an electrical plant. They didn't do that. Instead, the electrical engineering professor was going on with more mathematics than we had to take, and so forth. We kids would listen, and didn't know what it was all about.

But you have a hard time getting ahead of kids. There was a tradition at this college that the smallest man in the class had to get in and get a copy of the questions that were coming up for that examination. The professor always took the electrical engineers to Chicago to go through electrical plants, to give them practical information. In that interim, he'd leave another professor in charge to give the examination. It happened that my roommate had the job of getting the questions. Then everybody met and we had one of the electrical engineers come in and write the answers for us. We'd all get good

grades, although we didn't know anything about the subject.

Killinger: I hope you did the same for the electrical engineers in strength and materials.

Brunnier: They didn't have to take it, although we would have done it for them. But kids have a sense of values that you don't appreciate. We realized that electrical engineering would never be of any use to us, so why should we rack our brains?

Importance of Math

Killinger: Do you feel that you had enough mathematics in college?

Brunnier: Math is important for an engineer, of course, but it isn't necessary that you remember how to do it. You learn it, so that when you see the formulas that are applied today, you know how they are derived. Math came pretty easy to me, but today I probably couldn't do a problem in calculus or algebra if I wanted to. When somebody now comes out with a new theory, I may read about it, but when it comes down to mathematics, I turn it over to one of the other fellows and have him find out where he makes his assumptions. I want to know what assumptions are made—never mind the mechanics.

Killinger: This leads up to the next point. Some engineers seem prone to work everything out right down to the last decimal place on a formula that has a very broad assumption, so they are really spinning their wheels.

Brunnier: Take Mohr's slope deflection, which is not accurate because he omits deformation—deformation of structural members

due to deformation of joints in the frame. The minute you distort a frame, you get shrinkage in one place and stretch in another. He omits that because it got so complicated he just couldn't get it in there. But we don't belittle it, and we do use it.

For a time we used Nishkian's⁷ conjugate "points" method [for calculating deflection on a beam] until we got something better. We don't laugh off these theories of design, we work with them, find their practical application, and then use our own judgment. After you get your answers, you have to use your own judgment as to just what you're going to do.

Killinger: Yes, the old business of horse sense comes in.

Brunnier: And you can't have horse sense until you have had experience. You have to do things for a while before you have horse sense.

Importance of English and Reading

Killinger: Before you go into the American Bridge Company experience, I'd like you to go into your college life a little more. You said that math came to you fairly easily. Where any subjects tough for you?

Brunnier: English. I came from a small-town school that wasn't accredited. I had to take an examination and they said I was going to have to brush up on my English and take an extra

7. L.H. Nishkian was a prominent structural engineer in San Francisco throughout the early 1900s. Nishkian's professional practices were considered progressive, and he was one of the first structural engineers of the day to explicitly consider earthquake forces in structural design.

course. Then they finally decided I should write an essay every week and turn it in every Monday morning at 7:40. I had to do that the four years I was in college, and I thought I was being picked on pretty hard.

Then they stretched the time, so I didn't have to do it every week. That essay was always written after midnight on Sunday night. I wasn't any good, if black was black that was all I could say. But to expand on things, which is what they want you to do—I just wasn't any good at that. I had a heck of a time.

Today, however, I think it was the best thing they could have done for me, because I have a reputation of being able to write a pretty good contract or pretty good letter, which I never would have been able to do if they hadn't insisted on my learning how to write an essay.

Killinger: What about the other subjects—did you go into the humanities very much?

Brunnier: No we didn't, and we didn't have history, although we did have a semester of political economy, now that I think of it. Our subjects were chemistry, surveying, mathematics, physics, roads and pavements, sewerage disposal and treatment, some highway engineering, some railroad engineering. We went into those in more or less a general way. We had some structural engineering—we had to make up a design as part of our work in the drafting room in order to get a grade.

Killinger: Do you think that you would have been better off if you had had a little more of the humanities? That is, to equip yourself to go into your own practice later on?

Brunnier: No I don't think so. I think you can crowd only so much in so many years, and I think any youngster who has ambition can acquire these other things—learn how to meet people, how to deal with people—which you do by experience if you're observing.

Killinger: Right, and those subjects can also be acquired through extensive reading later on.

Brunnier: I was just coming to reading. I've often told youngsters when talking to them that I did more studying during the 20 or 30 years after I was out of college than I did in college, because I did more reading. Reading about world affairs. And reading about what other engineers are doing, not only in structural engineering but also what they might be doing in highway engineering or other areas. Because something they do, someday you can apply in a problem that you have.

For instance, during the war [World War II], we wouldn't have been able to do the Holding and Reconsignment Depot at Lathrop [California] if I hadn't been reading about highway engineering and learned something about soil-cement construction.⁸

Killinger: So engineering is a constant study year after year, like any of the professions. Just because you have the sheepskin, it doesn't nec-

8. Charles De Maria provided an explanation of Brunnier's reference to the Lathrop project: "In the soil-cement construction process, a windrow of cement is laid down on the ground, a traveling mixer picks up the cement and soil, mixes it, and lays it down in situ. In 1942, some 50 acres were paved over this way at Lathrop in the San Joaquin Valley to serve as an outdoor hard-stand storage area for wartime lend-lease materiel."

essarily say that you are finished and need not do any more studying or reading.

Brunnier: You don't get anywhere that way. When you stand still, you're going backwards.

Debating and Literary Societies

Killinger: Is there any college subject, some elective, that you would have liked to have taken and that might have done you some good, but that you didn't take? What about public speaking?

Brunnier: We had the debating society and the literary society. I belonged to the literary society. I didn't do much with it, but I belonged to it. I used to attend now and then to see what was going on. It wasn't compulsory, but you did it for a little relaxation and fellowship. All those societies met every Friday night, so instead of going to town and having some fun, those of us who belonged to the literary society would go to the society meeting.

Killinger: It's been said that engineers as a rule are poor public speakers. I don't know that this is so, but do you think public speaking should be given to them in college?

Brunnier: Well, they should be told the advantage of being able to think and talk on your feet. If they're going to get anywhere, be a leader in their own profession or anything else, they're going to have to learn to get on their feet and think and talk. Otherwise they can't furnish the leadership. You can't lead people if you can't get up and talk to them. It took me some time to find out the importance of being able to get up and talk to people.⁹

Living Arrangements at College

Killinger: Where did you live in college? Did you live in dormitories?

Brunnier: I lived in dormitories the first term. Then we had a fire, and I lived off campus the rest of the time. The first year off campus, there was no place to eat out there—it was two miles to downtown. So a group of us boys got together and got a fellow named Miller to build a little club house, with a dining room, kitchen, and room for the help, the pantry. There was nothing to it, it was nailed up in a hurry, and we had a cooperative.

At first it was fun in the cooperative. The first six months we thought this was real life, but after about a year of that, a number of us decided that it wasn't very good etiquette because there were about 25 of us and a long table, and if a guy had the ketchup down at one end and you wanted it at the other end, he just threw it at you and you'd catch it. We decided that sort of thing wasn't very good etiquette and we were getting bad habits, so about 10 or 12 of us persuaded 10 or 12 girls from the dormitory to form a club.

We got the same guy to build another club house, of a little better quality, and during the last two years, that's where we ate with these girls. One of the girls, Virge Slader, was the buyer, and I kept the books, so we got our meals free.

Killinger: You had a pretty good thing going there. You wanted to improve your etiquette so

9. Brunnier also discusses his first Rotary luncheon speech in Chapter 8, Participation in the Rotary Club.

you'd have the social graces when you graduated from college.

Brunner: We all came from pretty decent families and [our previous behavior] didn't look good to us. This isn't the way you want to live after you get out of college, or raise your own families.

Killinger: Did they have any fraternities?

Brunner: The college president, Beardshear,¹⁰ was against fraternities—there were no fraternities at college. We had things that really modeled fraternities, except they weren't national and they weren't secret. You were not allowed to have a secret organization.

We had the TLBs—I forget what that stood for, but those who didn't know used to call it the Tall Long Boys. No one was eligible unless they were six feet or over. They had a gold pin with TLB on it and the imprint of a foot. TLB is what I belonged to. There weren't too many of us members—we limited it to 13 and we had a hard time filling it. Kids weren't tall then like they are now.

Then there was a girl's organization, COB—Chips off the Old Block. In other words, girls that were daughters of graduates of Iowa State. Once a year, we had what we called a banquet—a dinner. And we set up crazy rules, for instance, the tallest man in the college would be the High Mogul of the TLB. When we had the dinner, he had to take the shortest girl in the college as his guest. Things like that.

Loan from Dean Anson

Brunner: During my last term, the Dean said, "I want you to have a little time out for social life. I'm going to loan you \$100, which you can pay back to me afterwards. I want you to take some time out and enjoy yourself, as well as carry on your work. But don't work too hard for me—I've now got others to take your place. You're going to leave me pretty quickly anyway."

That caused me to take out my first life insurance policy, so I'd be sure Dean Marston would get his \$100 back. The minute I got out of college and got employment with the American Bridge Company, I got hold of an insurance broker and took out a \$1,000 life policy. That got me started on life insurance, which was a valuable thing later on, because once you start, it's easy—you see the reason. When I got married I saw the reason for carrying more insurance and increasing it as I developed a family. But that's what started me on life insurance—because I owed the Dean \$100.

Killinger: And you were going to see that he got it back! In college you had been pretty much under the gun with your studies and working for the Dean and even working summers. Except for the literary society that you went to occasionally, did you have much time for any other social activities?

Brunner: Not very much. I never took many of the girls out—I didn't have the time, and I didn't have the money. The other fellows had more money. Anyway, there were so few girls in college that they could have their pick of the guys, so they picked the ones that had money. I should take that back, because there were some of the finest boys and girls there. In fact some

10. William M. Beardshear was President of Iowa State College from 1891 to 1902.

of them were working just like I was. But a number of girls I knew would pick the guys that had the money so they could have the best time.

Killinger: In those days, automobiles were a rarity.

Brunnier: There were a few fellows in college who had a horse and buggy—they had their own rigs. This was an agricultural-engineering school, and some of these Iowa farm boys had a horse and buggy while they were there. But I didn't know of any kid with a horse and buggy taking engineering.

Killinger: They were in the agricultural part of the college?

Brunnier: Yes, studying veterinary or animal husbandry, or farm engineering. Just learning how to operate a farm, maintain it and take care of it. They would have a fellow learn to take his binder and threshing machine apart and put it back together again—the mechanics of it, not the theory of design.

Other Recollections

Killinger: When did you graduate from college?

Brunnier: 1904.

Killinger: Do you recall any outstanding professors that you had there?

Brunnier: Of course there was Dean [Anson] Marston. Professor Maria Roberts in mathematics was very, very helpful to me.

Killinger: A woman professor!

Brunnier: Yes, and a good one too. There was also Edgar Stanton a very fine man, who later became Dean of mathematics, and Dean

of the general college. They [Marston and Stanton] had their homes on the campus. When I worked there during the summer vacations, I used to go to their homes once in a while, because their children were about my age. In fact, one was in my class, one was a couple of classes ahead, and one was a class behind. Dean Marston would have me to his house quite often during summer vacation. Of course I wasn't there at all during the last summer vacation between my junior and senior years—I was down in Harlan pitching baseball.

Another Job: Baseball as a Connection

Brunnier: I probably was partly responsible for Dean Marston's getting a job to establish the grades for the City of Harlan.¹¹ Anyway, we got the job of establishing the grades for Harlan. Being employed by the city as an engineer allowed me to pitch for them and still remain amateur. I had to appear at four o'clock every afternoon for baseball practice. We played two games a week, and I pitched for them.

Killinger: You evidently kept yourself pretty busy working for Dean Marston all through your college career. This background of experience no doubt was of considerable advantage when you graduated from college.

11. Harlan, Iowa is about 140 miles southwest of Ames, Iowa, where the Iowa State campus is located, and about 35 miles south of Manning, where Brunnier grew up.

First Job: American Bridge Company

It pays to spend extra time in the office and have everything go right in the shop.

Killinger: When you graduated from college in June, 1904, did you have a job waiting for you?

Brunner: No. I was trying to get on with some contractor, and it was a real depression year for contractors in the mid-west. There was no opportunity at all. Things were very slow. The American Bridge Company had a large contract in Brazil for some mining company, and they had other contracts. They were one of the few that were very busy, so they were taking on fellows out of college, like they always did and do still. I happened to be one of the lucky ones from Iowa State that got on. I wrote to the Bridge Company before I left college. I wanted a job. I even wrote to consulting engineers in sanitary engineering, because I had done some work in sanitary engineering for money [for Dean Anson Marston at Iowa State]. I also remember elbowing somebody in Chicago—writing to them. Anyway, I got this letter back from the American Bridge Company asking me to report as soon as available. So I went back there to Pennsylvania with the Bridge Company. I figured, that is contracting, and I ought to know something about steel

manufacturing and fabricating if I'm going to be a contractor.

Killinger: Where was the American Bridge Company plant located?

Brunnier: At Ambridge, outside of Pittsburgh.

Early Career Advice

Brunnier: Having outside activities can often help you. I not sure how it happened, but I've always assumed that some of the boys who graduated before me told the American Bridge Company baseball team to get Brunnier to pitch for them. Anyway, I landed there [in Philadelphia as an employee of the American Bridge Company] on Wednesday and on Saturday I pitched what was their most important game against the Rider-Connally Company at Leidsdale. I happened to be red hot that day and won.

Well, Dick Ewen, the chief engineer of the American Bridge Company's Ambridge plant, was a rabid baseball fan. So a week after this happened, I was in his house having dinner, just because he loved baseball. He gave me a lot of sound advice about when to stay with the Bridge Company, and what to do if I didn't want to stay.

Dick asked me if I wanted to stay with the Bridge Company—and he said, “Don't make your mind up now. After you've been here a year, you can go into design, estimating, shop practice or erection.” What was the fifth? Anyway, there were five different avenues that you could have, and of course they'd put you through special training. He said it's a slow process in any one of these departments, because

there are a lot people who want to stay with the Bridge Company.

He told me, “We have no feeling about you leaving the Bridge Company after you've been here a year, so that we've gotten our money back that we invested in you in the beginning. Because you're good boosters for us. We figure we do a good job and we figure that everybody who leaves here will be a booster for the Bridge Company”—which I was. I think everybody who worked there, who had the training, and is conscientious about having good work done was a booster for the Bridge Company.

One thing he said was “Learn everything you can about the American Bridge Company while you're here, in the shop and otherwise.” I had already gone down to the shop by then. First I went to where they fabricated something that I had detailed. I learned something there, because they made some very uncomplimentary remarks, not knowing that I was the guy who made that. But I learned, you see.

“Skyhooks”: Baseball Works in Brunnier's Favor Again

Brunnier: Another very interesting incident related to baseball took place at the American Bridge Company plant, very soon after I'd gone to work there. You know how every office has some jokes they like to pull on the new kids that come in? One day, the squad boss came to me and said, “I'd like you to go down to the shop and see how that order of skyhooks is coming along.” Well, I'd already heard colloquial phrases that I'd never heard before, and which didn't mean anything to me until I found

out what they meant. So I thought this was just another one of those.

So I go over the bridge and came down the steps, and here was the red-headed watchman. I don't know if he suspicioned that they had sent me on this errand or not, but he asked, "Where are you going." I told him, "I'm supposed to go see the chief inspector to find out about the order of skyhooks." I then learned from him that each man I would meet was primed, waiting for me. That way I would have to walk all 80 acres of plant before I got through.

The watchman said, "Come on, sit down, let's talk baseball." I asked how long the walk usually took, and he said, "About two hours. So we sat there and talked for two hours. He was a baseball fan, and I'd won one game for him [pitching against the Rider-Connally Company at Leidsdale the first weekend of Brunnier's employment]. Then I went back to the plant and back to my desk, and didn't say a word to anybody. Pretty soon the boss came over and said, "Well, how's the order of skyhooks?" I said, "I don't know anything about skyhooks." He looked at me and said, "Oh, it's that damned watchman."

Killinger: The watchman didn't want to see you put upon because you were a good baseball pitcher!

Brunnier: That's right.

Killinger: You spent about two years at the Bridge Company, didn't you?

Brunnier: No, just a little less than a year, from just after I graduated in 1904 until the late spring of 1905. Then I went to the New York Edison Company.

Killinger: While you were there, you had an opportunity to get around and see the entire Bridge Company Ambridge plant. I imagine it was a tremendous plant.

Brunnier: Eighty acres, and as modern as they had them in those days.

Killinger: They were doing work all over the world—all sorts of things. That was an invaluable experience. This I imagine was the largest plant in the United States at the time, wasn't it?

Brunnier: Yes.

Drafting and Detailing

Killinger: At that time you had it in mind that this work experience was for contracting?

Brunnier: Yes. Then I went with the Edison Company in New York and got into design, and I liked it. When I went with the Ford, Bacon, and Davis Engineering Company¹² to come out here to San Francisco, that was design. I just got into it and liked it and stayed with it.

Killinger: You said you were getting \$50 a month at the American Bridge Company. I imagine that was a princely sum in those days.

Brunnier: No, it wasn't—it was the sum that they could get you for.

Killinger: In other words, in those days they could get engineers for \$50 a month, whereas they might have to pay the riveter in the shop

12. Ford, Bacon, and Davis were engineers for the United Railroads of San Francisco. Brunnier traveled west from New York to work for them just after the San Francisco earthquake of April 18, 1906.

more than that. But they could get engineers for that.

Brunnier: In those days engineers didn't rate very high until they got to the top. It is not like today [1959], when your pay is \$550 a month on getting out of college.

Killinger: You were on straight drafting, shop detailing?

Brunnier: Yes. I got right into detailing.

Killinger: Did the American Bridge Company have an elaborate system of detailing?

Brunnier: Yes, they were very adamant that everything be shown on the drawing, so the man in the shop could punch every hole right where it ought to be. And the holes had to be such that the connections made by somebody else would fit the holes that were on the column or beam or whatever it was. Frequently, one man would detail columns, and another would detail beams that fit into the same columns.

Killinger: But you worked to such close tolerances and standards of design that there was no question but that things would fit?

Brunnier: Yes. We had one German engineer in the department, and he'd been used to detailing everything. He couldn't understand how someone could detail one thing over here and another over there, and it would go together in the shop. He just couldn't get it through his head.

Killinger: This was sort of mass production interchanging of parts—applied to bridge work and a lot of structural members. Did it take you long to get onto this method used by the American Bridge Company?

Brunnier: That's hard to say, but I don't think it did. Everything I did I always wanted to be thorough, and they certainly did it thoroughly there. One lesson I learned there was that it paid to do the work in the office.

Because if you left the work in the shop with any mistakes or something omitted, the shop man would go to the foreman, the foreman would go to the superintendent, and the superintendent would have to go up to the chief engineer. Then the chief engineer would come to the detail department to see what was wrong—that's a lot of lost motion. So it pays to spend extra time in the office and have everything go right in the shop.

Shop Experience

Brunnier: Another thing the Bridge Company did was have their own inspection to see that the shop fabricated the way it was shown on the drawings. They figured it was cheaper to make the corrections in the shop than it would be in the field, because they didn't have welding in those days.

Killinger: That's right, trying to drill and ream holes out in the field was a pretty costly operation in those days. They didn't have the equipment in the field that they have today. They had the equipment in the shop, and it would be much easier to do it there.

Brunnier: In going around the shop, you got more or less acquainted with all the shop practice. That is an experience very few of our engineers have today. That is, our engineers in school don't have the opportunity to see or work in a large fabricating shop.

You've just got to do that—go out there. To get the feel of a job you have to see it done, not once but repeatedly. A man may set up a machine for punching—a mug for punching we call it—he gets it all set up and all of a sudden he realizes that one of the punches is wrong. The next time, he does it properly right away.

You learn that mistakes can occur anywhere. You have to check to be sure that you don't have a mistake, because once you punch a plate with all those rivet holes, it's done. They would punch a number of rivet holes all at once with what we called a multiple punch. This fellow that set it, he wasn't the one that discovered the error, it was someone else who came along and checked before he punched the plates.

Killinger: Tremendous machines. We're kind of losing track of that now, because we've gone to welding. Some of the equipment they used to have has gone by the boards, although some of the shops still use equipment similar to that.

Brunnier: We used to get terrible designs in there. You couldn't figure out what the designer wanted. He would give stresses, but would not give any connections. If you had wind stresses, you didn't know if it could be a bracket or not. There was a very prominent national architect, and \$2 a ton was added every time one of his jobs came in. That was because somebody had to go back to his office and work out all these details before you could detail them at the shop.

I could see the waste that was there. While I never had any idea then that I'd ever be in business for myself, I said, "If I ever have to turn out a design drawing I'm going to do it so that the men who have to do the detail drawings

know how to do them without having to come back to me to find out."

Learning on the Job

Brunnier: Whenever a young fellow asks me what to do when he gets out of college, or is about to graduate and wants to know which job to take, I always tell them that I don't know which has been more valuable to me—my college education, or my training at the Bridge Company. Without one or the other, I wouldn't be where I am today.

Killinger: You had the golden opportunity of seeing theoretical and design knowledge put into actual practice, and the opportunity to work on these very details and see them turn into steel shapes.

Brunnier: After I'd been at the Bridge Company about a year, I worked on a detail for the new Waterside station for the Edison Company in New York. Their chief structural engineer came out, wanting to see how the job was coming along. McKinnley, my squad boss, came to me and said, "Bru, you know more about the shop down there than I or anyone else in this squad. I'd like to have you take this chief down and show him around. Show him the work we're doing, but also show him the whole plant."

So I did, and we ended up in the I-bar shop. I forget the Italian name of the man who ran the magnetic crane. Anyway, I called him by name and said "Here's one of our best customers, can you show him the magnetic crane?" When we got through, the Edison Company chief structural engineer asked me, "How long have you been here?" I told him a year. He said, "Gee,

you know a lot about this shop, and you seem to know everybody in it, yet you're in the drafting room. I used to work for the Bridge Company, and I haven't got a man in my whole department [at Edison] who's ever had any practical experience. They can design, but I have to watch them like a hawk for details. If you will come with me, I'll give you twice what they're giving you here."

I said, "Well you'd not be giving me much—I'm only getting \$50 a month now, and as to

the other \$50, it will cost me more to live in New York than the extra \$50 I'll get." He said "No, I'll guarantee to find you a place to live that will be just as economical and as good as what you have here. So it won't cost you any more to live in New York. You don't have to live in a high-priced building." So I went to New York.

Working for New York Edison

By that time I'd made up my mind on structural engineering. I was set on it, but figured I'd have to go some place else besides New York, where father traded with father and son traded with son, and it was carried down in families.

Killinger: The chief structural engineer from the New York Edison Company—the one you showed through the Ambridge plant—made you an offer of a job at double your Bridge Company salary, and also said he would see that you had a place to live that wouldn't cost you any more. I don't imagine it took you too long to think it over.

Brunnier: No, it didn't,

Living in New York

Brunnier: My pal Dan Moose wanted to go New York when I went to New York, so he got himself transferred to the New York office. While he was my pal, he graduated two years before I did.

Killinger: You had been in college together?

Brunnier: Yes. His brother, Fred Moose, was the manager of the Pacific Coast area here [for Portland Cement], and so he had more of an entree than I did, so he got himself transferred to New York. So we decided on uptown. Dan and I decided we'd live in different parts of town and learn New York, and that's what we did.

The first place we stayed was run by a couple of English old maids and I don't think I've been able to eat mutton since. We stayed there long enough to get the atmosphere of the boarding house and the region, and worked ourselves down gradually. We got ourselves a room in the district where there were boys and girls who were going into the theater. For instance, one of the girls from the Floradora Sextet lived in this place, and Annette Park—who was the illustrator, I think it was, for *Cosmopolitan*.

Anyway, there was quite a number and variety of people in this boarding house, and we got in there. We saw the life of those people. One thing we both learned there was to play poker, because the man who ran the boarding house loved the poker game. All the men in the place would sit down after dinner Saturday night and play poker until ten o'clock Sunday morning breakfast time.

So one day I was down at the office with nothing to do. I was working on probability and the chance of certain hands in poker—not by points but by trial and error. Then one afternoon I fooled around with it, and sat there thinking a bit. I said to myself, "What are you trying to be, a gambler or an engineer?" Here I was wasting my time and mathematics on this gambling stuff, instead of trying to develop a new theory in reinforced concrete, which was

new then and offered lots of opportunities, and here I was doing this.

So that night when I got back to the boarding house, I told Dan Moose, "This coming Saturday is my last poker game." He said, "You're not leaving?" I said, "I'll tell you the story Sunday morning." So Saturday night when we sat down, I said, "Boys, this is my last poker game, I've decided to be an engineer and not a gambler. Furthermore, none of us can afford this game, because whoever loses is borrowing from somebody, hoping he can pay it back the next weekend. We've had one or two fellows who have left the house because they couldn't pay it back. And I don't think it's good for you any more than for me." It busted the game up. Dan and I had to move out, that landlord got so mad at me. I haven't played poker since.

Killinger: How old were you then?

Brunnier: I was 23.

Killinger: That was pretty deep thinking for 23.

Brunnier: It was just how the idea hit me—I was enjoying trying to figure out what the chances were of these poker hands, but all of a sudden it dawned on me that it wasn't the thing to do.

Pitching Baseball

Brunnier: By this time, it was spring and baseball season was coming on. I wanted to get out into the country where I could practice pitching and keep in condition. So we moved over to Leona, New Jersey, got into a boarding house there. It so happened that there was a fellow who was a pretty good pitcher who lived

there too, and a couple of fellows who wanted to be catchers lived in this little town, so I had plenty of chance to practice again.

This one fellow knew the ropes, and just about opening day of the season, he got himself in a jam—he agreed to be in two places at the same time and he couldn't do it. One of them was over in Newark and one was in the Brooklyn area. So he sent me over with a note and a hell of a good boost to the manager. The manager was mad as hell because it was an important game against the Baltimore Orioles—the [Negro] team that was traveling around, one of the best.¹³ It was the opening of the season and if there was any one game they wanted for publicity, they wanted to win this.

Again, I had one of those days where I was lucky. I had a good catcher, who said "Don't throw any balls at their heads, because that won't hurt, but if you hit them on the shins, you'll scare the hell out of them. Somewhere along the line you've got to hit one of them on the shins." I had a good slider—I called it an "in-drop"—and I did hit one of them on the shins. He didn't get out of the way of it. I put it as though it was to be on the inside corner of the plate. I think he figured it was going to be the curve, and it finally got him in the shins. They told the boys to look out for that inside drop.

I kept them away from the plate from then on. I just kept them low. Most of them were straight balls and they were hitting on top of them. They had a good team, but anyway, I beat them—I still have the record down there for that score. I lost most of the records but

that score I still have. I have another one where I pitched a no-hitter.

The manager was tickled to death—he wanted me to come to his house. His whole family was there and he introduced me to them. I could see where one of the girls my age might like to have my company, but I thought "Gees, I'm not going to get into anything right now," so I didn't. Then this manager introduced me to the manager of the Flatbush team. And so I pitched for Flatbush, which later became the Dodgers. There was a question whether to call the Dodgers "Flatbush" or what.

There was no major league baseball in Brooklyn then, and none of the baseball towns allowed Sunday baseball—Philadelphia I know, didn't allow it. So they had these semi-pro baseball teams, which paid very good money for those days, because they'd have 5,000-7,000 people there. The ordinance said they could not charge admission to athletic games on Sunday. Here's how they got around the law. The only way you could get in was to go across the street from the ballpark to a peanut candy stand, buy a nickel's worth of peanuts, pay 50 cents for it, and they'd give you a ticket to get in. Then when you got inside, you had to pay another fee to get a seat. That's how they got their money without charging admission.

Killinger: During that baseball season were you playing about once a week?

Brunnier: Yes, sometimes twice a week, and holidays too. The office would be closed and they always had games on those days.

Killinger: Were all your games in Flatbush, or did you travel to other parts?

13. Editor's note: Brunnier used the "N-word" occasionally, as he did in this case.

Brunnier: We traveled to other parts—summer resorts during July and part of August. The summer resorts had clubs, which were an attraction at the resort, mostly at the beaches. So every weekend we were at some beach.

Killinger: Baseball has been a great thing to you. Do you still retain an interest in baseball?

Brunnier: Sure do. I'd rather play baseball. I think I could still pitch a baseball better than I could hit a golf ball.

Killinger: Of course, you don't get the same opportunities to play baseball do you?

Brunnier: Oh, I couldn't play now, I'd break my arm just throwing once. But I maintain an interest. I used to make more money pitching semi-pro baseball in New York than I did working in the office.

Getting Married

Brunnier: I saved up all the money I earned in baseball, because by that time I had decided to get married. I was making a little more money in New York, and once in a while I'd get in with the bright lights people. Then all of a sudden I realized—either I stay a bachelor and be hitting the highlights around here and enjoying that life, or I get married and be a home man. Which of these did I want to do? So I looked at my wife, (she wasn't my wife then) and I thought we could afford to get married now. She agreed, so I saved up that money for a honeymoon, because she was born in Lincoln, Nebraska, came to Iowa, and had never been out of that region.

Killinger: You were childhood sweethearts in Manning?

Brunnier: Yes, we went to school together for a short time. I always said her family moved over to Manning long enough to pick me up. As a matter of fact, I wouldn't look at her when she was there, because her mother kept her in short dresses and long pigtails, and she looked a lot younger than she was. Here I was, tall, and traveling with guys 3-4-5 years older than I was. She was just a kid. We met again the last Christmas I was at college.

Killinger: By this time she was a young lady.

Brunnier: She sure was!

Killinger: When did you get married?

Brunnier: October 2, 1905.

Killinger: You remembered that awfully fast.

Brunnier: We've taken a honeymoon trip ever since. One piece of advice my mother gave me was this—never forget the anniversary date, and you can commit murder the rest of the year. I never forgot that advice, and I never once forgot an anniversary. I'll admit that I put it in my date book so that I'm sure—I do that so I don't accidentally make another date without thinking about it. Recently it's worked out very well, because the structural engineers [SEAOC] always have their convention on the October 1-2-3 weekend. So we've been celebrating our anniversary with the engineers for many years now, and last year they made quite a do about it.

Killinger: Yes, I remember last year [the 1958 SEAOC annual meeting] at Yosemite—it was quite an occasion. When you got married, did you start out housekeeping immediately?

Brunnier: No, this lady that had the boarding house over in Leona, New Jersey moved back to New York and had a few rooms to rent, so I was living with her and her husband, and they had a small child. We lived at the boarding house for a few months, until my wife could get acquainted and a little better organized.

Apartment Living in New York

Brunnier: After a few months, we went out and looked for an apartment, and found one on 108th Street. The only sunshine we got in the apartment was what the manager sold us before we moved in—the sun never got to that side of the building. It was dark all day long, something my wife found a little difficult to take.

But we used to take every Sunday and go out and look around New York. Not infrequently we'd go down to the Pennsylvania Terminal where they were building the MacAdoo Tunnel coming in, and building the Pennsylvania Tunnel at the same time. She liked construction, and we'd sit there all day and just watch them work, because I wanted to get the feel of those kinds of jobs. Or we'd go up to the New York subway station, where they were also building.

Killinger: This was on Sundays, and they were working on Sundays?

Brunnier: Yes, they worked every day of the week to get this job done. In those days there was no overtime, or 8-hour days. Maybe there were 8-hours days, but I know that at the Bridge Company it was ten hours.

Killinger: What about New York Edison?

Brunnier: Eight as far as the offices were concerned. But we'd occasionally just go to see a

part of New York—because we worked Saturdays, except in the afternoon. Of course during the summertime, I maybe never went to the office at all on Saturday, because I didn't have to.

Anyway, it seems to me they built about 10,000-12,000 apartments. The subway had just been opened and they built some apartments up around 120th-137th. I lived on 137th and we were on the northern end of it. Right down from Broadway down to Riverside Drive.

I promised the Missus we'd go out and look for an apartment. We saw something in the paper about these and we went up and the minute we looked at them, I said, "You and I can't afford to get in here." She said, "Well, let's just take a look." She still does that—she likes to look at a house. So we went in and looked around. They were delightful, nice and sunny, and had big courts so there was sun in very apartment—four stories high and no elevator. There was space for an elevator, but apparently they were afraid of the competition of trying to get people out there. So they saved the elevator cost and operation in order to be able to keep the rent down, but they had telephones.

So we looked around, and here was an apartment up on the fourth floor, which didn't mean anything to us, because as it happened, we climbed four stories anyway. You could look out the window and see the Hudson River and East Side Drive—a chunk of it—the apartments across the way were just as high as ours. Of course you could look this way and see the subway entrance. Later after we took the place, I'd go down and she'd wave to me.

So we liked it very much, but we didn't say anything. We said it was a little too rich for our

blood, “We can’t afford this.” But he asked us for our name and address. A night or two later, in he comes. I told him where I worked. He said, “I’d like to make you an offer. It won’t cost you any more to live in that apartment up there than it does in this one.” He said, “We’ll move you up for nothing. We’re having difficulty getting the New Yorkers to move up—they all want to be downtown, even though it’s dark and lousy and everything else. We can’t get them pried loose like we thought we could with the subway, where you can get downtown real quick.”

So we took it and moved there—twenty minutes it used to take me from the house to the office down at the Brooklyn Bridge. The only thing we had to do was take a lease for a year—the rent was higher than what we were paying, but there was no rent the first or last month, which averaged out less than what I was paying. I’d made up my mind that I was going to stay in New York for three to four years, but I wasn’t going to stay forever, I’d also made up my mind about that. I’d stay for the experience, and then go out some place.

Getting Into Design at New York Edison

Killinger: How where you progressing with the New York Edison Company? Had you gotten into design by then?

Brunnier: Oh, yes, I was clear up to my neck in design. We had some very interesting projects—foundations and otherwise. I remember working on the coaling station for New York Edison. The front part of the powerhouse was cut down in about 20 feet of rock, and out where we were doing the coaling station we

had to use piles on a smooth rock surface—there was nothing on it. We had to support that on piles, because they picked the coal up out of the barges then and conveyed it in.

Killinger: Those were all steam-operated stations using coal as their fuel?

Brunnier: Yes. [Before I got to Edison] I had never seen a generator, a real generator turbine. Turbines had just come in at that time. I’d never heard of them, but being with the New York Edison Company, I learned to be damn careful when you’re on high-tension wires. By close shaves too—maybe if somebody else is careless.

I had a tape melt just once. I had hold of one end of it, but I had it on steel. Fortunately, the guy on the end did too, but he swung it behind a high tension switchboard. By the time it hit the switchboard he had it back on the steel that he was measuring from. The God damn tape just disappeared like that.

Killinger: You could have disappeared like that, too.

Brunnier: Sure, if I hadn’t had it down on steel. There was another substation that I designed. A 25-foot building down in the financial center, where they needed a substation. In those days they didn’t transfer their juice as far as they do now—they put in substations to transform it down from the higher voltage to the usable voltage.

Here you get in between two buildings and we had a nice foundation problem there with caissons—put in two caissons and put a girder across and set your outside columns on the outer ends of the girders, just cantilevering over the supports. They had 25-foot and

30-foot lots down there, like we have here. There were heavy loads. They had transformers downstairs, and storage batteries on top—these big heavy batteries they had for storage.

Killinger: They were using storage batteries as part of their system?

Brunner: Yes, if the thing went out of commission you had a little juice left. I had a very interesting experience in the short time I was there designing these buildings and docks.

Killinger: Did you find that the electricity course you took in college helped you any?

Brunner: No. Edison had an electrical engineering department that knew all about it, and I didn't. They had five sections, electrical engineering, mechanical engineering, architectural section, structural engineering, and construction. It was a very nice place to work, although the offices were over the boiler room, and in the summer they got awful hot.

Unpaid Winter Overtime

Brunner: Beginning October first, we'd start designing, and by March first everything had to be ready for bids, so we could contract on April 1st, when the frost would be out of the ground and they could start working. That's what determined the construction period—when the frost was out of the ground.

So from October to March we did a lot of work, including a lot of overtime, and we didn't get paid for it. We were allowed an hour for dinner, and everything was closed down there except an English tavern and one or two places. It'd cost you a dollar to eat in there. So you got nothing for working overtime.

But when the summer came along you were assigned to inspect and in general supervise the jobs that you had designed during the winter. Of course, there were sometimes other fellows with you, and if you had nothing to do, there was nothing in the rules—and in fact it was even hinted to you that going to a ball game was acceptable if there was a ball game on, but don't come back to the office, because it was a hell of a place to be. That was your compensation for working overtime for nothing during the rush period. So I saw a few ball games.

They were a funny company. They had no time clock until just before I left, although it hadn't been installed yet. We had one man in our department who persisted in coming in late every morning. We used to argue with the guy, who always made it a point to come in before the general manager came in. But one morning the manager came in a little bit earlier, and came up the elevator with this guy. He inquired and found out the guy was just coming to work, so he said, "Time clocks from now on." I think I would have quit if it hadn't been that I was going to come out here to San Francisco, because I wouldn't work on a time clock.

Using Caissons

Killinger: Was there any outstanding job that you did while you were with New York Edison that presented unusual problems?

Brunner: Well, I think of the Water Street substation, where we used the caisson and the cantilever, and had some terrific loads to take care of, so foundations were a big problem. The question was whether to use a little pile, or use a caisson, or what to do. That project sticks in my mind more than the coaling station out

on the waterfront, which was more or less routine, the only problem being to get a toehold with the piles down there on that rock.

Killinger: New York is practically all rock, isn't it?

Brunnier: Yes, except lower down, and as you approach the shores.

Killinger: In making the decision on the Water Street station—whether to use caissons or pilings—what did you arrive at and on what basis? Economics?

Brunnier: No, we used wood pilings in those days (green piles because it was below water level). We didn't have concrete or steel pilings. It was a question of whether the piles could get down to bearing, because there was broken up rock and other things. There's everything down there in the lower end of New York.

Killinger: You weren't going to depend on skin friction?

Brunnier: Oh, no, there was mud on top of everything—so you had to get down to bearing, as it was just pure mud on top. You never knew if it was on rock, or floating in mud. So

we felt using pilings wasn't reliable enough. While it was much more expensive, we decided to go with caissons. We used air in those days to go inside and break up the big boulders. Put a few small shots in and break it up.

Killinger: That's right, out here in the west, air has never been used as much as it has in the east. All the subways and that sort of thing were done with air. Were you still thinking about contracting?

Brunnier: No, I'd forgotten contracting. I could have gone into a general civil engineering corps or structural engineering, structural design, because I had had enough experience with Marston in general. By that time I'd made up my mind on structural engineering. I was set on it, but figured I'd have to go some place else besides New York, where father traded with father and son traded with son, and it was carried down in the families. It was very difficult even to break into an organization in New York in those days, and some of that still goes on today. Some of those big corporations have big engineers who wouldn't be there at all, except for family connections.

San Francisco and Start of Own Practice

I went on the basis of service—selling service and the idea that you had to get paid for it.

Brunnier: Then the 1906 earthquake came along in San Francisco. I don't remember just what date the earthquake was on, but I do remember that it was on a Wednesday [April 18, 1906]. After lunch one day, the chief engineer of the New York Edison Company came over to me and said, "How would you like to go to San Francisco?" The earthquake was my first thought, but I didn't hesitate, and said, "I'll go any place you want me to go."

Years afterwards, I learned this story as I'm telling it to you now. I used to go in and see a friend of mine, George, at the New York Edison Company, every once in a while when I was back there. One day George took me to lunch and said, "I don't think I ever told you how you got sent out there [to San Francisco]," and he told me this story. He had been out with a man named Ubelocker from Ford, Bacon and Davis, who were the engineers for the United Railroads, which had just been organized [in 1902]. All these separate railroad companies were put together and made into one, and they were getting ready for plans for development, and then the earthquake

came along.¹⁴ Ubelocker wanted a structural engineer, mechanical engineer, and electrical engineer. He said he couldn't find anyone who wanted to go to San Francisco. He [Ubelocker] was afraid they might need somebody out there in each one of these three branches, so they were sending us out blind, really. My friend, George, told him he had a big blond from Iowa who he was sure wasn't afraid of the Indians. "He's just been married, and if I can get him to agree to go, I can shame a mechanical and an electrical who are bachelors into going."

I talked to Ubelocker and told him, "I've just married, and I don't have enough money to take my wife out there." He said, "We need you desperately enough, we'll pay your wife's expenses, and we'll pay your living expenses out there as long as living is unusual."

Killinger: So he was taking you away from New York Edison?

Brunner: On a loan—it was intended that I come back to New York. When he was talking me into going, George said to me, "If there are any promotions, you'll get yours just the same

as though you were here. If there are any salary raises, and as you know we raise every six months, yours will be automatic because your experience out there will make you a better engineer for us than if you stayed right here, because it's going to be an entirely different experience. You can't go down the street there and pick up an I-bar. You have to order it from the east, so you have to know what you want before you order it."

So on a Wednesday I agreed to go to San Francisco, and on Saturday we were on our way out here. They agreed to take the lease off my hands—of course that amount of money didn't mean anything to them. I met a friend who had been in our apartment and liked it very much, and when he found out we were going to pull out of there, he said, "Don't tell anybody, let me take another look at it." And he said, "I'll take that lease off your hands, my wife and I both like that place."

Anyway, when I came home that day, my wife didn't know a darn thing about going west, and here comes a fellow who was going to take our apartment. It was quite a shock to her, but she was tickled to death to come to California. The only thing she regretted was that she didn't get to see what she wanted to see of New York. She thought she had lots of time, as we had planned on being there for a number of years. But I said, "We'll be back here sometime for a visit, and you'll see New York."

1906, the Trip West

Brunner: So that's how we came out here. I left my wife in Iowa, because with the stories we heard, I didn't know where I was going to sleep. I knew they'd take care of me somehow,

14. United Railroads of San Francisco operated several transportation routes in the city of San Francisco and south down the peninsula. The rail system was a combination of cable cars and trolleys—electric, horse-drawn, and steam-driven. The 1906 earthquake destroyed the Powell Street cable line and car house and damaged many others routes. United began aggressively repairing and rebuilding, but never expanded their system as much as had been planned prior to the earthquake. In 1921, United Railroads was taken over by the newly formed Market Street Railway, which was absorbed in 1944 into the city-owned Municipal Railway (today's Muni).

but maybe I'd have to sleep in a tent. So I just dropped her off in Iowa; I didn't stop. Nice thing to do after being married from October to May!

Then she came out to San Francisco the middle of June. I got an apartment up here on Haight and Broderick, and wasn't smart enough to take a lease. When the guy saw the situation, every month he raised the rent \$5, and after about six months of that the rent had doubled. So we started looking for another place, which was very difficult. They talked about a housing shortage after World War II—it was nothing compared to what they had after the earthquake and fire in 1906. There were 40,000 people living in tents out in Golden Gate Park and Jefferson Square. They lived there for two years.

Killinger: When did you land here in San Francisco?

Brunnier: May 4, two weeks after the earthquake.

Killinger: When you came out on the train, did you have any trouble coming on through to San Francisco?

Brunnier: No. The old Overland Limited used to drop their diner car in Reno, because they got here about eight o'clock in the morning and didn't serve breakfast—you could eat on the ferry, which I didn't know. We woke up in the morning and expected to have breakfast, and there was no diner. And with every freight train that came along, we were sidetracked because these trains were carrying provisions or something that was essential [for earthquake relief]. So all the freights had the right of way over the passenger trains.

The result was that we [Brunnier and the two other engineers who traveled with him from New York] got in about seven o'clock at night, and not a bite to eat since dinner the night before. I didn't know when we got on the boat that we could have eaten on the boat, because the New York ferries have such a short run, they don't even serve you peanuts or nothing. So we got here and had to walk out to Turk and Fillmore where the car barn was—streetcars weren't running yet. We got up to Turk and Fillmore and presented this letter to Pat Calhoun, who was the president of the United Railroads [from 1905 to 1913], and of course he wasn't there.

The boys there must have known about our coming—at least when we got back they had a place for us to live. But they said, "We can't do anything for you until Mr. Calhoun endorses this, and he lives on Steiner," or somewhere. So we had to walk down Fillmore to Washington until we reached wherever Pat Calhoun was. He was leaving and he signed it, and we had to turn and come back.

By that time it was nine o'clock pm, but they evidently anticipated our coming because when we got there, they had a nice big juicy steak and a great big baked potato and a nice big piece of apple pie with cheese and a cup of coffee. That was our dinner, and boy did we eat it! It was cooked in the street and we ate it in the streetcar. They weren't allowed to cook in the houses after the earthquake and fire, because the chimneys were cracked. Until the chimney was inspected and approved, you weren't allowed to cook in that house. Of course, there was no gas anyway for a while.

Killinger: If you didn't have a wood stove, you didn't have anything to cook on.

Brunnier: Then we had quite a nice place to live—it was near the car barn. She was police matron and he had the cigar stand and Hoffman Cafe on Market Street before the fire—I can't think of their names right now. Anyway, they were the most pessimistic people I've ever run across. They were just sure that San Francisco was through now—you could never rebuild it, it will never be San Francisco. So they rented the three of us the upstairs and they kept the downstairs. That's what we had until I found the apartment on Haight and Broderick.

1908, Starting Practice in San Francisco

Killinger: What is the date that you actually went to work for yourself?

Brunnier: June 1, 1908.

Killinger: At this time didn't the steel companies often do the structural design, or had that started to become passé?

Brunnier: No, some companies did—or had engineers representing them do the design.

Killinger: Did some engineers who came to San Francisco right after the earthquake for steel companies later stay out here and go into practice for themselves?

Brunnier: Outside of Chris Snyder, I don't know of any others. He was with the Milligan Brothers [contractors]. I don't think he was here before the earthquake.

Did I explain another reason why I went into business? Because of these fellows who were consulting engineers down on the corner, I had

the opportunity of making shop details for the Western Iron Works. We weren't too busy at the railroad, because there were the railroad strikes¹⁵ and the graft prosecutions,¹⁶ the high cost of labor—everything going into it. They [United Railroads] didn't build anything like they had intended to build when we were first sent out here.

During the period of decision, we didn't have much to do with things, so because of my training with the Bridge Company I used to work nights making shop details. After I made the first set of drawings for Western Iron Works—they hadn't seen details like that—I could have practically all the work that they had, which wasn't too much, they were a small shop. But whenever I had the time, I could do their detailing. That way I got acquainted with the type of work that the engineers were turning out.

They [other structural engineers practicing in San Francisco at that time] were not giving a complete service, complete details like I was

15. Strikes by United Railroads car men, August 26 to September 5, 1906; May 3 to September 13, 1907.

16. In the urgency to restore transportation after the 1906 earthquake, United Railroads president Patrick Calhoun sought and received a "temporary" permit to run overhead trolley lines on Market Street, which had previously been prohibited. When the permanency of the situation became obvious, public outcry led to an investigation. Mr. Calhoun was later accused of obtaining the permits by bribing the mayor and Board of Supervisors, and in 1909 was indicted (along with others) for graft. A 22-month trial ended in a hung jury. The charges were dismissed in 1911 for lack of evidence. Mr. Calhoun remained as president of United Railroads until 1913.

used to. I had already made up my mind that was what I was going to do if I ever did make a design, so the builder would know how to do it from the drawing, and not have to figure it out for himself. That I learned while I was at the Bridge Company. We used to get drawings from architects that just had the stresses on there, and somebody had to go back and find out how to detail them.

There was J.B. Leonard, with “Consulting Engineer” on his door, and down in the lower corner, “Corrugated Bar.” Maurice Couchot, “Consulting Engineer,” lower corner, “Kahn Products.” Then there was Richard Derfling, “Consulting Engineer,” and down here, “Corrugated Bar.” Chris Snyder, Consulting Engineer,” down here, “Milligan Brothers.”

I figured they just were not giving the kind of service that I thought an engineer ought to give. I knew I could give the service—it was just a question of whether I could sell it or not. I had a wife, two kids and no money, but I started out on that idea. For a couple of years, I guess they didn’t get any new clothes and neither did I. But we got by, and here we are.

Killinger: You had arrived at the United Railroad office and started in at the office. You had worked for one chap immediately after the United Railroads and then you had left him and you were starting up on your own practice. That was just about where we left off last time.¹⁷

Brunnier: One day on the elevator coming down [from the office of the engineer for whom he worked after leaving United Railroads], I ran into a fellow from Iowa, and he had just opened an office. He suggested I go in

with him. We rented an office, the two of us, for \$17.

Killinger: You ran into this fellow—what was his name?

Brunnier: Willis Kyle. He had just taken on the aegis of Corning Bar and opened an office in the Monadnock Building [685 Market Street, San Francisco], and he said, “Come and share it with me.” So we had one room—\$17 a month for the two of us. We had one desk and a drafting board.

Killinger: Explain what Corning Bar was.

Brunnier: It’s a bar for a window, holding glass—mostly for storefronts.

Killinger: How long were you in this office with Kyle?

Brunnier: I imagine a year or so, but I don’t recall exactly how long. Later on, he took on the McClintock-Marshall Agency, a steel fabricating firm for whom he had worked back east. Of course, to be a designer, I couldn’t be in an office with a man who represented a material. It wouldn’t do. So I moved into a back office on the same floor with three rooms. At that time, I’d gotten to where I needed more than one room, anyway, and I moved into a suite of rooms.

17. Editor’s note: The dialog suggests that a tape is missing from this sequence. This missing tape would presumably cover the period of time immediately after Brunnier’s arrival in San Francisco to work for United Railroad (for Ford, Bacon, and Davis, on loan from the New York Edison Company) and subsequent work for another (unnamed) structural engineer in San Francisco before opening his own office in June 1908.

Killinger: When you moved into the back offices in the Monadnock Building, you were then strictly on your own?

Brunnier: Yes.

Killinger: Were you still paying \$17 a month?

Brunnier: No, it cost me more, but it was pretty cheap in those days.

Early San Francisco Engineers

Killinger: At the time you started as a consulting engineer in San Francisco, there were only what, four or five engineers that you really could call structural engineers?

Brunnier: Well, there was John Galloway, whom I haven't mentioned. He was not associated with any material, but he was a partner with an architect, John Galen Howard, who was the head of the School of Architecture over at Cal. Galloway was consulting engineer for PG&E throughout all his [professional] life. He did primarily hydraulic work. But he did some structural engineering—stuff John Galen Howard did, and he did the engineering on it. I think he did the engineering on the work that [architect Bernard] Maybeck did also.

I know the last man to give up the commercial relationship was Chris Snyder [who had represented Milligan Brothers], and that was in 1913.

1912, Tearing Up a Contract for the New San Francisco City Hall

Bakewell and Brown, Architects, won the [contract for design of] City Hall in competition, and I had a contract with them to do the structural engineering. Then they came to me one

Saturday afternoon with tears in their eyes and said, "Would you tear up that contract?"

There was a commission for the civic center. On it was Charlie Derleth,¹⁸ who was an engineer, Fred Meyer, and I forget who the other one was. Fred Meyer, who was on the commission under [San Francisco Mayor James¹⁹] Rolph, was a close friend of Chris Snyder—in fact, Chris did all Meyer's work. Anyway, Fred puts this pressure on Bakewell and Brown [to use the engineering services of Chris Snyder], and they were afraid Meyer could make it awfully tough for them.

They just pleaded with me—and after listening to their story a little while, I finally tore up the contract and threw it away. They promised me that they'd give this job to Snyder, but after that I'd get their work. But I never did.

Killinger: That was a tremendous contract, too—probably the biggest one that'd been out for years.

Brunnier: Yes, but they [Bakewell and Brown] could have made it so hard for me that I'd have lost money on it. I did some quick thinking. I thought that if they were those kind

18. Charles H. Derleth was Dean of the College of Engineering at the University of California at Berkeley from 1907 to 1942. Derleth consulted on many major engineering projects in the Bay Area, including the San Francisco Civic Center, both the Golden Gate and San Francisco-Oakland Bay Bridges (Brunnier was also a consultant for the Bay Bridge), the Carquinez Bridge, and several other bridges and dams in California.

19. James (Sunny Jim) Rolph was mayor of San Francisco for 19 years, from 1912 to 1931. In 1931, Rolph became Governor of California and served one term, until 1934.

of fellows, I didn't want to do any business with them anyway. They didn't give me the future work—they were satisfied with Chris and just kept him.

Architect George Kelham and the Structural Design for the Sharon Building

Brunnier: While I was still in the Monadnock Building [685 Market Street], we got the job of designing this building that I am in now, the Sharon Building [55 New Montgomery Street, San Francisco]. George Kelham was the architect and we did the structural engineering.

It's an interesting story of how I met George Kelham.²⁰ Fred Moose was the manager of the Santa Cruz Portland Cement Company at that time, and was a brother of my chum, Dan Moose, back east—"Dad" Moose, as we called him. So I was introduced to Fred, and Fred on more than one occasion boosted me so that I got jobs I otherwise might never have gotten, and this was one of them. Kelham had the Marston Department Store [in San Diego] to do. Not being one of these who wanted free engineering,

he drew up a specification of stresses to be used and so forth, and then allowed the contractor to submit the structural design on the basis of that specification with their type of materials.

It so happened that by that time Maurice Couchot had given up Kahn Products [steel fabricators], and Alan MacDonald had taken them over. They made a design—which was the custom of the Kahn Products people, they were a little bolder than the rest—they went higher on the stresses that were in Kelham's specifications. Kelham was tipped off that while theirs was the low bid, the design was not according to his specifications. So Kelham went to Fred Moose and asked if he knew of a good concrete engineer who could help him out in this dilemma. Fred Moose comes into the picture and gives me a boost.

Fred must have given me a terrific boost because the next thing I knew Kelham called me up and asked me to come over and see him. When I walked in he said, "For Christ sake, you're not Brunnier?" He was a man who expressed himself. Then just that quick he said, "I didn't mean it that way, but hell, with all the experience you're supposed to have had, I expected to see an old man come in here." So I helped him out of a dilemma.

He called Alan MacDonald up and said, "Brunnier tells me this is not according to specifications." MacDonald said, "Oh, hell, engineers don't know how to figure Kahn bars." But I convinced Kelham that I was right and Alan wasn't, and he turned loose on Alan. I never heard a man cuss the way he cussed Alan MacDonald. From that time on, Kelham and I became close friends. I did all of his work from

20. George W. Kelham was a prominent architect in San Francisco at the turn of the 20th century. Kelham designed many civic, corporate, and private buildings in California, including the San Francisco Public Library at Civic Center, several downtown highrises that defined the shape of San Francisco's new skyline, and many buildings on the University of California at Berkeley campus, including the Life Sciences Building, Davis Hall, Harmon Gym, McLaughlin Hall, and International House among others. Henry Brunnier was the structural engineer on all these projects.

that day on, which later on was a lot of work, as you know.

Killinger: Well, Kelham was one of the leading architects of the time. When did you start on the Sharon Building?

Brunnier: Early 1912.

Killinger: You decided you would have your offices in the Sharon Building?

Brunnier: Yes. Maybe there was a little pressure put on me to do it—to rent in the building. Anyway, I could get kind of the layout that I wanted. I didn't have exactly what I wanted over where I was then [at 685 Market Street in the Monadnock Building]. I had expanded a little and needed more room. So I made arrangements to have a layout made to suit me here, and moved in here February 1, 1913.²¹

Killinger: Had you been working entirely by yourself up to this time, or had you put on some draftsmen?

Brunnier: I had three engineers before I came over here [to the Sharon Building]. That's why I was getting short of space. I worked on the boards myself, and it was kind of hard to squeeze four boards into one room.

Selling Service

Brunnier: Here is something interesting about fees. Right from the start of practice [June 1908], I charged more fee than the others were charging. Usually, the young fellows feel

they have to charge less in order to get the job. But I went on the basis of service—selling service and the idea that you had to get paid for it. Of course I had a little advantage at that time, with these others not being strictly professional [they represented materials interests in their own practice]. I could go to an owner, if I had an entree. If an architect was employing one of these fellows and getting his work done for nothing, I could tell an owner that.

Incidentally, it helped me become friendly with [George] Kelham, Hobart,²² Mulgardt,²³ and some of the old-timers who didn't believe in operating that way. They wanted to be strictly professional, and didn't want to have something done for nothing for them and be under obligation. I didn't care about the other guys—if they weren't honest, I didn't want to have anything to do with them anyway. Because sooner or later they'd get the best of me. So I had an advantage over the young fellows of today.

But I got to studying the fee matter, and had an auditor friend who went over the thing. I wasn't making as much money as I could make

22. Lewis P. Hobart was a San Francisco architect during the early and mid 1900s. Hobart designed Grace Cathedral, the Bohemian Club, and was a consulting architect for the 1939-1940 Golden Gate International Exposition on Treasure Island. Hobart designed the Shredded Wheat factory in Oakland, California, for which Henry Brunnier did the structural design.

23. Lewis C. Mulgardt designed the original DeYoung Museum in Golden Gate Park (1919), structural design by Brunnier. Mulgardt served as a consulting architect for the 1915 Panama-Pacific International Exposition, and eventually achieved international reputation.

21. Brunnier's first office in the Sharon Building was on the third floor. In 1925 he moved the office to the sixth floor, where it continues in business (2001).

working for somebody else, even though I was already charging more than the going fee. So the auditor and I would fool around with this, and finally decided that—since I didn't want to quit—there were two alternatives: One, I could reduce service, which I wouldn't do, and two, I could get more money [for my services]. So I decided I had to raise my fee.

Killinger: What year did you increase your fee?

Brunnier: Before the war—along in 1914, in that period. I decided to go to Kelham, who was my biggest client at that time, we'd done a fair amount of work together. He didn't get into the big work either until after the war. The Marston Department Store, the San Diego YMCA, this [the Sharon] building—this was all before the war. He was the chief architect out there at the World's Fair [the Panama-Pacific International Exposition in San Francisco] in 1915, so he had quite a bit to do. But it wasn't anything that gave me much business. There were small jobs around that we did together. Anyway, he was my best client.

I went to Kelham, and I laid my cards on the table. I had decided I was going to double my fee, or quit and go to work for somebody else and not have all this worry. I told him the whole story. He saw I was serious and evidently had decided he would like to keep me, probably needed me. He was a tight little fellow, and he didn't want you to be known. He was going around telling the clients he was providing the best damn structural engineer. I heard him say it one time when he was talking to a client, and I was behind his back and he didn't see me. And he used to put our names up on the board with his.

Killinger: That hadn't been done before.

Brunnier: But he was smart. He was telling people he was giving them the best service that could be given. Whether it was or not, at least he was selling them this. So he looked at me and said, "Well, I don't see how you can do anything else—it's all right with me."

All these other fellows I'd been doing business with were all small fellows—one a year maybe, or not even that—except this fellow named Billy Bender down in San Jose. We did a fair amount of work for him. It was all small but it was continuous. I went to Billy and he said, "I can't do that. In order to get these jobs down in San Jose, I've got to charge less than they do in the city, otherwise they get the city boys." I said, "Billy, you don't have to do that. Sell service—you've done enough jobs." And he did a good job, too. He looked after things—not only designed, but built.

Billy and I with our ladies used to hike together—sometimes hike for three days with nothing but the clothes on our back and our camera with us. But at the end of the destination was a suitcase with our clothes that we could change into. We used to hike over Mt. Tamalpais. Anyway, we were very good friends—families and all. But he got mad at me [after I told him I was raising my fee] and didn't talk to me. His wife tried to talk him out of it, but he felt he had helped make me, and I was throwing him down. That's what I think he felt.

It was years afterwards that one day he walked into the office and I heard his voice. I got up and met him and said, "Gee, I'm glad to see you, Bill." There was such relief on his face, he didn't know how I was going to take it. He'd

been carrying this for all these years, and he just couldn't take it any longer. He'd turned Christian Scientist. I invited him in and we had a grand old talk. Then he invited me to come down to his place in Los Gatos. He was retired, had lost his wife. But that fellow carried that [grudge] for a long time. How silly.

1917, Brunnier Moves from Design to Managing and Promoting the Firm

Brunnier: Then I found that there was a tremendous up-and-down curve in the office—periods of nothing, then busier than hell, and then nothing. And it bothered me—I didn't know what to do. I don't remember if Henry [Powers] was here then or not, I don't think so. Anyway, I plotted the productive hours—hours chargeable to the job by everybody in the office, because I used to do a lot of the work over the [drafting] board myself. And I plotted my time at the drafting table, and found it was just inside of the big curve.

Then it hit me, just like that—if I hire somebody else and I go out and do public relations, I wouldn't have these dips. I had to make up my mind to get off the board, and it was a hard job to do because I love to do design, create new things, try to do things differently. So I still make some crazy suggestions once in a while, but it isn't like when you're out there working [at the drafting board].

So, I finally decided I had to do it, and I got off the board. It was 1917 and I've never been on the board since. I say "never have," but I've gone out and made little details or something like that. What I mean is that I've never gone

out there and really designed [since then]. I remember going back to Washington one time on this post office job, and making all the changes that they wanted on standard forms. I was back there and thought, there's no use in hiring a draftsman, and I put them on.

Killinger: Even after you got off the board, you kept a close finger on everything that went through the office.

Brunnier: Oh, yes. In fact, I used to come in nights, and I could tell if a guy was working or not. Because in those days I did the hiring and firing, although I only fired one man, that's all. We've let a lot of them go, but we always did it nicely—waited till the work slacked off and said, "Well, we don't see anything ahead." And we always gave them a 30-day separation pay so that they're not worried. I always tell them, "It's my worry whether you've got a job or not. When I see you haven't got a job, I'm giving you 30-day notice, which means you can take the whole 30 days and go out and look for a job if you want to."

The one man I fired was just a kid out of college. He just wasn't honest. Not that he'd steal anything, but you couldn't trust him to put the time on the time cards. He'd come in late. We never had any office hours, we left it up to every man. If we can't trust a man to keep his own time, we don't check his time, and we don't want him around if we find out..., and sooner or later we'd find out. This kid always made it a point to get in before I did, and some way or other I got hep to it. So I called him in one day and had quite a talk with him.

Then I waited a while and I kind of felt that.... Well, one day I left word that I didn't know if

I'd be in much before noon, or at least not unless something happened. I didn't say, "unless something happens," very loud, it was just to clear my conscience. I was here at eight o'clock the next morning, and he came in about eleven o'clock. By that time I had his check written out with a 30-day separation pay—I handed him the check and said, "Go back and pack your books up and get out of here, I don't want you around. If there's anything I hate, it is dishonesty, and I just don't want you around." So he packed up his stuff, and as he came out I said, "Come here, I want to talk to you."

I talked to him for quite a while. I told him he had ability, and was just a damn fool and was throwing it away, and for what. He didn't get anything by not being here on time—in fact he lost, because he didn't gain any experience, which you can only get by doing. I talked to him like a father would. Then he left.

Five years later, he blew into the office and said, "Well, I've got a nice job with Standard Oil Co. in Chicago." Told me what he was getting, what he was doing. He'd just gotten married, and one of the arrangements of the

marriage was they were going to honeymoon in San Francisco. Of course that didn't hurt her feelings—she wanted to come to San Francisco. He said, "I wanted to come back here and thank you for firing me. It wasn't the firing, it was what you said afterwards."

Killinger: You woke him up. I interrupted you where you said you'd gotten off the boards.

Brunnier: At that time Frank Johnson was in charge [of day-to-day design and drafting]. One day Frank came in to me and said, "You're taking the initiative from the boys, because you come in here at night, see a detail, and make another one. Sometimes we think ours are just as good as yours." I said, "Wait a minute Frank. I get it, maybe sometimes you think they're *better* than mine." I stopped a minute and then said, "I realize what I've been doing. From now on, any time I see a change like that, I'm going to make a note of it and we'll have a consultation on it and discuss it. Then we'll decide who's right." That taught me to delegate orders. I got so I did less and less of going over the work in the office. Hell, now I don't even know the jobs that are on the boards.

Early Waterfront Projects

[He told me] "If you had taken one penny off of that fee, you would never have gotten that job." I like to tell that story to the young men I talk to. You can sell service if you stick to it.

1908, Work on the New San Francisco Waterfront

Killinger: I know you worked on the development of the San Francisco waterfront. When was that?

Brunnier: Yes. I hadn't been in business very long, about four months or so, when Steigert Terra Cotta Works called on me—I think it was October 1908. They had a \$6 million bond issue, which was a lot of money in those days, and they were going to build [a big waterfront project] in concrete.

Killinger: That's a lot of money even today [1959].

Brunnier: Not for the waterfront—it wouldn't go very far today. They had nobody there who had any experience in concrete design, so he talked to Fred Moose. Steigert wanted me to come down there [to the project office on the waterfront] and be the designing engineer. Ralph Barker was the chief engineer, but of course he didn't do the designing. He had the whole

waterfront to look after, and I don't know how much of a designer he was.

Anyway, he wanted me to go down there and do all the structural engineering for the waterfront he was going to build. I said, "I'm just beginning to get results from these months that I've been wearing out shoe leather trying to sell myself. I can't quit now." By that time [about four months after opening his office], I had one man working for me. So I finally made an agreement with him—I'd get the pay of the designer, but I'd only put in part-time down there. They had no arrangement in state employment that they could put a man on part time, but I was supposed to put in part-time there. There wasn't anybody down there who knew anything about design or who could even make a decent drawing. The work got so interesting that I put in most of my time in there. I would go to my office [at the waterfront] about four o'clock in the afternoon and work there until ten, eleven, twelve o'clock at night, because the work was so interesting.

In those days, when a new governor came in, everybody down there at the waterfront went out. Those were the days before you had civil service. It was a political thing, absolutely political. While I was working on the waterfront, there was one fellow there, I won't mention his name because his family may still be alive—who was drunk every afternoon. He'd go out to lunch, get drunk, and come back to work. As a matter of fact, he broke an electric light bulb that was hanging over my desk. He made me so mad that I grabbed him by the nape of the neck and the seat of the pants and threw him out on his face. Then I went to the president and told him I had thrown the guy out and told him to

stay the hell out of here. The president [of Steigert] said he concurred, that he didn't like the fellow either. Two weeks later, the president comes back and shows me a letter from Governor Gillette telling us to put this fellow back to work.²⁴ He wanted to know where to put him, what to do with him. I said, "Put him as inspector out there on Fishermen's Wharf"—they were building a seawall—"That's the farthest-away job that we've got."

Killinger: Is any of the work you did still there?

Brunnier: Oh, yes. A seawall running from the [Islais Creek] channel [designed in 1910], clear down to the Ferry Building is still there. Pier 36, a number of the piers—I just don't remember the numbers—down on the south end of the waterfront. That was the first part that they made permanent, the north end came much later.

Killinger: That's where the Matson pier and the Dollar Line pier used to be—they are at the other end now.

Brunnier: That's right.

Brunnier Unearths Waterfront Plans from 1872

Brunnier: When I was looking around through drawings, I tried to systematize the data that was down there, because there was only one man who knew where to find it. There was an old man named Karl, who seemed to have hung on through all these

24. James N. Gillette, Governor of California 1907-1911.

administrations and knew where everything was. Karl got sick, so I said, “My God, we spend so much time trying to find things here, let’s index it.”

In this indexing I found data and a report developed in 1872 by an engineer by the name of Arnold, recommending putting this seawall very near where it is today. Remember that the waterfront in 1872 was all the way up to Montgomery in places, or even up to Kearney at Commercial Street. The picture I have up there [points to his office wall] shows the waterfront up to Kearney in 1850.

The reason I mention it is that it was interesting to see that an engineer of that day had the vision to establish a pier line, and recommend establishing a bulkhead at approximately the location of where we eventually built it. The report showed that somebody had foresight. His [1872] report said the land would be developed, and would more than pay for the construction of the pier. Of course, with the changing of the administrations, I suppose some graft got in there. Anyway, they never did realize anything from the land that they made back of that seawall. All that filled land was tideland once. Today it would be worth a fortune.

Animosity Later Becomes a Close Friendship

Brunnier: I had one very interesting experience there [while working on the waterfront]. A man named Howard C. Holmes had a patent where he would drive a pile down first, then put a wood casing down around it, then pour concrete around there to protect the wood pile. Unfortunately for him, he didn’t realize that

teredos [shipworms] would eat the casing he had around there, and because he didn’t have good concrete around there, the concrete would drop off, and then they would get at the wood pile. And that had happened on some of his jobs.

Holmes designed Pier 34 for the Western Pacific Railroad, and it was up to me to approve that design. I wouldn’t approve it, and I told him why. I said, “You’ve got to get that mud and water out of there, so that you can put concrete down there, in the dry.” I even went so far as to suggest that he develop a gasket of rope or something else that he’d put around that sleeve, and that he’d slide down there, and then jet the mud and water out of it. He just hated me like poison and called me a damn kid, but he had to do it. Of course, the thing [Pier 34] cost quite a bit more than they figured, but it is still there today.

It was years afterwards, but all of a sudden he called me up and wanted to know if I’d have lunch with him at the Bohemian Club. You could have knocked me over with a feather. He said, “I’ve been unfair to you, young man—I realize now that you were right, and I just wanted to invite you up to have lunch with me and tell you that I appreciate what you did there.” After that, he occasionally invited me to lunch, and gave me some pretty sound advice.

One of his pieces of advice was “Don’t worry about making any money until you’re 55. Go on and get experience. After 55, make them pay for what you’ve learned. Don’t be afraid to charge—they’ll pay it, but go along now and establish a reputation, and don’t worry about money, or spending money to make contacts. Make every contact you can, that’s what a professional man has to do.” He even suggested

that I might join the Bohemian Club, but I didn't feel that I could afford it at the time. Besides, I had gotten into some other activities—Rotary was one of them. You only have so much time when you're trying to make a living. But it shows how animosity can develop into a close friendship, because we were very good friends ever after that.

Patent on Hanging Fenders

Killinger: You got a vast amount of experience on that waterfront—seawalls, power dredging, things you normally wouldn't have gotten into unless you had taken that job.

Brunnier: That's right. Of course I had had a little waterfront experience in New York for the New York Edison Company. Their coal hopper was out on the waterfront. One end of it on rock, and the other end out in 40 feet of mud—that was in concrete. I guess it was on that basis that Fred [Moose] sold me to the Harbor Commission. It was a wonderful experience and that was why I put the time in down there. You can't develop something and not put time in it. Incidentally, one thing that struck me was the tremendous amount of money they were spending on fender piles, which sometimes would only last six to eight months to a year. In 18 months, they'd be gone.

Killinger: Were these green or treated piles?

Brunnier: Green. Treated piles wouldn't do you any good, because it's 3/4" treatment, and the chaffing up and down of the boats would go through that very quickly. So I schemed and thought about it in the back of my head all the time. There should be some way of hanging a fender on these concrete structures, although

you couldn't do it very well on the wood structures. If you had a hanging fender you wouldn't have to tie the whole dock up to put in a pile driver to put in a new fender line. That was happening, with a lot of loss of money, because the dock was tied up with the work for a new fender line.

I carried that in my craw for quite a while, and one morning about four o'clock am, I woke up at home, and there it was. I got up and sketched it out quickly for fear I'd forget it. I probably couldn't have gone back to sleep anyway, so I sketched it up. My first scheme was hydraulic pressure, surcharge. Of course that would have been very, very expensive, so I modified it. They already had car springs, and that turned me to using car springs on this hanging fender. I have two basic patents on it.

Then when this [waterfront] work was done, I went back to my own office in the Monadnock Building again. Then Hiram Johnson was elected governor,²⁵ and a whole new regime came in. They went on designing some concrete docks, got some more money, and used this hanging fender. But the engineer in charge didn't believe in an engineer honoring a patent, and he changed the details and then told the contractors that it wasn't like the patent. It happened that they let three contracts almost at once, and each went to a different contractor.

I wrote them a letter and told them they would have to pay me so much a foot for the use of that hanging fender. They said they were told it wasn't covered by the patent. So I got my attorney and when they saw they were going to have

25. Hiram Johnson, Governor of California 1911-1917.

a suit on their hands, they got together and got old Bill Healey to take me out to lunch one day—in other words I’d made friends when they were down on the waterfront. He said, “We’ve got the money, we could tie you up for years taking this up to the Supreme Court. We’d probably win, but look at the money you’d spend. We’ll give you so much.” I thought it over a minute. There was a good profit in it for me, so I said, “All right. I’ll take it. I’m going to write a letter to *Engineering News-Record* and tell them anyone can use it. They can take it. I don’t want anything to do with royalties from now on.”

Santa Cruz Wharf

Brunnier: Coming back to the subject of waterfronts, I’ve had several interesting experiences. One is the Santa Cruz Wharf.²⁶ I had reached the point where I needed a job offer there. I just had to have it. This was about 1913. I had made a report for the Chamber of Commerce down there on the possibility of the wharf and about what it would cost, so they could present it to the people and have a bond issue. Previously, I had made a study for the Santa Cruz Portland Cement Company. They were going to build a waterfront at Davenport²⁷ so they could ship their cement to the northwest. That was going to be a long wharf. But before they got ready to build [at Davenport], somebody started to build a cement plant up in the northwest so they [Santa Cruz Portland

Cement] decided not to build this wharf, because that export market would be gone. So I had this information and was able to use it to advise the Santa Cruz Chamber of Commerce, and a bond issue went through. The Chamber of Commerce told me they would do everything they could to see that I got the contract for designing the wharf for the City of Santa Cruz.

So the night I expected to sign up the contract with the Santa Cruz City Council, when I got in there, I found out that there were some other engineers there. Councilman McPherson said, “If you take a thousand dollars off your fee, we like you and we’ll give you the job.” He said there were some other engineers who are willing to do it for much less. I said, “Mr. McPherson, I can’t do it for any less and give you service. I’ve built up that reputation you’re talking about by giving service.” He had complimented me a little bit before he asked me for the reduction, and I said, “I just can’t do it. I’m entitled to take some profit—every man has to have some profit in order to stay in business, you know that.” I said, “I just can’t do it,” and walked out.

Two hours later, Ray Judah of the Santa Cruz *News*—he’d been my good friend and had helped me—and the mayor²⁸ walked up to the St. George Hotel. I’d sat there worrying for two hours because I *had* to have that job. The mayor walked up to me and congratulated me. Evidently, I had gotten the job. I said, “Thank you.” He said, “If you had taken one penny off of that fee, you would never have gotten that job.”

I like to tell that story to the young men I talk to. You can sell service if you stick to it. Don’t

26. The City of Santa Cruz is on the coast about 70 miles south of San Francisco.

27. Davenport is on the coast about 10 miles north of Santa Cruz.

28. F.W. Drullard was mayor of Santa Cruz in 1913.

give in and give somebody over here a job for half price and expect the other fellow to give you a full price, because the two of them are going to get together some day.

Work on Harbors in Hawaii

Killinger: Didn't you do some work on harbors in Hawaii?

Brunner: Yes, I did. After the 1915 Rotary convention,²⁹ I'd worn myself out, and so on the advice of a doctor, I decided to take a while to recuperate. At that convention [1915], I'd been elected District Governor of the new district that included California, Hawaii, Nevada, and New Mexico. I thought that the Missus and I could take a nice vacation, I could rest up a little, and I could give the Honolulu Rotary Club their new charter.

Some time before going over, P.J. Walker³⁰ told me, "Why don't you do like I do? Get an album and put pictures of the jobs you've done into it. When you go see a client, just take this book along and open it up and finger through it. During the conversation mention, 'This is such and such a job.' Then you don't have to con-

vince the man that you can do it, because you have done it."

Here I was going to be on the boat for six days, or whatever it took to get there, so I thought—here's a good chance to do this. I had the album and I was pasting pictures in the book. Our cabin was on the upper deck. How it happened I don't know, but one of the pictures slid away from me, was out the door and on the deck. There was a man there and he grabbed it and came in with it. Of course he'd looked at it.

He introduced himself and he said, "Evidently you're an engineer." He said, "What is this," and I said, "It's one of the caissons they use down on the [San Francisco] waterfront to sink the piers. They had originally tried to do it with a cast iron bell and it broke, so they had to slip a caisson over the outside of it to be able to pump it out and go down there and fix it." He asked me all about it. Then he said he was the chairman of the Harbor Board of Honolulu. (I can't think of the chairman's name. The hell of it when you get older, is you can't get these names out when you want to. After awhile you remember them.)

When we got there, Colonel Charlie Forbes, the chief engineer of the territory, came to meet him. He got Charlie Forbes to take us out to the beach and find a cabin.

Incidentally, we had met another couple and gotten quite friendly with them on the boat. They were on their way to China—in fact, he was in business in China. They wanted to stay in Honolulu a little while, so we took a two-room cabin out on the beach there. It's about where the Royal Hawaiian used to be, but you used to have to cross a swamp to get to

29. The International Association of Rotary Clubs met July 198-23, 1915 during the 1915 Panama-Pacific International Exposition. Brunner's title was "Chairman, San Francisco Rotary Clubs Convention Executive Committee." For additional discussion of the 1915 convention, see Chapter 8, The Rotary Club.

30. Percy J. (P.J.) Walker was a San Francisco contractor and knew Brunner professionally. Brunner would eventually build several highrises with Walker and join the Board of Directors of the California State Automobile Association, an organization Walker helped found.

it. There was a bridge going out there, and you used to take a streetcar to get to where the Royal Hawaiian used to be. We had a very nice place there.

We got in [to Honolulu] in the morning, and about three o'clock in the afternoon, the phone rang. It was the chairman of the Harbor Board. He said he'd been talking it over with Forbes, and said, "We've got a problem here on different islands—lightering out in these different ports on account of the coral reefs."³¹ We'd like to have you go along with Forbes, he's going to be gone for maybe ten days to two weeks to all the islands, to study these different ports. Don't misunderstand me, we want to pay you to go along." I turned to the Missus, and she didn't like it at first, but then she said, "Sure, you can't turn that down."

That night I was on a boat going out to the different islands, trying to determine the economic feasibility of docks versus lighter. It wasn't a very difficult problem, because there wasn't enough shipping in those days to warrant the cost of a long dock. To get a dock out to where a ship could dock, you would have to get out beyond the coral reef around any of these islands. Compared to lightering, which was slower but cheaper, long docks were too expensive. Docks weren't economically possible then, although they did use them later on, but the traffic grew in the meantime.

Then Charlie asked me to review the plans of Piers 8, 9, and 10. When I looked at them, I recommended a different design. They just

31. "Lightering" is offloading cargo in deep water from a deep-draft vessel onto a lighter ship, which ferries it to shallow water harbors and docks.

hadn't had any experience in concrete and salt water, so he asked me to take the things back with me [to San Francisco] and send them back with my thinking on it. So the net result was that we were there, and the Missus had a five-week vacation. Not only did she have a good vacation, but I had a good vacation because it really was a good vacation to go around to all those islands. And I came back with \$2,500 more than I left home with.

Some people say, "You were lucky." If I hadn't been going there in the service of something [Rotary], hadn't been on that boat, if I'd been in my office, I wouldn't have had it. I admit that I was lucky that this man picked up the picture, but if I hadn't been on that boat it wouldn't have happened. So you see there is a little element of luck in golf, baseball, everything. But fundamentally, you've got to do something.

Killinger: Did you do any other waterfront projects?

Brunnier: No—well, in more recent years, I did this small inland harbor down at Moss Landing. [R.J.] Wig, head of the Bureau of Standards, used to come out once in two years, I think it was. I used to go up and down the coast with him to look at the effects of salt water on concrete, which is what he was supposedly studying.³²

32. The Brunnier firm also designed the head wharf and finger piers in Balboa, Panama Canal Zone; the Corozol dock for the U.S. Army Corps of Engineers, also in the Canal Zone; the Benicia arsenal wharf; and the California Point pier (designed but never built on the east side of Tiburon). All these projects were during World War II.

Designing Concrete Ships During World War I

We got to working on the thing, came to build up an organization, and had about as fine an engineering organization as you could put together under one roof.

Brunnier: My association with R.J. Wig [of the National Bureau of Standards] led to another thing—in 1917 they decided to build concrete ships [for use in World War I]. The wood ships were not standing up, they just couldn't take the gaff [abuse]. There were many reasons for this, but anyway they just weren't performing.

So the first idea Wig told me about was to line the wood ship with concrete. Well, that's ridiculous, a wood ship is already heavy. You might be interested to know that the displacement ratio for a wood ship is greater than a concrete ship. Those thick wood braces can get waterlogged, and when they get wet, they're very heavy.

Anyway, I don't know what transpired in Washington, but all of a sudden I got a wire from Wig—he wanted me to come back

there and help him with a concrete ship for the Emergency Fleet Corporation.³³ Whether they thought since he [Wig] had come from the Bureau of Standards, they should have some practical man, too, I don't know. Anyway, after R.J. Wig left the Bureau of Standards he made a hell of a lot more money than I'll ever make, so he's smarter than I am.

Anyway, we both had the same job, got the same pay, but if I said "No," and he said "Yes," we wouldn't get anywhere. Yet we never had a bit of trouble, we worked together perfectly all the time. We had a lot of scraps and a lot of difficulties—I could tell a whole raft of stories on those experiences.

Killinger: Did you stay back in Washington on this concrete ship project?

Brunnier: For one year, from 1917 to 1918. I was there a month, and saw the political picture. You see, everybody was against concrete ships—steel labor, steel manufacturing, steel ships. They didn't want to see those things getting started. They had seen what concrete had done in buildings, and their [the steel industry's] influence was apparently such that the concrete ship proposal just couldn't get off its base. I said, "What the hell is the use!" I resigned and came home.

I was no more than home, however, than apparently they'd gotten an appropriation of \$60 million out of Congress. So Wig wired me again and said, "Please come back." I went back to Washington again, and he said, "We've got the money, now let's do something."

33. The U.S. Shipping Board was organized in January 1917. Its subsidiary, the Emergency Fleet Corporation, was organized in April 1917.

So we did. We got to working on the thing, came to build up an organization, and had about as fine an engineering organization as you could put together under one roof. We had experienced consulting engineers because they had no work to do during the war, and they were willing to come back and work. And we picked up young engineers, particularly men who had studied naval architecture—they didn't have any experience, but they had at least studied it, which we needed badly because the Navy and the steel shipping industry was taking everybody they could find for their own use.

We found enough young fellows, and I'll never forget that experience. We were used to working to eleven, twelve, one or two in the morning. We'd get to working on an idea, keep discussing, batting it around. These young fellows had been in the service just long enough to smoke cigarettes.

One morning about two o'clock I said, "Give me one of those damn things," because it seemed to relieve them, and that's how I started smoking cigarettes.

Killinger: And you didn't smoke up to that time?

Brunnier: No.

Killinger: How old were you about that time? [Brunnier did not answer this question, but it was 1918, so he would have been 36.]

Brunnier: I'd smoked cigars for a time, and I'd quit them and I wasn't smoking at all till then.

Killinger: I suppose you smoked a pipe in your college days?

Brunnier: No, I never smoked until after I was out of college. I got to Pittsburgh [to work

for the American Bridge Company] and everybody was smoking Pittsburgh stogies. I got started smoking stogies, and that led to cigars. They were a nervous habit with me. I got to smoking too many, so I quit. Then I got started on those cigarettes and started smoking too many of those, so I quit that in 1939, but I had smoked from 1918 to 1939, practically as a chain smoker.

New Shipyards Had to Be Approved First

Killinger: I'd like you to talk a little bit more about those concrete ships, because not very much has been published about concrete ships and how they fared.

Brunnier: Well, there was at the time. The *Engineering News-Record* had a very complete story on the design.³⁴

Killinger: At the time—this was 1918?

Brunnier: Yes. The story I started to tell was how we actually got to build the ships. For a while we just couldn't get to first base. We made a survey of 21 sites. In other words, the people of the various Chambers of Commerce and others wrote in and wanted shipyards. We set up a set of specifications, and then had men visit these sites. Wig and I visited some of them ourselves, the ones that were finally ranked 1, 2, 3, 4. And there was the labor market for carpenters, because you needed good carpenters to build forms, and steel placement, cement. All those things were available in all of the

larger ports. Of course, even the small ports like Monterey wanted the concrete shipyards.

So they had them rated 1, 2, 3, down to 21, and gave a reason why each was selected and was #1, #2, etc. And we did the same thing for contractors. With San Diego, being way out here, we selected a firm that had engineers—a Philadelphia firm—because there would be some engineering problems coming up away from home. We didn't have airplanes in those days, didn't have airmail, so in order to work, we figured it'd be better to have a firm that had engineers.

Anyway, we had those all picked, they were sent up to Charlie Piez, who was the head of the Emergency Fleet Corporation. Nothing came of it. Then these people from these different communities began to write and wanted to know, "What about the concrete shipyard?" Well, Wig and I got our heads together, and we did a little politicking ourselves. So we wrote back and told them there was no money available. We were telling the truth. The money was available as far as the Emergency Fleet Corporation was concerned, but it was not available for the concrete ships.³⁵

So pretty soon letters came in to the chairman of the House Finance Committee, who got mad and wrote a hell of a letter to [Edward N.] Hurley, president of the Emergency Fleet Corporation. "What do you mean writing out and saying you have no money?" Hurley didn't

34. *Engineering News-Record*, "Concrete Shipbuilding Firmly Established by Norwegian Firm." December 13, 1917.

35. Edward N. Hurley, president of both the U.S. Shipping Board and the Emergency Fleet Corporation, in his book, *The Bridge To France* (1927), says that no one on the Shipping Board or Emergency Fleet Corporation favored concrete ships.

know who had been sending these letters out, so the next thing we were on the carpet. I don't remember if it was Wig or myself, because one of us would be on the road one month and one would stay in the office [in Washington D.C.]—we alternated. Anyway, the thing got to along about May, and I wrote a letter of resignation. I was sick and tired of this—of being batted around.

Fred Kellogg of the *Call*, and on United Press, was a good friend of mine and a fellow who just couldn't understand displacement—a stone ship floating—he just couldn't understand it. He got interested in it because the damn thing floated. He came in and said, “Bru, how are things going?” I handed him my letter. I had just signed it, and hadn't put it in the mail yet. He picked it up, read it and stuck it in his pocket.

He said, “Meet me at the hotel at six o'clock, no dinner, I want to talk to you.” Then he said, “I've got to get back quick, because my room may be gone, I just left it” because rooms were scarce. He said, “I'll cancel my train reservation and we'll have dinner.” Then I told him the whole story, just like I told you. Being a newspaper man, it didn't take him long to get a full set copy of the letters.

Then he went to Charlie Piez and told him that he was going to send out a story that night over the UP [United Press newswire]. He was going to praise him to the skies if Piez would tell him when and where they were going to build concrete ships. But if he didn't get that information today, he was going to send out a story just lambasting him right and left. Here was this great urgency, and they weren't doing anything about it because of selfish interests, and so forth. Gee, this was so long ago I don't remember whether

Wig went over [to Charlie Piez's office], or I went over, or we both went over, but I know I was there. I think we were both there.

Anyway, when I got there, Charlie Piez said, “How about the location of yards?” I said, “Mr. Piez, you've got a report on your desk someplace. There are 21 yards, and you'll find the first two places are briefed why each one of the 21 has been picked and the rotation from one to 21, and back of that is detailed information.” “Oh yes,” he said, “I forgot about that. How about the contractors for the design.” “The same thing,” I said. “You've got 21 contractors just like with the other report.”

So Fred spoke up and said, “Mr. Piez, let's not fool around with this. I know the whole story. Here's a copy of the letters. Now when are we going to build concrete ships?” We'd have to add some equipment, and Charlie wanted to know how many yards. Well, I believe we said eight yards—that's about all we could handle for the amount of money that was available. Anyway, we selected five sites. So we took the first five—they were Bloomington, North Carolina; Jacksonville, Florida; Mobile, Alabama; and San Diego and San Francisco in California—five yards and five contractors. We all agreed. Then when we started to leave, Fred put his arm over my shoulder and turned to Piez and said, “I have a letter of resignation from this young man in my pocket—don't ever let him come home [to San Francisco].”

Designing and Constructing Concrete Ships

Killinger: What size were the concrete ships that they built?

Brunner: I think there was one or two 3,500-ton cargos. The others were 7,200-ton tankers. When the war was over [in 1918], we stopped everything that wasn't 70 percent complete (we took some arbitrary figure). We stopped it unless it was poured up to that point, and finished the others. None of them were completed at the end of the war, although some were awfully close to it, and went into service pretty quickly.

Killinger: They were good sized.

Brunner: You bet. And less displacement. Believe me, we did a lot of worrying on those things—they had never built anything that size before.

Killinger: You were out in the wild blue as far as getting your criteria?

Brunner: We got Professor Franklin McMillan from the University of Minnesota, and he brought with him an electrical engineer. They had been making some instruments for measuring stress and recording it, and we got him back there to Washington D.C.

As I recall, he [the electrical engineer] tried to get General Electric to build motors that you could put in different parts of the ship and record stress measurements. You push a button over here and they'd all run at the same speed at the same time. As I recall, maybe they were too busy with the war, but they said they couldn't do it.

This electrical engineer went to a watch company, and somehow they worked it out together. They did develop a machine so that they could have an instrument down here below water, measuring the pressure of water

against the hull, and have another instrument up here, measuring the distortion of the ship and recording it all at the same time.

We showed the steel ships something with that, because they had never done that. Steel ships had been more or less designed empirically by Lloyds, and you had to design to Lloyds specifications or the ship wouldn't be insured. They'd build a ship this size, find its weaknesses and correct them, and then build another one a little bigger. That's the way they developed them, as far as displacement and balance, etc. From that basis we designed.

Killinger: What did you find was your biggest stumbling block when you actually started to pour the concrete in these ships? Did you have difficulties?

Brunner: The first one was deformed bars, we couldn't use deformed bars. See, the shell was only four inches thick. Then we had the frames—I think it was every 30 inches we had a concrete frame. Well, you get four bars going by each other here, and if you didn't keep things particularly square, and didn't keep them in the same plane, then you have made a lot of grief.

So we got Professor Willis Slater from the University of Illinois³⁶, who had charge of this testing laboratory—he was there and we got him to look at all the records he could find on plain bars, bond plain bars. We concluded that we could use plain bars, and we did. The stress was permissible. We might have used hooks in

36. Professor Willis Slater was a concrete and rebar specialist and had published several articles on the subject.

some places, and other places we'd allow a little more length for bond. Anyway, we used the plain bar.

Then we found we had to do sideways launching. We had one shipyard that we took over, a private shipyard. They built one ship in that yard. They had end-launching, and with the expansion of the steel in the dams in the daytime with the sun shining on it, it would crawl downhill, but it wouldn't crawl back up again when it cooled off. They had jacks and everything else to jack it back and hold it there.

Postwar Use of Concrete Ships

Brunnier: The one [concrete ship] that was built here in San Francisco was just a barge. It didn't have throw lines, but they used it during the war [World War II] to haul nitrates from Chile to the East Coast. In fact, some of the ships are over here in the [Oakland-Alameda] estuary. Ten years after the war [World War II], you could go down and light a match on the bottom on the concrete—it would be dry. So they used them—the first ships that came in—they were used for bringing up nitrates. Associated Oil had one of them on the bay for years bringing the finished product from Martinez down here to the distributing plant, just as quick some ways. They used that for years.

One of them I know is on the rocks up in Maine, and another one I think in Tampico, Florida. As far as I know they're still on the rocks. They took everything off of them. There's one, the *Palo Alto*, down here at Aptos at the State Park, split in two. It was to be made a gambling joint and was all outfitted when the Depression came along.

The Moore Dry Dock wanted to get their steel that hadn't been paid for, so they floated the barge in, and then sunk it.³⁷ But they happened to sink it over a pinnacle of rock in the middle, and it broke in half. I haven't seen it in four or five years, but when I saw it I said, "That's a remarkable thing, the condition that is in." It hadn't been maintained since 1919, and to see the condition it was still in, with all those bars exposed and corroding where it was broken apart.... As I say, I haven't seen it in the last 4-5 years. I've threatened to go down there and take a look at it, but I just haven't gotten around to it.

Developing Lightweight Aggregate

Killinger: It's amazing, pouring that thin a shell in 1917, especially when you consider that we didn't have the technology that we have today, and everything was job-mixed and so forth. Four inches is tough to pour even today.

Brunnier: Yes, and we had no vibrator. Of course, you couldn't put a vibrator in anyway. You vibrate on the outside. We took these air

37. The *Palo Alto* was sold as scrap in 1924. In 1925, the Moore Shipbuilding Company of Oakland, at the request of the U.S. Shipping Board's Emergency Fleet Corporation, removed the 2800 hp Llewellyn reciprocating engine, two 100-foot steel shafts 18 inches thick, and a 15-foot bronze propeller. In 1930 it was towed to Seacliff Beach in Aptos, California, and sunk as part of a new dining, dancing, and fishing attraction. The hull was cracked by winter storms in 1932, and it became a fishing pier in 1936. The separation has worsened over the years, and the pier and ship have been closed since 1984.

guns and put on a big pad on and vibrated on the outside.

Killinger: I'd suppose you were using a very small aggregate, not over one-half inch in size.

Brunnier: Yes—a half to three-quarters, depending on where it was. It was lightweight aggregate—we developed that too. That's another story. A fellow named Boynton was in charge of the laboratory trying to develop lightweight aggregate. One of the things he did was squeeze it out like you squeeze a hose and cut it off and squeeze it in. He thought we could make lightweight aggregate that way. He'd expand it, and there'd be the hole in there.

One day, I think they wanted to heat this aggregate, and told the boy to turn it on or off when he got it to a certain temperature—I don't remember the details—in the lab. Anyway, there was a certain time that he was to do something, and he didn't do it. He got to reading a novel and the time got by him. When Boynton came in there and opened it up, the material had swelled up and filled this whole thing. He knew the kid hadn't done the right thing, so he put the kid at ease—he said, "You've done something wonderful here, now can you tell me just what you did?"

From that, we finally found that if you took some shale or clay and fused it—it had such a chemical composition and some of the chemical turned to gas, and at the point of fusion you'd get that expansion. All these little gas bubbles, they just expanded and formed that lightweight aggregate. We thought at first it had to be carbon. We found out afterwards that in the case of any shale that had such a chemi-

cal content, something would turn to gas the same time the material fuses, and you could make that lightweight aggregate.

This guy Hayden came in there about that time, and Boynton told him all about it. And Hayden goes out and patents it. He tried to collect the royalty from us, but we just told him he couldn't have it. He went back to Hannibal, Missouri, and put it in a kiln and got the patent on that.

Killinger: You certainly were in on the start of a lot of those things. You had tremendous problems to overcome with those concrete ships—trying to do the structural design and handle all the attendant problems. And with no previous concrete ships built, it's like building an atomic bomb—where do you start?

Brunnier: We had another interesting problem—slope deflection. You see we picked on [the University of] Illinois pretty much—they had done so much experimental work with slope deflection. To check on what our office had already designed, they [Slater and his team] wanted to check every frame. But we'd be still checking frames forever that way, so we said, "We've got to build ships, we can't wait. Take some of these, check any one of them, and take the average."

Somebody said, "Supposing they don't check," and I said, "We're just as right as that man with his slope deflection, because the slope deflection doesn't take into consideration the change in shape due to stress." I said, "We just want to see how it comes out." I remember Specter saying, "Supposing it's 100 percent," and I said, "He still isn't going to believe me. We can't wait—by God, we've just got to do it." That's

the one trouble with engineers—they're afraid to use their judgment—everything has to be worked out mathematically.³⁸

38. Charles De Maria, interviewed some years later, explained the context in which Brunnier and Killinger were discussing slope deflection: “Slope deflection is a method of determining bending moments in the members of indeterminate frames. The method does not take into account the effects of changes in length of members due to tension or compression or distortion due to shear forces. In steel frames these effects are small. The method involves the solution of a number of simultaneous equations, which before the days of calculators was a laborious, time consuming process. Brunnier and Killinger were talking about the ribs of a concrete ship, which were poured monolithically with the shell of the hull. It is almost impossible to determine the effect of shell-rib interaction on the stresses in the ribs. Brunnier knew that a refined analysis would not yield more reliable results than the rough approximations they already had, and he was too practical to allow the whole program to get bogged down awaiting questionable theoretical results.”

Practice Through Two World Wars and the Depression

For a spell there, I didn't know what I was going to do. I woke up one Sunday morning and I happened to think of my insurance. I probably could borrow on my insurance....

Keeping the Office Going During World War I

Killinger: After the war and after you had finished your concrete ship program, you came back to San Francisco. Did you keep your office all during the war?

Brunner: All the boys were in the service, except Jude Davidson, the man I first employed. He couldn't recognize you across this table without glasses. He wasn't going anywhere, so he stayed. I used to blow in here [into his office at the Sharon Building] every other month for a day to see how things were going. There wasn't much doing—just enough to keep the office and one draftswoman designing. That's about all there was.

Killinger: Wasn't it a little unusual to have a woman draftsman in those days?

Brunnier: Yes, there weren't very many, and there still aren't many today [1959]. Nobody wants them. A friend of mine had his daughter come in here and she's a graduate too. Graduated in architecture/engineering and I tried my damndest to get her a job. Different offices have tried women, and it seems the fellows don't like it, so they just don't get them. Oh, there are one or two in great big offices.

Killinger: During the war [World War II] I did find some with the Navy in architecture and engineering, there again because of the war. I don't know whether or not they stayed on afterwards.

Brunnier: These great big offices have them.

Killinger: But it doesn't work out well in the smaller or medium size offices. It has to be an awfully big office.

Brunnier: Yes, but if you say that's new, [consider that] I had a teacher, Miss Wilson, in surveying when I was in college. She taught surveying, shades and shadows, and descriptive drafting. And when I landed in New York, she and her sister were both working in a large engineering office. That was way back in 1905.

Killinger: That's most unusual, because women were not generally even teaching in colleges in those days.

Brunnier: No.

Killinger: After you got back from Washington in late 1918, you had to pick up the loose ends and start your practice up again.

Brunnier: Of course, I had some architects as clients.

Killinger: Oh, sure, and they started up again. Do you recall some of the big jobs you did immediately after the war?

Brunnier: Standard Oil, Commercial Union Assurance, and the Federal Reserve Bank—they all came around at the same time—all in the early to mid-1920s.³⁹

Killinger: It must have placed quite a burden on you to get all those out. You must have had to enlarge your staff greatly.

Brunnier: Yes, I did, and the boys came back out of the service. I had a hard time getting Harry Bolin back. He had been sent out on special service in France, and when his company came back, he wasn't with them. I had quite a time getting him—he wanted to get out and couldn't. Then there was a fellow named Andy [Arthur W.] Anderson over across the Bay. He was working in the Bethlehem Shipyards in Alameda after the war was over. He was a captain in the Army, and came back here and couldn't get a job in engineering. Every Saturday afternoon—I worked every Saturday afternoon—he'd come in and want to know if there was a place open yet.

39. George W. Kelham, Architect; H.J. Brunnier, Engineer, for all three of these buildings: Standard Oil Building, 225 Bush Street, designed in 1920; Commercial Union Assurance Building, 20 stories, 315 Montgomery Street, designed in 1920; Federal Reserve Bank, 301 Battery Street, designed in 1921. All located in downtown San Francisco, these, along with the Russ and Hunter-Dulin Buildings (Schultze and Weaver, Architects; structural design by Brunnier), were the new highrises of the post-war San Francisco skyline.

Those jobs didn't all three come on the same day, and then also you've got to get them organized first. I kept telling him I'd have an opening for him, but I didn't have it just yet. I didn't have any money to throw away in those days. About the third time he came in, I said, "You're too damn persistent. Come on in, and tell them you're quitting." He was a very capable man.⁴⁰

Killinger: When did Henry Powers join you?

Brunnier: April 1, 1917. When I introduced him at Rotary, I said he was no April Fool's joke. He joined the Army the next year, toward the end of the war, and was about ready to be shipped over when the war ended. He came back to me after the war [1919].

High Prices and Labor Relations

Killinger: Those big buildings that you got right after the war—did you run into any unusual or difficult problems?

Brunnier: No, we took them in stride. Standard Oil Company was put up at a time when steel was at its highest—I remember it was about \$129 a ton, whereas the Russ Building and the Hunter-Dulin Building [respectively, 225 Montgomery Street, and 111 Sutter Street in San Francisco] were about \$89 a ton. It [the Standard Oil Building] was right after the war, and steel was still scarce. Everybody needed steel, automobiles, building construction, highways, and everything. Steel went way up. Then they had a strike on at that time, too. Some-

body burned a cable on a boom—threw acid on it. That's how vicious it [strikes] used to get.

Killinger: I can dimly recall when they had a lockout of the carpenters.⁴¹

Brunnier: An industrial case—that was in the '20s. Was it P.H. McCarthy? Was he still head of the Building Trades Council, or was he dead by that time?⁴² Anyway, a bunch of businessmen got together at the Merchants Exchange [in 1920] and raised about \$2 million to establish the American Plan—where anybody could work, you didn't have to belong to the union.⁴³

They got all the big companies and manufacturers to agree to not sell to any dealer who would sell to a closed shop. Any closed-shop contractor or manufacturer couldn't get materials. That had its effect pretty quick. I can see them when the business agent came around, [union members were] tearing up their membership cards and throwing them at him, so relieved to get rid of him, to tell him what they thought of him.

It lasted for quite a while, if I recall. Avery of the Gypsum Company—U.S. Gypsum—was very anxious to cooperate with this thing [the American Plan], to get the unions under control. Came to the other end, the Depression came along and these fly-by-night builders were employing men by contract and otherwise to

41. May to June 1921.

42. Patrick Henry McCarthy was president of the local and state Building Trades Council from 1900 to 1922, and was mayor of San Francisco from 1910-1912. McCarthy died in 1933.

43. The National Association of Manufacturers sponsored the American Plan.

40. Arthur W. Anderson was one of the authors of Separate 66, and later became a partner in Corlett & Anderson in Oakland, an architectural-engineering firm.

get their work done cheap. When the Industrial Board wanted to put the brakes on those people and not give them supplies, Avery and his company couldn't see any outlet for his stuff except to these jerichos because the Depression was on, and he wouldn't go along. And that's what gave the unions a chance to come back. These short-sighted men—it's hard to understand.

I served on four wage boards. Father Hanna and myself were on all four wage boards.⁴⁴ I was in New York one time when I got a quite urgent call—I was back there on the American Can job or something—and they called me up on long distance telephone and paid my expenses to come back [to San Francisco]. I served on the board, and then they paid my expenses to go back to New York and finish what I was doing for American Can. They said that between labor and the contractors, they couldn't find anybody from the engineering-contracting side that they could agree on, so they insisted on my coming back. Hanna was always on [the wage board], because most of these men were his men, and he was a good man.

Killinger: He always took a very active part in San Francisco affairs.

Brunnier: We got to be very friendly. The first time I ever heard his name, I was serving on a committee for the San Francisco Chamber

of Commerce and somebody said we ought to find out what Father Hanna thinks about this, and I said, "Who the hell is Father Hanna?"

Killinger: You soon found out?

Brunnier: No, I didn't soon find out. Nobody said anything. Later on I got very well acquainted with him. I think he was a little too progressive for Rome. He made too many friends. They pulled him back to Rome.⁴⁵

Killinger: He had a tremendous friendship at all levels in San Francisco.

Brunnier: But if you get too progressive....

Keeping the Sharon Building Location

Killinger: We're up to the 1920s. In the meantime, you've kept the same location here in the Sharon Building and taken additional space as you need it.

Brunnier: I was originally on the third floor. Then when Associated Oil moved out of the top three floors, I moved up here to the sixth floor.⁴⁶ The lower floors were engineers, contractors, architects, materials. In fact Associated Contractors had the whole ground floor, except the little wing here where Cory had his bar. They also had the second floor.

Killinger: When was it that you moved up to this floor, the sixth floor?

44. The Impartial Wage Arbitration Boards were created by San Francisco Mayor James Rolph in 1921 to arbitrate and set basic wages for 17 crafts in the city of San Francisco. Father Edward J. Hanna, the third archbishop of the San Francisco diocese (from 1915 to 1935) and widely respected among labor and business, was appointed chairman.

45. Father Hanna retired to Rome in 1935.

46. In 2001, H.J. Brunnier Associates is still located in the Sharon Building at 55 New Montgomery Street, sixth floor.

Brunnier: Oh, boy, it was before the Depression, about 1925. P.J. Walker took this part,⁴⁷ I took the next part, [George W.] Kelham took the last room, plus the rooms down there. The three of us had this whole thing—we had the whole floor between us.

Training Other Engineers

Killinger: A great number of fellows have gone through your office. Apparently, between yourself and Chris Snyder, most of the engineers who established themselves in practice in San Francisco in the first half of the 1900s had at one time or another worked for one of you.

Brunnier: Yes, mostly for me.

Killinger: Actually, you trained a fine bunch of competitors.

Brunnier: Well, not always competitors. Harry Bolin became the chief for the southern division of the [California State] Division of Architecture, and Frank Johnson became the chief of the northern division [of the Division of Architecture]. Both of them at one time had charge in my office here.

47. Percy (P.J.) Walker was contractor for several major buildings for which Brunnier was the engineer, including the Commercial Union Assurance Building (1920), the Federal Reserve Bank (1921) and the California State Automobile Association headquarters (1924). Walker was also a car enthusiast, and founded the California State Automobile Association (CSAA) in 1907. In 1919 he got Brunnier elected to the CSAA Board of Directors, on which he served for 52 years. It was Walker who suggested to Brunnier in 1951 that he create a photo album of his work (see page 42).

Killinger: I don't know if you know it, but Harry Bolin was instrumental in setting up the Testing Laboratory Association in California. When he was in charge of the southern office in 1953, he called us all down to Santa Maria, and said, "You boys should form an association—let's do it so we can smooth out the problems with the Division of Architecture and procedures." So that was the start of it. Bolin later became an honorary member of the association—he was the one who got it started. He has always impressed me as a wonderful fellow. I've had a lot of conversations with him. He does a very splendid job.

Some Larger Buildings Designed By Brunnier

Killinger: Would you run briefly through some of the larger buildings you have done in San Francisco? You mentioned the Standard Oil Building, the Federal Reserve Bank, Commercial Union, the Hunter-Dulin, the Russ Building.

Brunnier: After we finished up Standard Oil and the Federal Reserve, we were pretty low on work. All of a sudden, the Russ Building came along.

Killinger: When were the Russ Building and Hunter-Dulin Building?⁴⁸

Brunnier: In 1926—they were both at about the same time.

So we talked them [the contractors for both buildings] into giving the contract to American Bridge. I got a good price out of American Bridge for the two jobs, damn good price—\$89.50, erected. Leonard Schultze of Schultze and Weaver, Architects [architects for the

Hunter-Dulin Building] had bet me \$100 that I couldn't get a price of \$95 on it. He wanted to go out for bids. If it was anything less than that, I'd win. The bids came in and I got them back, and he came out on the train and down to the Ferry Building. I went down there to meet them, and he reached into his vest pocket and handed me a \$100 bill.

We made an arrangement with the American Bridge Company that we would keep up with their shop, their detailing and shop, coming up on the buildings. We'd give them so many floors on the Russ Building this week, and so many floors on the Hunter-Dulin Building the next week.⁴⁹

Killinger: Two of the biggest buildings in San Francisco going up at the same time—that must have about driven you to nervous prostration trying to keep your head up. I know you did the structural design for the Shell Building. When was that?

Brunnier: The Shell Building [100 Bush Street] was in 1929. The Standard Oil Addition was after the war [after World War II, in 1947 or 1948].

48. The Russ Building (George W. Kelham, Architect) is at 255 Montgomery Street. Designed in 1926, it was one of the first highrises in downtown San Francisco to include a basement garage. The Hunter-Dulin Building (Schultze & Weaver, Architects), is at 111 Sutter Street—now named the One-Eleven Sutter Building—was also designed in 1926. The Hunter-Dulin Building is probably most famous for its fictional tenant, Sam Spade, Dashiell Hammett's fabled detective.

Killinger: And when was the American National Bank Building?

Brunnier: That was back in the 'teens [1917]. There was an interesting experience with that building. P.E. Bowles, president of the American National Bank, thought [Pierre] Zucco was a great engineer because he had designed the tunnel on the Sacramento Northern. P.E. was connected with [the financing for] that.

Kelham [George W.] was the architect, and he insisted that I do the engineering—he knew Zucco, and wouldn't have him on a bet. Zucco was not ethical at all—and I don't mind that for print. Zucco went to P.E. and told him I was an extravagant designer. So P.E. went to Kelham and said, "Do you mind asking Brunnier if he'd object to us having his drawings checked?" Kelham called me up and I said, "I don't mind, as long as it's a reputable engineer. I don't want any shyster. I'll name a half a dozen good men." Well, he [P.E. Bowles] said he'd like to have John Seattle. John was the old school, and he

49. Henry Powers, then [1959] in charge of the office, was present at the oral history interview. He interjected an explanation of why the two extremely large jobs, both highrises, occurred at the same time: "The Hunter-Dulin Building came in first, in 1925—30-odd stories, maybe 32. We were working on it day and night, and were scheduled to finish it by the time the Russ Building was going to come in the first of January [1926]. We had the 30-story Hunter-Dulin Building practically designed, ready to turn over. We were working late one night, and a telegram came that said, 'Suspend all work, plans being revised to 22 stories.' The boys just took all their drawings and threw them up in the air. And then, the doggone thing, Hunter-Dulin had to come at the same time as the Russ Building."

didn't think to call me up to talk it over. We never look at another man's drawings if we don't call the engineer up and tell him: "We've been asked to check your job." The owner has that right, you know. We call the engineer up right away, but he [Seattle] didn't.

So he told P.E. that these steel brackets that I'd put on the bottom of the column on top of a cast-iron shoe weren't necessary. They didn't put them on any more, they just put a little clip—enough to bolt the thing down to the cast iron shoe. I said "P.E., yes, quite a few engineers do that. But I don't do it, because I've had the experience of these castings cracking after being in place. I figure it's damn cheap insurance to have this steel shoe on there so that it will carry the pressure out. The cast iron will still have some value, being cracked, but it won't be like a knife pushing through the middle—it will be spread out on it." So he paid John Seattle \$500 and thought this [not putting on the steel brackets] would save \$500. He thought he'd save the \$500 as long as I didn't object.

I had never had this happen on my jobs before, but one day there was a hell of a popping sound. Loud enough so P.E. heard it in his office in the next building [where American National Bank then had its offices], and came out. Here two of those castings had cracked, before those columns had been put on there. I told P.E. that never happened on my job before, but I used to do some inspections and I'd seen it happen in the shop when they cooled them too fast. I also knew of it happening on the job after the concrete had been poured. So immediately, P.E. wanted to know what it would cost to put these shoes back on. I think it

cost him \$750 to put the shoes back on. But after, that I was a good friend of his.

When old Moffitt of First National Bank loaned me money—quite a bit—as long as I showed I had quite a bit of income from jobs and put them down.... [Then] I came to a period where I didn't have much to show, but I needed some money to hold the organization together. I told him what it was for, and by God, he wouldn't give it to me!

So I went down to P.E. Bowles and gave him the whole story—told him I owed them [First National] so much—it wasn't much—but I wanted some more and they wouldn't give it to me. P.E. said, "How much credit do you want?" I said, "\$20,000 and [tape is garbled].... The first thing I want to do is pay those bastards off." Anyway, P.E. called a cashier and said, "Give this man credit—whatever he wants." And all on account of this incident [of the cast-iron shoes]. He now had confidence in me, and also because I went out and laid everything on the table and came in for help.

I had some good friends there [at First National], people I'd dealt with, and they were just sick that Moffitt did that. When Moffitt realized his mistake, he came to me one day, sidled up and talked friendly. You know, twice afterward when some other engineer was asking for credit, Moffitt didn't call me up but had some other man come up and ask me what I thought about that man—if I thought his credit was good or not.

1930-1940, Work During the Depression

Brunner: Harry Bolin, Frank Johnson, and Andy [Arthur W.] Anderson were all a part of my organization before the Depression, and I didn't let a one of them go until I found them another job before they went.

Killinger: You carried them all that time during the Depression?

Brunner: Part of it I had to do, we were busier than hell up to 1931.⁵⁰

Busy, But Losing Money

Brunner: We had the Harmon Gym at Cal [1931], and we had all the original buildings at UCLA.⁵¹ Contractors were taking work for nothing, less than nothing. The contractor took the Harmon Gym job for less than it cost, just to keep his foreman. He put his foreman to work—the superintendent was his foreman you

see—just to keep him. He just didn't want to lose that organization [during the Depression].

Not only did the contractor take it cheap, but the building had to cost a million dollars, so we designed the baseball stadium and field there. That didn't bring it to a million dollars, and then we had to design a filtration plant or something to put out for bids. Of course, he [the contractor] bid them all in and finally got it to a million.

Well, we got the fee for one job, but had to design three jobs for one. Hell, I lost \$27,900 in 1930. I mean I paid out that much more than I brought in. I couldn't go to my clients and say, "I've got to have more money, got to have a higher fee." I just couldn't do it, and you multiply a percentage by nothing, you get nothing. I was broke higher than a kite during the Depression. Not only that, when you get along as far as I was, normally you can borrow money. But I was in trouble with the banks, too, and they were in trouble because Uncle Sam was on their necks.

Borrowing Against Life Insurance

Killinger: Sure, everybody was up to their ears in difficulties. And you, at that time, had a well-established reputation.

Brunner: Yes. For a spell there I didn't know what I was going to do. I woke up one Sunday morning and I happened to think of my insurance. I probably could borrow on my insurance—I hadn't thought of it up to that point. Of course, I couldn't get in the safety deposit box on a Sunday. I couldn't wait till Monday morning came along so I could rush down to see how much I could borrow. I found out I

50. Charles De Maria added this: "In the 1920s, when he had many major projects, Brunner had quite a few very capable men in his employ, including Harry Bolin, Frank Johnson, Arthur Anderson, and Henry Powers. Later he had people like Henry Degenkolb and John Blume for periods of time, and Fred Bostad, who was in charge of the office in the Panama Canal Zone. These were followed by Herb Lyell and the whole group of young engineers [including De Maria] who became partners when H.J. Brunner Associates was formed."

51. Brunner's office designed the following structures at UCLA: the library, the Chemistry Building and Addition, the Men's Gymnasium, and the Education Building. George Kelham was the chief architect for all.

could borrow on it, which I did, and it helped carry me by.

Then the Bay Bridge came along in 1931, just about the time I was sunk. I was fortunate enough to be one of the consultants on that. Incidentally, of those five board members, I'm the only one alive. The chief engineer, Charles Purcell, isn't alive any more.⁵²

Field Act Creates New Work for Engineers During Depression

Brunnier: Then what really leveled the ship off was the earthquake in Long Beach in 1933, and the Schoolhouse Act [Field Act] came into being.⁵³ The school boards had to do something or be responsible [for the consequences]. We really got busy there—we were being paid there for knowledge, you see. School boards could get it done cheaper, but I was able to sell them the idea of no fee, but on a cost-plus basis. Because when you go in a building, you can't tell what's in it.

I said, "The easiest thing for anybody to do—I hate to say it, because some engineers would do it—is knock the walls down and put new walls in, and that's all there is to it." But we always endeavored to save the building. If it cost 60 percent or more to replace it, then we said forget it—build a new one. But up to that point, we did everything we could to save what was

there. We used a lot of ingenuity in a lot of places to do that.

Killinger: Well, I see I'm running out of tape. We had a good talk, did it tire you at all?

Brunnier: Hell, no. Get an old man reminiscing and he doesn't get tired!⁵⁴

52. The Bay Bridge Board of consulting engineers was appointed September 1931. The members were: Charles H. Purcell (Chief Engineer), H.J. Brunnier, Ralph Modjeski, Leon S. Moisseiff, and Charles H. Derleth, Jr. A caisson was named for each board member. See page 109 for a photo of the Brunnier caisson.

53. The March 10, 1933 Long Beach earthquake, caused over 70 schools to collapse and seriously damaged over 120 more. Fortunately, the earthquake occurred late on a Friday afternoon when the schools were largely empty. The State of California immediately recognized its duty to provide a safe place for California's children to attend school, and the Field Act, often called the Schoolhouse Act, was enacted within a month. The Field Act mandated that new California schools be built to seismic safety standards and that local school boards must seek structural evaluations of their existing properties if safety was in question. School boards could elect not to have their properties evaluated, but once a structural evaluation was sought, school boards had to act on the engineering recommendations. Coming as it did during the Great Depression, the Field Act created jobs for a lot of engineers who had been out of work.

54. Brunnier was about 77 years old at the time of these oral history interviews in 1959.

Participation in the Rotary Club

Some years before, it had been suggested to me that I accept the presidency. I said if they'd wait a few years, I could do a better job, because I'd then be in a position where I could devote more time to it.

Brunnier: I have told you how I went into business for myself and the different changes that I made. You want to know something about my outside activities?

Killinger: We kind of let your outside activities go by the board, as we were coming through the years, and I know there were a lot of them. What was the first organization that you joined?

Brunnier: The first organization was the Rotary Club of San Francisco, in 1908. I opened my office June 1, 1908. Because a friend of mine was a good friend of Homer Wood, who organized the San Francisco Rotary Club, I was invited to become a member of within months of opening my own office.

Maiden Speech: Caisson Story

Killinger: Earlier you mentioned that you gave your first public speech at a Rotary Club luncheon.

Brunnier: I had charge of design down on the [San Francisco] waterfront, and I had my office in the Monadnock Building [685 Market Street] at the same time [about 1909].

They had a little blow-in down at the waterfront just before a Rotary lunch one day, and I didn't like to miss the luncheon or the fellowship that was there. So I went down there to the waterfront and saw what the problem was—a simple thing that could be easily handled. So I got on the hook and went down the hole without putting on any coveralls. It didn't take me long to tell them what to do, then I cut out and went to the lunch. Evidently, in going down the caisson I got a little mud on my sleeve, which I didn't notice.⁵⁵

When I got to the luncheon, one of the boys noticed this mud on my sleeve and wanted to know how come. I told him I was down in a caisson, and then somebody wanted to know what a caisson was, and why a caisson? A lot of questions came up, and first thing I know I'd given them a good education on caissons and foundations, and they liked it.

So when the lunch was over, they went up to the president, Homer Wood, and said, "Bru had a fine story on caissons, you ought to get him to tell it to the group." Well, he was without a speaker the next Tuesday, so he called me up and said "Bru, I want you to tell that story of the caisson to the club next Tuesday, I have no speaker." I said "Homer, you're crazy, I can't even answer roll call. I'm scared to death when I do that, and you can't hear me ten feet away."

55. Also see Brunnier's discussion of his work on the San Francisco waterfront in Chapter 5, *Early Waterfront Projects*.

He said "You're a good Rotarian and you'll be there next Tuesday." And he hung up on me.

Then Monday rolled around, and I called Homer. I said "Homer, I am"—I didn't say, "I have to"—"I am going to San Jose tomorrow, and you know there are just a few trains a day and I can't possibly get back in time for lunch, so you'll have to get somebody else." I didn't want to lie to him, so I actually went to San Jose. I had no business there, so I walked the streets and came back home on the first train, which was later in the afternoon. I just wasted the day, but I didn't make the speech.

Several weeks later, he again had a speaker who just didn't show. There at the lunch he spotted me over in the corner, so he said "Bru, I'm without a speaker again today, so come on up here and tell them about that caisson." When I think about it, I can still feel it yet. I could have crawled through a knot hole—just scared stiff to get up and talk to a group. I can talk around a table, but to talk to a group? Yet, there I was—I couldn't help myself. I had to go up.

As I recall, I stumbled around a little while, but all of a sudden I got the feeling that these fellows wanted to hear what I had to say. I knew my subject, there wasn't any question about that. First thing I knew, I was talking to the whole group and telling it to them. That's how I learned I could get up and think and talk. I've always been grateful to the San Francisco Rotary Club for developing me so I could do that.

Killinger: That was kind of a tough crowd for your maiden speech. But I wanted to bring out that engineers as a group should learn public speaking so that they can talk before service clubs,

city councils, and so forth. It's a necessary part of their education, the same as the mathematics.

Brunnier: Engineers are doing tremendously well compared to what they used to do.

1913, President of Rotary Club of San Francisco

Killinger: When was the Rotary Club formed in San Francisco and when did you join?

Brunnier: The Rotary Club of San Francisco was formed in 1908, and I'm a charter member. I was president of the club in 1913.

I'll tell you how I became president. In 1912, they decided to have a primary election, so they elected two tickets. Charlie Victor, who was almost elected at the primaries, was defeated by almost the same vote when it came to the finals. Evidently, Harold Bashford's friends were better politicians, and Charlie's friends got sore—and it sort of split the club up.

As I learned afterwards, they were looking for somebody who wasn't on either side. The first thing I knew, we had our annual meeting and J.L. Gander, for whom I was doing a job at that time, got up and made speech and nominated me [for the office of president]. Somebody seconded the nomination, somebody moved the nominations be closed, somebody else seconded the nominations be closed, and the next thing I knew, I was president. I was so scared, I couldn't say anything. I think if I had my preference, at that point I would never have been president. Because I had never been president of anything, and here, to be president of the San Francisco Rotary Club was just unthinkable!

Anyway, I lived across the Bay in Oakland, and when the meeting was over and I was on the ferryboat, I got to thinking the thing over and thought, "Here you have an opportunity. Now get to work." And I did work like the dickens to have a good year. I had some problems. I was just a kid, a young fellow, probably one of the youngest men in the club. And there was a previous president named [M. Louis] Wooley, who used to say, "Why do we have to have this damn kid?" He made a number of remarks like that and it got back to me. And I could tell that most generally, he was against something that I was trying to do.

He irritated me one day at lunch. So after lunch, I went right down to his office and I said, "Now Wooley, I'm the president and I didn't do anything to hinder you when you were president. I'm asking you now to lay off of me. And by God if you don't, I'm going to take it up to the club and find out whether you're president or I'm president!"

Through that we became good friends. I was very frank with him and took him off his feet. He finally decided maybe the damn kid had something.

Killinger: The straightforward approach.

1915, Elected District Governor

Killinger: You mentioned the Rotary convention that was out here in San Francisco in 1915 during the Panama-Pacific International Exposition.⁵⁶

Brunnier: All these national organizations were holding conventions out here on account of the Fair. In 1915, I was chair of the executive committee for the host club for the convention

year [Brunnier's title was Chairman, San Francisco Rotary Clubs Convention Executive Committee]. I was also chairman of the Iowa building, chairman of the engineers entertainment committee. I just got myself involved too much.

Killinger: This was a tremendous thing to have the Rotary Convention in San Francisco at the Fair. The amount of time you put in must have been tremendous.

Brunnier: Well, it was. It was pretty hard to get the fellows to put in much time prior to the convention in helping with the planning. As a matter of fact, two or three weeks before the convention, I called up the Missus, and I said I'm taking a room at the Palace [Hotel in downtown San Francisco]. I'm going to be working night and day here to get this thing worked out.⁵⁷

The secretary and I worked out the whole plan and wrote it out, so we could give copies to each chair of each committee. I'll say this, when the week came, everyone of them worked all day long and worked hard. They did their job, but we had had no prior meeting with them to instruct them. They had to take it from the plan that we had developed.

56. The International Association of Rotary Clubs met July 18-23, 1915 during the 1915 Panama-Pacific International Exposition, popularly referred to as "the Fair." The Exposition grounds were constructed on reclaimed land on the north edge of the city, today's Marina District. According to *The Rotarian* (September 1915), "A large Rotary International flag flew from the mast of the Exposition Memorial Auditorium where the business sessions of the convention were held."

On the opening day of the Rotary Convention I keeled over, but I was on my feet before anybody could get to me. I just had a dizzy spell—I hadn't taken any time out for dinner or breakfast. One of the doctors of the Rotary Club happened to be there, and he took me in charge. All day he stayed with me and wouldn't let me do anything. Then I went home, went to bed, had a good night's sleep and was ready for work the next day. But he gave me a good lecture and said, "You ought to get away from here, and I suggest you go to the Islands where nobody can reach you. When you get to be 50 or 55 this might react on you, although it won't right now. You can travel along at this level for quite a while, but you better recuperate." The more I thought about it, the more I was inclined to do it.⁵⁸

It was quite a job, and the convention was rated as the best they'd had. I had made up my mind after two other convention banquets that I had

57. "The Missus" herself, Ann, is also dear to Rotary history. The previous year, for the 1914 convention, the west coast Rotary Clubs had organized a special train to pick up Rotarians from San Francisco to Los Angeles and take them to the convention in Houston. Along the way, the 90 or so men on the train started calling Mrs. Ann Brunnier, who always traveled with her husband, "Rotary Ann." Years later, Brunnier recounted the trip and the train's arrival in Houston in *The Rotarian* (November 1951), "...someone wrote a 'Rotary Ann' chant. When we arrived in Houston, some Rotarians grabbed Ann, put her on their shoulders, and marched around the depot singing this chant. We were all kids then, remember." Wives of Rotary Presidents and women active in Rotary were called "Rotary Ann" for decades afterward.

attended—what they called a banquet!—that we were going to have a real banquet, and we did. We had one at the Palace Hotel and served 1,922 people in one sitting. The meeting wasn't very far along when Guy Gundecker—a [Rotarian and a] restaurant man from Cougars restaurant in Philadelphia—said, “Bru, I want to get down in that kitchen and see how they can serve things hot.” In those days you served about seven courses—it wasn't like today. Seven courses made a banquet. I got him in touch with Roy Close, the manager, and the two of them never did come back.

Killinger: He was making good use of his time there.

Brunnier: By the way, in 1915 the Rotary at that convention adopted a district plan—in other words, they divided the Rotary into districts for administrative purposes. Then they selected a District Governor, and I was selected as the first District Governor from our district here. At that time, the district covered New Mexico, Arizona, Nevada, California, and Hawaii. There were only nine clubs in that whole region. Today [1959], this same region has eleven districts. Honolulu already had been organized, but hadn't received its charter. Anyway, I decided it would be a nice thing to go over there and give the Honolulu Rotary Club their charter, and have a little vacation over there. That doctor had told me to take a vacation, and Hawaii certainly sounded like a vaca-

tion. I wasn't to get my expenses paid—those first few years they didn't pay the District Governor's expenses like they do now. So the Missus and I got on a boat and went over. On the way over, I got a job—I think I told you that story about the picture blowing out of my cabin when we were talking about the waterfront jobs. So I gave the charter to the Honolulu Rotary Club. And then I was consultant on piers 8, 9, and 10 for the Honolulu harbor down there.⁵⁹

Killinger: You had to cover each one of these clubs some time during your term?

Brunnier: Yes, but there were no clubs in New Mexico or Nevada. I went down and organized them. I didn't get any expenses like you do now, and I didn't have any money either, but somehow or other I got around.

1917, Elected Rotary International Vice-President

Killinger: How long did you serve as District Governor?

Brunnier: Just the one year—1915 to 1916.

Killinger: And you served as chairman of various committees?

Brunnier: Oh, through the years I've served many times as committee chairman or was on committees. In 1917, I was elected a vice-president of the International at the Atlanta convention. That year, I was chairman of the constitution bylaws committee, and never got out on the floor at all until I made my report before the committee, because we had a lot of problems and it kept us pretty busy.

58. Brunnier and his wife traveled by boat to Hawaii after the 1915 Rotary convention, to give the Honolulu Rotary Club its charter. See Brunnier's description of this trip in Chapter 5, Early Waterfront Projects.

59. Chapter 5, Early Waterfront Projects.

Someone on the spur of the moment decided that I should be a vice-president of the [Rotary International] organization. We had three vice-presidents—they were really directors, but they were called vice-presidents. There were only four men on the board of directors, including the immediate past president, and in those days they needed five altogether. So they decided I should be a vice-president, and they put me up without consulting me at all, because I was tied up in the work [of the bylaws committee]. The next day, when they counted the ballots, I found out I was one of the vice-presidents!

1918, Dirty Politics Affect Outcome of Rotary President Election

Brunnier: Then in 1918 was the story of the dirty deal I got on the election in Kansas City [at the annual convention]. I was back in Washington helping R.J. Wig organize and manage the concrete ships for the Emergency Fleet Corporation.⁶⁰ Well, Dewey Powell of Stockton, Les Everett of San Diego, and Ralph Schafer of Tacoma tried to get hold of me. They wanted to propose me for president of Rotary International, but they couldn't catch up with me, I was out on reconnaissance work for the concrete shipyards. I came back to Washington and ran into George Harris [a photographer and active member of the Rotary Club in Washington D.C.], and he said, "Bru, I'm sorry I can't vote for you." And I said, "Vote for me for what?" He said, "President." And I said, "I'm not running for president." He said, "The hell you're not!" and showed me some litera-

ture these boys [Powell, Everett, and Schafer] had gotten out.

I said, "That's news to me, I'm not going to ask anyone to vote for me—I never have, and I'm not now." The reason George couldn't go for me was that a group in Kansas City—and I'm not going to mention names—wanted to, and did decide to, run a man by the name of John Poole. He'd never been a District Governor or president of his club. But I think they [the Kansas City group] were for him because he helped them get the Federal Reserve Bank in Kansas City—at least that's the story.⁶¹

Apparently, the ones who were promoting me had enough votes to elect me, so something had to be done quick to get me out of the way. Then while we were at an officers' dinner that evening, one of my friends from Phoenix came in—he'd had a couple of drinks and that's the reason I'm not mentioning his name—he was madder than a wet hen at me. I said, "Wait a minute, what's the matter, I haven't done anything!" He said I'd double crossed him, and

61. The Federal Reserve Bank opened 12 regional offices in 1914, one of which was in Kansas City, Missouri. John Poole was president of First National Bank in Washington D.C. at the time of this election, in 1915. Brunnier was indicating that he thought the Kansas City contingent of Rotarians would vote for Poole because he may have helped influenced the Federal Reserve Bank to locate one of their branches in Kansas City, thereby greatly benefiting the business community. Brunnier himself was a beneficiary of the Federal Reserve's decision to open regional offices. The architectural contract for the Federal Reserve Bank branch in San Francisco went to architect George Kelham, and Brunnier did the structural design in 1921.

60. Brunnier discusses concrete ships in Chapter 6, *Designing Concrete Ships During World War I*.

showed me a newspaper heading in the evening paper: “Can’t Run.” And the election was the next morning; from seven o’clock a.m. to ten o’clock a.m. The morning papers had the same headline. “Well,” I said, “I had nothing to do with it. I haven’t said anything.”

The article said that Brunnier had been proposed by his friends without his knowledge, and it is rumored that because of his war work, he cannot accept. They just said “rumor,” so it left them off the hook. Both papers contained that, so everybody, all those people who didn’t know the inside story, probably figured, “What’s the use of voting for him?” Even with that, I still got a sizeable vote. But the other man, John Poole, got in.

The thing [those underhanded tactics] was considered so raw..., and if you look in the 1918 proceedings of Rotary International, you’ll find that Leslie Pidgeon, who was president at that time, made a statement—and it would be pretty difficult for him to make any kind of statement because the new man, his successor, had been elected. I can’t give you his exact words, but he said that Brunnier “has a just cause for complaint,” and he hoped it wouldn’t happen again in Rotary. It must have been pretty bad or he wouldn’t have said that.⁶² And I’m glad getting elected didn’t happen then. Because later on, I did become president when it was a much bigger and much better job, and I could do much more than I could have at that time.

Killinger: That story is from 1918. When did you become president of Rotary International?

Brunnier: In 1952-53. I was out on the golf course, the San Francisco Country Club, and the chairman of the Rotary nominating com-

mittee and I got on the phone. The chairman said, “We have just met and haven’t been here a half hour, and we’ve decided you’re the man we want to nominate for president of Rotary International—will you accept?” I said, “I will,” and that was it.

1922, Redistricting Committee Chairman

Brunnier: Then, in 1922 I was chairman of the redistricting committee. I had been so responsive to the district idea in the first place [in 1915, when districts were first approved], that whenever there was any redistricting to be done, they called on me. I had done it when I was on the board [in 1917]. In 1922, it had gotten to be a major job, because things had grown like topsy. You just had to put everything back in the hat and reshuffle. Crawford McCullough, who had become president of Rotary Interna-

62. This quote by outgoing president E. Leslie Pidgeon is from the Proceedings of the Ninth Annual Convention, Kansas City, Missouri, June 24-28, 1918, International Association of Rotary Clubs (Chicago, Illinois), “I think now in just a word, it would not be out of place, without blaming any one, for the chair to express his regret, and I think the regret of many Rotarians, that newspaper reporters, no matter who was responsible for them, seemed to be unfair to so many candidates. (Applause.) I think in this connection that Vice-President Brunnier had some reason to complain that repeated reports that other duties made it impossible for him to accept, or something to that effect, were somewhat against him, and I am not laying blame on any one, but I really feel that from the chair some statement of regret is due. Let every one know that Rotary doesn’t stand purposely or intentionally for newspaper advertising, either for or against any candidate. (Applause.)”

tional, realized that, appointed a committee, and asked me to take the chairmanship.

That [1922 redistricting effort] was one of the toughest jobs I've ever had. Clubs in the different regions were used to associating with one another, and didn't like to be put in different districts—because then they wouldn't be with the friends they'd made in the prior years.

I was able to put it over in all the different regions, except my own here at home. Here, I had been assured by some of the old-timers that it [the redistricting plan] was the only thing to do, but when they saw the sentiment at the district conference they double-crossed me [and did not support it], which didn't make friends for a little while either. It was pretty bitter, so bitter in fact that my wife said, "You're never going to talk redistricting in this district again." I said, "I won't—I've had enough of it."

Down in Texas, when I went down there, one of my good friends was just about ready to shoot me. He was opposed to redistricting and got very mad at me. His wife tried to placate him, but couldn't. It took several years before he got over it. He thought I was down there to sell something, when I was only down there to explain what we were trying to do. So all these jobs are not glory.

Killinger: No, they all have their headaches.

1952-1953, Traveling the World for Rotary International

Killinger: You traveled all around the world for Rotary International, didn't you?

Brunnier: When I was president I think Rotary was in about 83 countries, and now [1959] I think we have over 110.

Killinger: How many of those countries do you think you visited?

Brunnier: I've been asked that so many times that I've been meaning to stop and count, but that isn't the thing I'm interested in. The thing I tried to do was go to places where my immediate predecessors hadn't been. For instance, my immediate predecessor, Frank Spain, had covered all of Europe very thoroughly. So I stayed out of Europe entirely, except when I was over there for a convention committee meeting or for something which the president has to attend. And being that I went to the expense to go to Europe, I felt I had to do something, so for a week or two I would visit clubs in that region.

I covered a meeting in one city at noon, generally, and another city's meeting at night. I didn't go to Latin America at all, because I knew that my successor would have to be somebody out of the United States, and everybody felt it should be a Latin American. As it developed, a nominating committee did nominate a Latin American. Being that I couldn't talk Spanish, I figured a Latin American or even a Frenchman—because they can usually talk Spanish—could do a better job down there than I could, because they can talk their language.

Australia and New Zealand

Brunnier: So I covered Australia and New Zealand thoroughly, which nobody had done before. I took 21 days to do that, and contacted all the clubs through intercity meets. I might

not have thought of giving it that much time if it hadn't been for Angus Mitchell from Melbourne, past president of Rotary International. He said, "Bru, if you're coming down our way, don't come unless you can cover the whole territory. If you don't, the clubs that never get the president feel hurt, because Sydney, Melbourne, and Brisbane get them all."

So I figured out how much time I could give them between certain meetings that I had to be at. There was a period of 21 days that I could give them down there, so I let them arrange the time and schedule. As far as Angus was concerned, he had it scheduled so it was reasonable. But the District Governors down there—every club wants to see the president—got the idea, "Well, we're organizing a new club, so let the president give them the charter." So they organized some new clubs so that I could give them their charters. The result was that the itinerary got very much heavier than what Angus had planned.

But I had a good one on Angus, too. When we came to Melbourne where he lives—my wife was always with me—Angus met us at the airport with some friends and said, "We're going to have you to lunch and then we've got a nice suite of rooms. We're going to let you rest for the afternoon till six-thirty, and then we'll pick you up to go to the meeting to address the group."

At six-thirty that evening, Angus rings the phone and I was just out of the shower getting dressed. Angus said, "We're down here." I said, "Give me a few minutes, I'm just out of the shower and getting dressed, but I'll be there pretty quick." He said, "I'm glad you had a good rest." I said, "What?!?—I had four press conferences, my wife had a social editor confer-

ence, and I gave two radio interviews." He was dumbfounded. But he had had a radio man down at the airport interview me, and that guy goes uptown and tells everybody the president of Rotary International is in town, and that's what happens. I didn't get any rest.

A lot of people think it's swell to be president because you get a lot of travel. I never worked harder in my life—and I was 70 years of age when I had that job! Even when I was in headquarters, which was 25 percent of the time. I never left that office till seven o'clock or seven-thirty p.m. I didn't do that in my own office! And my wife just about killed herself, because she kept a diary all day long. We'd get back to our room at the hotel at twelve or one o'clock at night, and I couldn't do a thing to make her go to bed. She had to write that diary, because, "Tomorrow there will be some more stuff, and once I quit I'm lost."

Killinger: Australia and New Zealand were covered thoroughly. Did you get to Manila?

Brunnier: Yes. We left Australia, and we went to Indonesia, to India, and to Burma too. We went to the Philippines and to Japan, and then we came home.

Killinger: You covered all those countries. During the year, roughly how long were you gone on all your trips?

Brunnier: About 75 percent of the time, and 25 percent of the time I spent in Chicago, the headquarters office.

Killinger: So you were gone from your office that whole year?

Brunnier: Yes, and the few times that I was in my office here, I did nothing but Rotary work,

because my desk was piled up with mail waiting for me.

Killinger: That was your Rotary year.

Brunnier: Well, I was willing to do that. Some years before [in 1918], it had been suggested to me that I accept the presidency. I said if they'd wait a few years, I could do a better job, because I'd then be in a position where I could devote more time to it.

Killinger: That was a terrific undertaking—all that traveling, being at the Chicago office, staying all over the world in strange surroundings—especially, as you say, you were 70 years old at the time.

Brunnier: I never had time to think about it being strange.

Killinger: It must have been a most rewarding experience.

Brunnier: It was. I made some very good friends just traveling there, and still have that friendship with these people. I'm sure I can say what Charlie Rhodes of Auckland, New Zealand, said to me one day as we were headed for Japan on the boat. He got me on the back deck one night and kept me there till after midnight. I was telling him the history of Rotary as I had experienced it. When we got through, he said, "Bru, I'm egotistical enough to say that because Rotary has afforded you and me the opportunity of getting acquainted, our two countries understand each other just a little bit better." I thought that was very apt.⁶³

Rotary in Japan

Killinger: Rotary is quite large in Japan, isn't it?

Brunnier: It's grown very rapidly since the war [World War II]. See, before the war in Japan, Rotary was only the well-to-do. The well-to-do lived in the cities in Tokyo—only the real top people. So the Rotary Clubs were in just a few communities—and of course during the war, they were disbanded. In fact, when I was over there in 1948, I spoke to the Wednesday Club, which was really the Rotary Club of Tokyo. But [at first] the Occupational Forces wouldn't allow them to have Rotary clubs. They did, though, shortly after my visit.

One of my friends over there told me that the New Deal they couldn't put over in the United States, they did put over in Japan. See, they tried to make a democracy out of Japan with the result that everybody that had any money before the war had nothing when the war was over. One friend of mine had a number of properties, and he wanted to sell one property to get a little money. When they sold it on the basis of what he paid for it, they took the buying value at the old yen, and the selling value at the new yen. So when they got through, he owed the government money.

But when they got all through, these older Rotarians decided that in order to make democracy work over there, they thought they could do a good job by organizing Rotary Clubs in all these communities, which they have done. Rotary has grown rapidly because of these men, where before the war, Rotary was almost lim-

63. Charles Rhodes, a gold miner, was a charter member of the Rotary Club of Auckland, New Zealand, a Director of Rotary International from 1923-24, District Governor for the 53rd District (New Zealand) in 1927-28.

ited to people in high places. They now come to the smaller merchants, smaller towns, and bankers and so forth, and it has a terrific influence. So Rotary has just grown like wildfire over there. I'm sure it's done a lot to create better understanding of democracy over there.

Killinger: By the same token, Rotary couldn't very well exist behind the Iron Curtain could it?

Brunnier: It can't. You see it's a classification club. One man from each line of business—well nobody has any business behind the Iron Curtain.

Killinger: So it goes hand in hand with democracy.

Brunnier: And free enterprise.

Some Eager to do More

Brunnier: Some funny things happened, and one of them really gave me a lot of concern.

A lot of these fellows who had been District Governor, and very good District Governors, very good administrators in their regions, were anxious to do something more for Rotary.

Obviously you can't put them all on committees. At that time [when Brunnier was Rotary International president, 1952-1953], I think we had about 200 districts, and now [1959] we have over 260, and you couldn't put them all on committees, even just the good ones.

You can't load up an organization with committees. It costs money to have committees. You have to pay their expenses to travel, and it's a worldwide thing. Whenever you have a committee, you've got to have representation from all over the world, otherwise it wouldn't be

worldwide. You have to be a little careful with how many committees you have, because you can run yourself in debt awfully fast.

So here these fellows wanted to know what they could do. They weren't necessarily asking me to put them on the committee, but it gave me quite a bit of concern. Then all of a sudden I got this idea. I wrote this letter and said, "I have your letter and I appreciate what you say. As I look back over my own record, I find that at the times when I was not active on committee work on Rotary, I was doing my best job in vocational service, community service, and international service."

You see, we [Rotary] had four avenues of service. But I often found I was doing my best service when I could devote all my time to a service, other than being a leader in Rotary. For instance, I had lots of time for structural engineers. I couldn't have been active in Rotary, and at the same time been active in promoting the structural engineering organization,⁶⁴ because I still had to work for a living. I've been fortunate to live a long time, and perhaps that's why I've been able to do the things I have.

64. Brunnier was a charter member and the first president of the Structural Engineers Association of Northern California (SEAONC), which was founded in 1930. He was a staunch advocate of offering a high degree of professional service for a fair and professional fee. His leadership was instrumental in uniting northern California structural engineers to work together for the advancement of the profession of engineering and getting a fair fee for services. Unfortunately, the taped conversations in which Brunnier discussed the beginnings of SEAONC and SEAOC do not survive.

Parrying a Religious Query

Brunner: Another matter involved two men from entirely different parts of the country, almost simultaneously wrote in and said they had read with interest my biography as it was published in the Rotarian. One of them said, "I'd like to know your activity in the church." Both of them said just about the same thing. They wanted to know what church I belonged to and what I'd done for the church.

Being a fellow that didn't belong to any church, that gave me quite a problem, but finally I came up with this answer. I said, "I have your letter of [such and such date]. As you know, in Rotary we do not discuss politics or religion.... Sincerely." But it took me a long while to think that one up. They [such queries] worry you. You don't think of that on the spur of the moment.

Work with the Automobile Clubs

I was made chairman of the CSAA highway committee in 1920 and I've been chairman of it ever since.

Killinger: One thing we haven't covered at all is the California Automobile Association, and you've been in that for a long time.

Brunnier: Forty years. Actually, it's almost 41 years.⁶⁵

Killinger: Your name is one of the first names I can remember in connection with the California State Automobile Association (CSAA).

Elected to CSAA Board of Directors

Brunnier: Percy (P.J.) Walker was one of the prime movers in the California State Automobile Association in the early days—in fact, I think he probably did more than anyone else in keeping that thing going.⁶⁶ He came into my office one day and said, “Bru, we've just elected you to the board of directors of the California State Automobile Association.” I looked at him and said, “Perc, I don't even belong to the damn thing!”

65. Brunnier became a member of the California State Automobile Association in 1919. This interview took place in 1959.

So he turns around, takes my phone, calls up Dave Watkins, the manager, and said, "Write out a membership for H.J. Brunnier, date it back one year, and send me the bill." So it didn't cost me anything to join, and the first year's dues didn't cost me anything.

Killinger: When did you get your first automobile?

Brunnier: In 1919, the same year I joined. A Buick. I'd driven a car before that, but...⁶⁷ He told me the reason they wanted an engineer on the board was that they were getting into difficulty with this black pavement and white pavement—asphalt and cement. They wanted an engineer to help them. I said, "I don't know anything about highways, all I know is what I studied in college when I had Baker's *Roads and Pavements*."⁶⁸ He said, "That's more than the rest of us know."

66. Percy (P.J.) Walker, in 1907, organized the California State Automobile Association. Walker was responsible for putting Brunnier on the CSAA Board of Directors in 1919, on which he served for 52 years. Walker, who was also a contractor, worked with Brunnier on several buildings for which Brunnier was the engineer and George W. Kelham was the architect, including: the Federal Reserve Bank in 1922, the Hills Brothers coffee plant in 1925, and the California Commercial Union Building in 1926, and the landmark the CSAA headquarters building at 150 Van Ness Avenue in San Francisco, constructed in 1925.

67. Before he purchased his first car, Brunnier and Henry Powers would visit jobsites by riding double on Powers' motorcycle.

68. Baker, Ira Osborn, *A Treatise on Roads and Pavements*. John Wiley & Sons, New York. First edition, 1903.

Assessing Asphalt and Cement Pavements

Brunnier: So I went on the CSAA board of directors in 1919. Sometime later, I said to the Missus, "Let's get in the car and go up to Oregon and Washington." Oregon was known as the "black pavement" state, and Washington was known as the "white pavement." I said, "We'll drive up there incognito, and just look around and I'll see what I can learn about pavements—see how they've held up."

I wasn't there very long incognito. First thing I knew, the Governor [of Oregon] had hold of me. He was very much interested in highways. He got the highway engineer to take me around and show me and explain everything. I got a pretty good idea of maintenance, because I had gone over some roads that had already failed, which was nothing new in those days, no matter what the type. So I got a pretty good education on black [asphalt].

Then I went up to Washington. I hadn't been there very long when the head of the Portland Cement Association up there got hold of me and decided to take the Missus and me around. So I learned all about concrete pavement. When I came back I had a pretty good idea. The two opposites were both selling the best thing they could sell.

It gave me a chance to draw my own conclusions. Then the next thing I knew, I had to go east, so I stopped off in Detroit. The famous Wayne County road was built in concrete—a lot written about it and so forth. That's how I got into this, and when I get into a thing, I want to be of service if I can. I got an education that helped me, too—I learned a lot of things.

Chairman of Highway Committee and CSAA President

Brunnier: I was made chairman of the CSAA highway committee in 1920 and I've been chairman of it ever since. Time doesn't mean anything any more. Somewhere along there, I was elected CSAA president [in 1928], and I said I would take the job if I could remain chairman of the highway committee, because I thought I could do more good there than I could as president. It was agreed I could have the chairmanship as well as the presidency. Every president serves two years, so I served two years.

American Automobile Association (AAA)

Brunnier: And about that time—I guess prior to that—I'd been a Director of the AAA [American Automobile Association], the nationwide association of which California State Automobile Association was a member organization]. I had been elected from CSAA to represent them on the AAA Board of Directors. For every 5,000 members, I think it is, we were allowed one Director on the AAA. Anyway, there were four or five of us on the Board of Directors of the AAA, three from northern California. My activity in that led to my being president of the AAA, and I was elected in 1945.

Killinger: Was the California State Automobile Association always a member of the AAA, right from the start when it was formed?

Brunnier: Yes.

Erecting Road Signs

Killinger: In those days—and even to some extent today I guess—the CSAA used to erect all the road signs.

Brunnier: Yes. Well, they don't do it any more. They don't do it gratis, anyway, and they've been trying to get out of it. The State [of California] came along first, you know. They always want to do everything, and we're glad of it as far as that's concerned. But the State decided they wanted to do it [make, post, and maintain road signs]—they wanted to build up their own organization to do it. The argument was used that we put our emblem on the signs, and that we were advertising. They couldn't let us advertise, and not let any other automobile club come in.

But we [CSAA] still do some work for counties and cities, because they claim we can do it cheaper than they can. We just can't get out of it in the City of San Francisco, they won't let us out.⁶⁹ It costs us money, because we can't charge them the full cost of maintaining the crew to do this work and repair it. We put in bids to do the work, and we can do it cheaper than the others. But we still do it for only a few counties and a few cities. I don't remember the budget offhand now, but it is very small compared to what it used to be.

We [CSAA] used to pay for all of it, and the reason we did was selfish. For example, I can remember a garage man in San Jose having his sign out on the highway saying, "Save your flats

69. Brunnier is speaking in 1959. In 1969, CSAA discontinued providing San Francisco road signs.

until you get to San Jose, it's only 10 miles" when it was actually 20 miles. Things like that were misleading. Merchants did the same thing. With those types of roads, of course, 10 miles seemed like 20 anyway. We finally got into road sign work just for our own members' sake, and that grew as the highways grew. It got so it used to cost us a good deal of money, but it was for the benefit of the members.

Then we realized that it was for the benefit of everybody—so why should we continue doing it? So we began charging the counties and cities a certain amount—not what it cost—and we agreed to maintain them. We just charged them for the sign itself, but would put it up and maintain it. Those changes came along so gradually that it is kind of hard to say when the breakoff came. Anyway, we were still in the sign business, but not much.

Gas Tax, Legislation, Speed Traps

Killinger: You really had no state highway system then, but a system of interconnected county roads. If it hadn't been for the California State Automobile Association (CSAA), motorists must have been hard put to know where they were going to or coming from.

Brunnier: That's exactly right. Incidentally, everybody who has an automobile should support CSAA or any other auto club, because somebody has to furnish the leadership. We furnished the leadership to get this "metering" of the highways—the gas tax. I personally, with others, stumped the state to sell the gas tax idea [1923]. We'd never have these highways if it hadn't been for our leadership in the beginning. Of course, someone else may have provided it. If we hadn't done it, somebody would

probably have organized an organization that would have done it, because it had to be done.

Killinger: CSAA was the organization that could do it the best.

Brunnier: Yes. Every year we're up there at the Legislature to protect the motorists against freak legislation. I can remember one thing that got out of committee before our representatives there ever caught it. Somebody had a patent on the front plate—if you hit somebody, that plate would fall off and that would be evidence that you'd hit something. When our representative caught the bill, he went before the Legislature—it had already got on the floor. He said, "All right, every time you fellows park your car, you're going to have to get out in front to see whether your plate's on or not. Because if somebody backed up against you while you were parked, your plate would be lying there." Well, they hadn't thought of that. That's the kind of legislation that sometimes gets through.

We also got it put through that any money collected from motorists goes into the highway fund, not the general fund. The Antidiversion Act [1938], that's another thing we put over.⁷⁰ Because in New York—I don't remember that figure now offhand—but I don't think that half the money that is collected from motorists goes into the highways or for the motorists' benefit. It all goes to the general fund and has to be appropriated out. The same thing is true with the money the United States government col-

70. The Antidiversion Act, passed in California in 1938, prevented jurisdictions from diverting monies collected through the gas tax to uses other than roads and transportation.

lects—I think that only 15 percent of that came back [to the states], until we got this interstate highway system in. I think maybe now a little more is coming back.

Killinger: CSAA also eliminated speed traps, didn't it?

Brunner: Yes, we did that years ago. Back then, when the local cop and motorcycle cop used to be in cahoots with the judge—maybe they wouldn't stick it in their own pockets, but they'd get the money for the community. But we always had the feeling that there was a little divvying before it got to the community.

Killinger: In my mind, the CSAA has done a wonderful job in eliminating all those abuses. Because the motorist was prey in those days to every little shenanigan they could work.

Brunner: Probably, even today, there is any amount of legislation that comes up that somebody has got to be watching. That's why I say that, because it benefits every motorist and it costs so little, every motorist should support this association [CSAA], and then we could do more than we do.

Smog Control

Killinger: What is the attitude of the association on smog control for cars?

Brunner: They're for it. It's the only reasonable thing to do. All you have to do is go down to Los Angeles and see what happens down there. That can happen and does happen down in San Jose. And as they get a bigger population down there, it's going to get worse. I've been down there in San Jose when my eyes smarted.

AAA President and International Traveling

Killinger: When you were president of AAA in 1945, you had to do considerable traveling, didn't you?

Brunner: Yes. You see, we have a Federation of Inter-American Automotive Clubs. There are 22 countries in Inter-American. Then there is the International Federation of Automobile Clubs (FIAC) with headquarters in Paris—wait, I think it's moved to London now, since my time. I had to go over there for those meetings with the idea of trying to make it easier for motorists to travel from one country to another, either here or there.

The big thing that has always been before the Federation of Inter-American Automobile Clubs has been the international highway, to get a highway to connect up the countries to give people an opportunity to mix up motoring and visit each other. We believed that the more traveling you can do, the more understanding you'll get. You get those contacts if you travel that you can't get if you stay home.

Killinger: And that's a tremendous thing. A number of the countries have finished their portions, haven't they?

Brunner: Yes, although there are some gaps. Of course there is one portion that will never be completed—that's in Panama—because of the type of country, the water, lowlands, jungle growth, and the expense. They'll have to ferry there, as near as I can understand it—use some kind of ferrying system.

Killinger: So you also traveled for the AAA—you spent a lot of time traveling in your career.

Brunnier: Well of course my business took me a lot of places too. And there was some pleasure traveling too.

Killinger: Was it still a pleasure, after all the traveling you've done?

Brunnier: Yes, it is, because you do like to have a little freedom to do what you want to do. When you're on business, you just don't have freedom. In South America, it seems that my predecessor had alienated the South Americans. Somehow or other, there was friction there. My first job [as president of AAA] was to visit all the automobile clubs after the FIAC meeting in Montevideo, Uruguay. I visited all the countries that had automobile clubs and talked to the automobile club officials, and once in a while, it was a joint meeting with the Rotary. My previous connections with Rotary helped get the audience.

I tried to sell them [the automobile clubs in South America] the idea of encouraging travel, building roads down there so that our people could travel. We had found out by taking polls that a great many of our AAA members wanted to travel in South America—I think about 80 percent of our membership. About 60 percent wanted to do it in their own cars if they could. So I had something to tell these people.

Then when I told them what it meant in California—a \$600 million industry [in 1945], money that came in there from tourists. It got them all excited. As a matter of fact when I got into Lima, Peru, the president of the Lima auto club had me meet each one of the [government] cabinet members and tell them about this tourist business. He was just sold on this thing. He

wanted to get them interested, and to see if they could do something to promote tourism.

So I had the opportunity to go to all but four South American countries, and those didn't have automobile clubs. That was so long ago, I don't remember the numbers—maybe it was all but two of the countries. I met with all the officials of the auto clubs. Of course I'd already met them at the FIAC meeting—the top officials, anyway. Then I'd go back to their own towns and meet with their directors and perhaps their mayor and so forth, the people of the community, and tell them a story. I said, "The traveler doesn't ask much. He doesn't want a palace to live in. As a matter of fact, we're building motels in the U.S. now, and the American tourist is taking to them faster than we can build them, because they can leave their cars right outside. They don't have to bother with the bus. So if you just build a shack, like some of these were, and have nice clean bedding and have a shower—have it clean, that's the main thing—and they'll be tickled to death to stay there rather than stay in a hotel downtown. The other thing is have some place where they can get clean food. Have your auto club, like we do, designate a place that has food that the Americans can eat."

Killinger: With all these trips and all these various organizations, you've met thousands of people all over the world.

Brunnier: That's why I can't remember names any more.

Killinger: At that, it's amazing the way you recall them. In summing up your organizational experience, do you find that the men you dealt with pretty much all want the same thing?

Brunner: Oh, sure. Everywhere I've gone I've had the opportunity of meeting what you might call the common people all over the world—guides, chauffeurs, etc., and meeting men on the jobs—superintendents, foremen, and talking to them. Wherever I am, I always talk to the chauffeur, to the maid. And I can say without hesitation that all over the world they don't want their kids to be gun fodder. They'd all like to live in peace and harmony, everywhere. And this thing you hear about—that they hate America—I have yet to find anybody

who hates America. And I've talked to a lot of people. I can well imagine they can hate *some* Americans, but not America. I can make a distinction.

I remember giving a talk somewhere in Latin America. I made some remark that all the Americans traveling aren't representatives of America, and we don't like to see them go out as ambassadors. And I got a ripple out of the audience. They immediately thought, "We've got that kind too."

Other Organizational Work

You do a little [volunteer work] now and a little then. After a while, it adds up.

Chamber of Commerce

Killinger: You mentioned the Chamber of Commerce. When did you go into the San Francisco Chamber of Commerce?

Brunnier: Probably in 1914 or 1915. Later, I was chairman of the municipal affairs committee when this young fellow from PG&E made the arrangements to get Miller McClintock, the traffic expert of that day, out here to talk to us and for us to hire him, because we got a citizens' committee appointed. When we got it to the point where we were had McClintock invited, Clay Miller (Chamber president) took it away from the committee man and had a big dinner. This fellow got sore and quit, which I didn't blame him for at all.

Anyway, we were responsible for getting Miller McClintock out here, who made the first traffic studies for San Francisco, probably one of the best reports they'd had at any time. Miller McClintock had a chair at Yale—I think it was called the Streets and Traffic Chair—something like that. He was a Stanford graduate, a pretty smart lad and had a lot on the ball.

Killinger: This was back in the 1920s?

Brunnier: Yes.

Killinger: You also served on all sorts of committees for the State Chamber of Commerce

Brunnier: I've been a member of the State Chamber for many years and helped them get more engineers to join. And I've been committee member on the highway committee for quite a few years. Never been chairman of anything there. In fact, I won't take any chairmanships any more.

Killinger: Did you serve on any other offices of either the State Chamber or San Francisco Chamber?

Brunnier: No, just committee chairman—I have been chairman of quite a few committees, and have been on quite a few committees, and still am. I'm on this redevelopment committee, and have been on that I guess for 10-12-15 years. I'm vice-chairman of that, but I just won't take any chairmanships.

Killinger: You've certainly done more than your part. It's amazing to look back at what you've done and wonder how the devil you found time to do all those things.

Brunnier: Well, it's been a long time. I have had my own office 52 years. You do a little [volunteer work] now and a little then. After a while it adds up.

American Society of Civil Engineers (ASCE)

Killinger: One thing we didn't touch on is the American Society of Civil Engineers (ASCE).

Brunnier: Well, I've been in and out as far as the national association is concerned. In 1915, I had more experience than some of the fellows around there who were sporting a membership

badge. As far as age was concerned, I was just old enough to qualify, but they turned me down. "Daddy" [Charles D.] Marx was president at that time, and he didn't know anything about it [the membership application] before it came before the board.

I wrote a letter back [to the ASCE office in New York] told them that my impression had always been that ASCE was an old-fogey organization, and now it was confirmed. I had a long letter nicely written, but I didn't mince any words. Well, "Daddy" Marx wouldn't let that letter go into the minutes. He said, "Give me that letter and I'll stick it in my pocket." Then he came back here [to San Francisco] and talked to me and said, "I've got the letter, let's forget the letter."

He said, "Next year [1915], the ASCE annual will be in San Francisco. I'll have you meet some of these board members, and we'll take them around and show them some of the work that you've done." So ASCE came out and met here, and before I'd even met them, they invited me up.

In the meantime the local chairman [of the San Francisco section of ASCE] had made me chairman of the entertainment committee. I was certainly a boob that year. I was chair of Iowa Building, I was chair of the Host Club for the Rotary International Convention. I got myself tied up with more darn things that year.

Anyway, I stayed in [ASCE] and used to go back and see them at headquarters. They've always been friendly—I've gone to quite a few annual meetings. I don't think I've ever written a paper. I'm not much good at writing, anyway. When they get write-ups for my jobs, the *Engi-*

neering *News Record* man comes in here, and they give him the dope and he writes it. I just hate to write.

Engineers Week

Brunnier: A few years ago when we had Engineers Week—the first time we had Engineers Week here, with all the engineering organizations.⁷¹ They made me chairman. I got in and we did a pretty good job. We got a lot of publicity, got on television. I had a fine committee. Each one who was assigned their jobs, did their jobs. So we put up a darn good promo. It would give the engineers a lot of publicity and give the public a chance to understand what engineering was, and we brought some young talent into the television. We had a movie, a film, and kept a pretty good record of the whole thing. We had a public relations man keep it lightened up.

I had to go back to Washington for some reason or another [that same year]. As long as I was going to be in Washington, I wrote and

told them [ASCE headquarters] that I was coming up to New York, and asked if they would get all the society heads together for a luncheon meeting with me, and I'd tell them what we did here for Engineers Week. I wrote this to the headquarters of the American Society of Civil Engineers. Although I didn't belong to it, I stopped in at the NSPE [National Society of Professional Engineers] in Washington D.C. I talked to the men there and told them what we'd done [with Engineers Week in San Francisco]. They already knew, and said, "You sure did a fine job out there."

Then I went up to New York, called up the American Society of Civil Engineers headquarters, and they hadn't done a thing. I got madder than a hornet. I said, "Either you call them right now and have a meeting this afternoon, or I'll do it and have them come to the hotel." I forget just what I said, but I was mad. Then they weren't going to get the local representative of the NSPE—I said, "Yes, you are—I'll invite him up there." He was with the New York Edison Company, the company I used to work for.

So we had the meeting, but accomplished nothing. They listened to what I had to say, but they didn't have too many there. I got back and I got hold of the local director. I just told him what I thought of headquarters and the type of people they had there, and that they better get it changed. They did. So my experience with the American Society of Civil Engineers hasn't been.... I don't know what they think of me, but I certainly let them know what I think of them.

71. National Engineers Week was held February 20-26, 1955. Brunnier was chairman of the northern California regional organizing committee, which represented 12 local chapters of engineering societies. Displays were erected throughout the east and west Bay Area counties, television coverage was devoted to it, and engineering organization meetings were held. The week concluded with a joint dinner meeting of all 12 engineering societies at which Outstanding Young Bay Area Engineers were announced. Charles De Maria, of Brunnier's firm (nominated by the Structural Engineers Association of Northern California) was selected Outstanding Young Bay Area Engineer in the field of structural engineering.

California Structural Engineers

Killinger: You mentioned the Structural Engineers Association of Northern California (SEAONC) briefly.

Brunnier: We've covered that already. I told you about Maurice Couchot. I'm sure I told you that.

Killinger: Did we cover your period as president of the organization?

Brunnier: I'm sure we did.⁷²

Killinger: Structural engineers are unique to California, aren't they—no other state has them?

Brunnier: Not like they do here.

Killinger: Certainly ours is a far different type of organization—a closely-knit organization statewide.

Brunnier: It started on the right foundation of fellowship.

Killinger: That's still evident to this day.

Brunnier: That's why I became involved in the structural engineers' groups. I keep telling the mechanical and electrical engineers they should be doing the same thing. Get together, learn to know each other so you can call them names and get by with it.

72. Presumably Brunnier was referring to earlier discussions of the Structural Engineers Association that were either not recorded, or if recorded, the tapes were lost. Charles De Maria discusses Brunnier's involvement in SEAONC in Chapter 12, *Recollections of Henry Brunnier*.

Delegation: Giving Up Responsibility

You're no good unless you develop somebody below you better than you are, and right down the line.

Brunnier: Well, I've got to go. Henry Powers is coming over for his birthday. I was just in my prime when I was his age—65—although I was beginning to take it a little bit easier. Of course, I had transferred a lot to him [Powers] all the time and I kept after him. I used to tell him, “You're no good unless you develop somebody below you better than you are, and right down the line.” He wasn't here today, but Herb [Lyell] assigns a job to these fellows, and they know that particular client better than Henry, Herbert or I do. They have close associations.

There's no use in taking it through one man, if this other man is the leader of it. You forget something by the time you hand it down. I learned that a long time ago when I tried to do all of this coordinating work. Every once in a while I'd forget something, and wouldn't know...until I discovered it wasn't there....

Killinger: That's another unique thing about your office. I don't know of any office in San Francisco where the engineers have as much individual responsibility as they do in this office. That's because you've developed it that way.

Brunnier: Yes. Well, I started out early. First of all was to find a man who could run the place. I had four others before Henry Powers. Jude Davidson, the first fellow who worked for me, was a fine fellow. But I ruined him because he was the only man working when I started. Never gave him a chance to develop initiative, I just told him what to do. It got to the point where I had to have somebody take over some of this and direct. He couldn't—he just hadn't

had that experience. He worked like hell himself, because nobody else was working, and he finally learned he couldn't do it.

I had to get somebody else and I got Sykes. Well, I made a mistake there, and I should have known better. He was too egotistical, but I thought maybe I could get it out of him, because he was capable. He would have never worked out [however, and] I had to get rid of him.⁷³

73. Herbert Lyell, former H.J. Brunnier president, in a written communication with the editor (dated August 8, 2001), commented, "Sykes was Brunnier's second employee. They did not get along and their relationship was short."

Charles De Maria's Recollections of H.J. Brunnier

He had the quality of leadership and the power of persuasion...he knew how to set up an organization and how to get people to work together.

[Editor's note: This chapter is from Stan Scott's oral history interview with Charles De Maria. For the rest of the De Maria/Scott interview, see the second half of this volume.]

Scott: I'd like to ask you about your recollections of Henry Brunnier. You were close to him during the second half of his career. What can you tell me about the man and his career?

De Maria: When Brunnier first came west right after the San Francisco earthquake, housing in San Francisco was almost impossible to find due to the destruction and fire. So he first lived with his family across the Bay in Oakland, and commuted to San Francisco by ferry. Later when he had become more affluent and the city had expanded west of Twin Peaks, he moved to a home in the posh St. Francis Woods area. Still later, he moved out towards the Marina to a community apartment building at 2100 Green Street. Brunnier hadn't done the

original design on the Green Street building, but he did design some alterations to the garage after it was built. In his later years, Brunnier scraped his Cadillac because, as he told me, the darned structural engineer had put a column in the parking garage area!

When he started out as an engineer, he was quite a young man. He was competing with older people, and I think he had to be quite dignified and stiff and formal. He came to San Francisco in 1906, right after the earthquake. He was born in 1882, so would then have been very young—in his mid-twenties [Brunnier was 24 years old]. Back in those days, I think people got started in their careers earlier. Maybe they didn't spend as many years in education as people do now.

Scott: The formal demeanor might have been partly a personal characteristic, but also presumably in those days “old-school” behavior patterns were more generally practiced than now.

De Maria: Anyway, it was 1941 when I went to work for him. I was immediately sent to Panama, where he had a big Navy contract. So at that time he expanded his forces and had a big office in Panama. I had been hired by Henry Powers, and I believe the first time I saw Brunnier was in Panama. He used to come down to Panama every couple of months. I presume it was part of his contract to see that the work was going on properly.

Down there in Panama we did not treat him with the deference that his old-time crews had. We were in a tent camp out at the edge of the jungle, it was hot and miserable, and we just didn't give a damn. It was such an unpleasant spot that we didn't care if they sent us home.

He was the boss, but we had not had a long-standing relationship with him and did not treat him with a lot of deference. I think he sort of liked that.

Scott: He liked the more informal treatment?

De Maria: Yes, I think he did. He called us his boys, and he was a little more casual and easygoing with us. He unwound a little more than he had in his younger years. As I said, my first recollection of him was when he came down to visit the crew in Panama. After a year there, I came back and worked for a short time in the office, and we had jobs building military bases out in the valley at Tracy and Manteca. He used to come out there to the jobs on occasion. I didn't have much contact with him in those times, but we were very busy. Shortly after that I went into the service, and was gone for three years.

When I came back after the war, we were immediately very busy, and I think I sort of fell into his favor, even among my contemporaries there. I was the first of that group to get their structural license, and I think that impressed him. On occasion people would ask him to go look at a job or something, and I went with him a few times. He usually arranged to take me along and visit some town where they were having a Rotary lunch. I would stay with the plant people and get the details of the work, while he would go to the Rotary lunch.

Taking Part in Society

De Maria: It was Brunnier's philosophy that you should not confine yourself to engineering. You should take part in the broad workings of society, join organizations, and be a leader in

other things besides engineering. That was his personal philosophy that he tried to imbue the rest of us with, with more or less limited success. It was a very strong point with him, to be a part of the community and be a leader in the community, and do your part in other things.

Scott: He believed in being an actively engaged citizen, and I take it he pushed that idea with his office colleagues and others?

De Maria: Yes. He always said you should get out and do things, join things, be active in organizations, and rise to leadership if you could—first in the engineering associations, but also beyond that. “You should get into the community.”

Also, he had the idea that he was working for the client, not for any materials supplier. That was very important to him. In other words, he was more truly professional than some of the other people working in the field at that time, and he felt that entitled him to a good fee. He probably charged a little more than some of the other people, and he made it stick. He lived well. He was never a really wealthy man, but he lived well and traveled widely. He was very respected in a lot of fields.

Brunnier Helped Organize SEAONC

Scott: I believe he was active in helping get the northern California structural engineers organized, sometime around 1930.

De Maria: Yes, around then. It happened in northern California about the same time as in southern California. There was always a contention about who got organized first, but it was actually at about the same time. There

were some prominent engineers down in the Los Angeles area who were also active, like Brunnier was up here.

He was one of the organizers and charter members of the Structural Engineers Association of Northern California (SEAONC). He was the first president and served two one-year terms. I think it was the force of his character that brought them together and kept them together, because in those days engineers were jealous of each other. They thought other people were trying to steal their jobs and their secrets. This may have been prominent in their own minds at the time they were thinking about getting organized.

Scott: I take it engineering could be a rather tough game in those earlier times?

De Maria: Yes, back in those earlier times—say from when Brunnier started in San Francisco in 1908 all the way into the 1930s. I do not think structural engineering was such a great business—I think it was a pretty much hard scratch. It was very competitive, and I do not think it paid very well.

There were a lot of engineers, but they were not making a great deal of money. They were practically bidding against one another, and undercutting each other in fees. Also, apparently various materials suppliers had a lot of influence. Some of the engineers were practically captives of the materials people, selling their products and incorporating those products into the designs. Brunnier was smart enough to see that that was not the way to do professional engineering.

Instead, he thought the engineers should be more cooperative, should set standards and put them high enough so that everyone could make a decent living out of it. That was one of his

themes. So he got some of his main competitors together. The first meetings consisted mainly of luncheon get-togethers and getting acquainted. They met this way for quite a while before they accomplished much, but they did become more friendly and established trust with one another, so relations were better.

Scott: So Brunnier played a key role, and no doubt his extensive previous organizational experience paid off here.

De Maria: Yes. There is no question but that Brunnier was the driving force that brought at least some of his competitors together to form the northern California organization. He had the quality of leadership and the power of persuasion. From his experience with the Rotary Club, the California State Auto Association, the Chamber of Commerce and the Pacific Association of Consulting Engineers, he knew how to set up an organization and how to get people to work together. He understood the public relations and political values of being an organized group. He understood the benefits to all of fair and honest competition, and he was deeply imbued with the principle of fellowship among all men.

He was the first president of SEAONC and served for two one-year terms. The first meetings consisted mainly of luncheon get-togethers and getting acquainted. This went on for quite a while. Finally, one of the members approached Brunnier and said, "These meetings are all well and good, but when are we going to *do* something?" Brunnier's response was, "When we get to know each other well enough so that we can call each other 'You S.O.B.' without coming to blows, that's when we'll *do* something."

Some of the engineers were suspicious of Brunnier's motives in getting the organization going. They were concerned that his urging them to provide better service and to raise their fees was designed to put them at a disadvantage in competing for work against Brunnier, who always charged higher fees. But there was nothing underhanded about Brunnier, and he had no ulterior motives. Of course, he would benefit if structural engineering became more professional, and if public awareness of the value of engineering increased. But the other engineers would also benefit, as would the general public.

The early annual conventions of the state association were small. This was during the Depression, and midway locations such as Santa Maria, Fresno, Monterey, Bakersfield, and Santa Barbara were chosen to minimize travel costs. Members carpoled to these sites and very few wives accompanied their husbands. The programs were devoted mainly to business and professional problems. It was not until after World War II that the conventions became large and were held in resort locations like Yosemite and Coronado. Attendance of wives became the norm, as well as that of key employees, along with Principals. Lavish social programs were introduced and the programs tended more toward technical matters and less toward business and professional problems. By the time I arrived on the scene [in 1941], Brunnier usually attended the conventions and enjoyed the social functions and the fellowship, but he took no part in the technical programs.

Things were very bad at the time they were organizing, of course, because the Depression had hit by then and there wasn't much work at all. Only a couple things kept them going. One

was the Field Act and a lot of work on schools, on rehabs, and so on. That probably kept a lot of engineers from starving to death. Brunnier's office got quite a few of those jobs. And then he was on the board of consultants for the Bay Bridge. I don't know how well these things paid. I wasn't in on the finances of Brunnier's organization until much later, about 1963, when we became a corporation and I became one of the partners.

Brunnier's Contacts in Sacramento

De Maria: Brunnier was active in Sacramento. That was possibly how he got involved in the Bay Bridge construction, through the state engineers, and the State Highway Department. He was on the board of consultants for the bridge—a high-powered, five-man board, I think. The Bay Bridge was designed by the State [of California], but this board sort of oversaw it, and made high-level decisions.⁷⁴ I think for his part, he did a lot of public relations to gather support for the bridge. At that time, he gave a lot of talks about the bridge to lay groups—on the need for building the bridge, the need for financing and so on. There is a caisson out there somewhere that's named for him—there's a “Brunnier caisson” on the bridge. Apparently the name is there on it somewhere, although I've never seen it.

74. The Bay Bridge Board of consulting engineers was appointed September 1931. The members were: Charles H. Purcell (Chief Engineer), H.J. Brunnier, Ralph Modjeski, Leon S. Moisseiff, and Charles H. Derleth, Jr. A caisson was named for each board member. See page 111 for a photo of the Brunnier caisson.

In Sacramento, Brunnier was well-known in the State Legislature. From his early days in the Auto Association he had been up there lobbying for money for roads and that sort of thing, back in the 1920s, I think. Then when the move came to license engineers, he was a member of the original licensing board for civil engineers. There were three people on the board, and they set up the licensing system. I think they drew lots for their license. Brunnier was Number 3. He could have been Number 1, but he ended up being Number 3. Most of the people in practice at that time were grandfathered in and got their license.⁷⁵

Active Socially and Organizationally

De Maria: He was a great believer in organizations, and as I said, also a believer in getting outside of the engineering profession and doing things with civic-type organizations. Getting to know other people in the community. Of course, I'm sure that when he was doing this, all the while he was also preaching about the importance of engineering. He would talk about engineering to lay groups, and that sort of thing. He met a lot of people. His circle of friends wasn't just his fellow engineers.

He moved in the circle of higher society in San Francisco. He was a bit aloof from the people in the office, and in the early years I think had been even more so. He belonged to a golf club

75. The California State Board of Registration for Civil Engineers was created in the summer of 1929 by the Legislature. The three engineers appointed to the first board were: Donald M. Baker, President; Henry J. Brunnier, Vice-President; and Albert Givan, Secretary.

and met certain people there. He was into the Masons and the Shriners, and one thing and another, and was very important in the Rotary.

He was very active in the auto associations. He was a director of the California State Automobile Association, and became president of the American Automobile Association, an umbrella for all of the state auto associations. He traveled quite a bit on that, and had meetings with the auto people in Europe and South America.

Scott: How did he manage the time for all those things? Of course, a lot of local social activities would probably have been done evenings or weekends.

De Maria: I think they went out evenings a lot, and at that time he wasn't doing any detailed work in the office himself. It was just public relations and contacts.

Brunnier's Participation in the Rotary Club

De Maria: Rotary was like a religion with him, and it was his only religion. Actually, I'm not sure, he was either an agnostic or an atheist. He never attended church, and never attended funeral services for his friends or colleagues. It was a sort of joke in the office that the secret of Brunnier's longevity was the fact that he never attended funerals, particularly his own. When his wife died there was a non-religious memorial.⁷⁶ But Rotary was his religion.

Scott: He had been active in Rotary from much earlier times, from before the World War I era.

De Maria: Rotary was his big outlet. It was his life, really. And he encouraged other people

in the office to participate in Rotary. The San Francisco club was the second Rotary club in the United States, after Chicago. It was formed in 1908 and he was a charter member. It was a very large club, and he had the chance to nominate an alternate. Basically they have one person from each profession, but because it was such a large club and covered such a big area with so many people, they allowed an alternate in each profession. When somebody retired, they could be past-active, and they could bring in yet another person from the same profession. They divided the professions into quite a few subdivisions, so they could get more people in. Like car dealers, small, foreign and large luxury cars. They had a huge club in San Francisco. Brunnier probably devoted more time to Rotary than to anything else.

I guess it was about 1952, he became president of Rotary International. He spent that entire year traveling around the world and speaking to Rotary clubs. Past presidents had always traveled to various places, usually picking the nice places to go. But he picked out-of-the-way places that no Rotary president had ever gone to before. He was out in the bush in Africa, and in a lot of the far-flung places of the world. He spent the whole year on the road. Sometimes he'd make two or three speeches a day. He'd to go lunch at one place, spend the evening at another, and

76. Herbert Lyell, former H.J. Brunnier Associates president, written communication to editor August 8, 2001. "When Brunnier died, there was a service similar to the one for his wife. Brunnier had specifically arranged with the undertaker that there be no service. But that was not followed under instruction from his sister-in-law."

meet with small groups. It was strenuous. A whole year. His wife accompanied him.

Scott: If he took a whole year off, the office must have been almost totally on its own.

De Maria: Yes, that's why Henry Powers was in charge of the office. Whatever was done in the business sense, Powers did. While Brunnier was away on that long Rotary trip there was one I think rather humorous occurrence. We decided that the office would send him a gift on his fiftieth anniversary. We had a gold belt buckle made with his monogram on it. A real gold belt buckle. A fellow in the office designed it. He checked all of us as to which way we slipped our belts through the loops on our trousers. Everybody did it the same way, from right to left. So he designed Brunnier's belt buckle that way.

Well, darned if we didn't learn later that Brunnier slipped his belt through the loops the other way, from left to right. So the monogram on the buckle was upside down. Anyway it was shipped to him when he was in Egypt, I think, where it was pilfered out of the mails. It was recovered and returned to him, however, through some high contacts of his. I think that valuables disappearing in the mails was then a common happening in those countries. He did appreciate that belt buckle, although as far as I know he never wore it.

As a result of his work with Rotary and the Automobile Association, Brunnier had many friends and acquaintances all over the world. One very important task delegated to his secretary was to see that his Christmas cards were mailed with proper postage on a schedule of

dates, some as early as October, so as to arrive at the far corners of the earth before Christmas.

Competitive, Truly Professional, Working for Client

De Maria: He was competitive. He had the drive. He had been competitive in athletics. Undoubtedly he was ambitious. My feeling is that he was basically a very sound engineer. He had very good training at the American Bridge Company. He knew how to make good drawings. In those earlier days there were a lot of poor drawings that people had to build from, but Brunnier knew how to make a good set of drawings.

A Practical Man: The Santa Cruz Wharf Job

De Maria: One of his early jobs was a Santa Cruz wharf, about 1913. He got that job, even though somebody else was trying to undercut him. But apparently he made a good presentation, and then they gave him the chance to cut his fee to meet the competition. He said, "To hell with it." He walked out. On that basis they gave him the job.

Brunnier was a very practical man. He sent someone from his office to look at all the wharves that he could see along the coast, to determine how they were braced. They didn't know too much about the forces of wave action, or even ship docking forces, but he knew enough to look at what had worked, and from that got an idea of what he should do on the Santa Cruz wharf. They developed a system of braces and batter piles, and the wharf is still there today.

He did a good job on that. The drawings of the wharf were done in his own hand. He had a bold, easy-to-read hand and made very clear drawings. I'm sure that came out of his detail experience with the American Bridge Company, where he worked a year or so before he came west. But there were not many jobs with his own handwork on them in the office. Up through the 1920s there were some jobs on which he had made estimates of material take-offs and costs, but even then he was not doing the calculations or the drafting. By that time he was mainly the developer of business for the firm.

Strong Points: Foundation Work and Decisionmaking

De Maria: Brunner had been involved in some foundation work on the east coast, and that was one of his strong points. He had a practical sense about soils and foundations and that sort of thing. This was before the days of soils engineering. The way they handled jobs then, they would hire a well-driller to go and drill some holes at a site and bring in the samples. From analyzing the samples according to their characteristics, he would determine what type of a foundation they would have on some of the major structures.

There may have been a few mistakes, of course. Hindsight is a great thing. For example, with the Shell Building, which was done in the late 1920s, they found from their drillings that there was a fairly thick layer of compact sand, but it was underlain by stiff clays. According to the textbooks, at that time sand was not considered to be a very good foundation material. So he made the decision to drill caissons through this fairly compact sand, and found them in the

stiff clay layer. The stiff clay layer did have adequate capacity to support the building, but it also had a lot of moisture that over a period of time would squeeze out, so there was a good deal of settlement. By the time I retired [1983], that building had settled at least 18 inches.

Of course, the whole area of downtown San Francisco has a general area settlement. In my time, however, when we came to doing a building nearby, the Crown Zellerbach Building, we had the same basic foundation material, but we had the advice of soil engineers, and founded that building on the stiff sand layer. The sand was a cheaper foundation and easier to do, and the settlement was much, much less. Perhaps the sand layer did not have the strength of the stiff clay layer, but it spread the load out so that when the load got down to the stiff clay, it didn't squeeze the water out of the clay as much.

Whether or not Brunner always made the right decisions all the time, he did *make* them, and I will say that they were basically all successful. So foundation engineering, such as it was in those days, was one of his strong points. You had to make decisions with whatever information you had, and with whatever background you had. He was a person who made decisions, kept right on going, and never looked backward. He didn't worry. I think when he walked out of the office each day, he left every worry of the office behind him. That's a wonderful characteristic that he had.

Brunner's Willingness to Delegate

De Maria: The thing I remember most about Brunner was his willingness to delegate responsibility, especially to us young people, which is what we were when we first went

there. He would give you responsibility and he did not second-guess you—he stood behind you. Of course, he had started very young himself, and with all the responsibility of an office, so he did not feel that a young person should not have a position of importance. That was good from a professional point of view.

I'm sure we made some mistakes, but he was never one to bawl us out. Not even near the end, when we did the Bank of America Building [1967], a tough job. It was tough because it was a fast-track job, and we started when there was no firm contract and no firm drawings. I was responsible for getting the drawings out, and we were making drawings as we got the necessary information. We were just keeping ahead of construction needs—the foundation first, then we were turning out the steel drawings a few floors at a time. Because the drawings were not finished, however, the lead contractor, Dinwiddie Construction, was not giving their final price to the Bank of America. So it was sort of an open-ended thing.

Well, this went on for a long time, while I was really harassed and was trying to keep up with things. One day the vice-president of the bank, who was in charge of construction, asked Brunnier to come over and see him. Brunnier walked over proud as a peacock. He thought they were going to give him a commendation for the work, or something like that. Instead they bawled the hell out of him for being behind on the job.

So he came back to the office. He had not been in on the details, so I briefed him on the reasons why we had not done this and that, and why we were not ahead of the job. Then Brunnier charges over again to the vice-president to

explain all this, and the vice-president bawled the hell out of him again. But Brunnier never gave me any trouble about it—he accepted it. Brunnier was very good to work for in that way.

Lifelong Habits

De Maria: He had some lifelong basic habits. One was punctuality. He wouldn't wait more than 15 minutes for anybody. If he was to meet somebody and they did not come within 15 minutes of the set time, he left.

In my time, he had an appointment with young Stanley Hiller of Hiller Helicopters. He had been called, perhaps to talk about some work for Hiller. He went to the meeting place, and Hiller didn't show up. He left. We never did any work for Hiller.

He did this with his wife, too. He used to bring her downtown—I don't believe she drove. She'd go into a store, and they were to meet on the street at a certain time. He would arrive with the car to pick her up and take her home. If she wasn't there within 15 minutes, he left her downtown. She'd have to get a taxi to get back home. He always used to say that the secret of a happy marriage was, "Never go to bed angry with your wife." But he admitted that they stayed up pretty late on those occasions when she had to get home by taxi.

He was a very physically fit person. He always did calisthenics every morning, besides being active playing golf and other things. When I first went to work for Brunnier, there was a lot of skylarking in the office. We used to do what was called Indian wrestling. We'd lie down on the floor, each lift up one leg, and engage ankles and try to throw the other person over.

He had always fancied himself as an expert in Indian wrestling. Only once had he ever been bested by anybody in the office, by a very athletic young fellow they had in the 1930s, who Brunnier claimed cheated because he hooked his other leg under a heavy file cabinet and couldn't be dislodged. Later, I was sort of the champion of the office. Brunnier was in his early sixties at that time. I was in my twenties, and had very powerful legs. He took me on and I tipped him over fair and square. I think that was the end of his wrestling days, but he never held it against me.

Brunnier was a heavy smoker at one time in his life, back in his early years in New York. But he swore off smoking before he ever came to California. There was also a time during Prohibition when he was a heavy drinker. This may have been in part a rebellion against government intrusion into his private life, and was also probably the standard behavior of the social strata that he associated with. When a solid citizen like Brunnier would ignore the law, it is no wonder Prohibition was a failure. By the time I first knew Brunnier in 1941, he had become an extremely moderate social drinker.

Brunnier was Daring, Had High Standards

De Maria: In his younger days, Brunnier visited jobsites and walked the steel beams with the fearlessness of the steel erectors. He was even a bit of a show-off for the benefit of spectators watching from adjacent buildings.

For many years he was an excellent golfer. Before that he played tennis and in his younger days was a pitcher in semi-professional baseball.

In his school years he played football and baseball and was a high-jumper on the track team.

Brunnier was a member of the Lake Merced Golf and Country Club. Sometimes the members put on programs that included skits. One of the skits involved a lot of swearing in the wings, and then a golf club came flying out onto the stage—then another round of swearing, and another flying club. The members all knew that the skit was about Brunnier and that his game did not always meet the standard of excellence he set for himself. He was undoubtedly a better baseball pitcher than he was a golfer.

Some of His Loyalties and Interests

Scott: You have already mentioned some of Brunnier's organizational interests, such as Rotary. Talk about some of his other loyalties and interests. He was for example a very good baseball player and an avid fan.

Baseball and the Seals

De Maria: He had a lifelong interest in baseball. When television first came in, during the World Series he sometimes rented a room with a television set over in the Palace Hotel, and took the whole office crew over there at lunch.

Scott: According to his oral history, he had been a very active baseball player in his younger days, and evidently was a very good pitcher. He played semi-pro baseball when he was working in New York City.

De Maria: He was loyal to the San Francisco Seals baseball team, and in the 1930s his office had designed the Seals Stadium. He thought it was the best baseball stadium ever. He got very upset when people complained about the fog at

Seals Stadium, which was out about 16th and Bryant Streets. He claimed that it was never foggy out there. He said sometimes when they were switching the steam locomotives out in the Potrero district, a little of the steam blew over the field, but it was never foggy.

Iowa State

De Maria: He had other strong loyalties. He was a very loyal alumnus of Iowa State University. He attended alumni meetings of Iowa State, and contributed to the university. They were one of the beneficiaries of his estate when he died.⁷⁷ He hired graduates of Iowa State if they came around. From time to time we had quite a few Iowa State alumni. One fellow came around when he wasn't there—he was on one of his trips. The fellow was an Iowa State graduate, and Mr. Powers decided, “Well, he's from Iowa State, I'd better take him on because Brunnier would like to hire this fellow.” He was a nice kid, and while he didn't tell Powers, he was a distant cousin of Brunnier, whom he had met once back in Iowa at a family gathering. But he didn't let on until much later, after Brunnier was back from his trip, and then did tell him that he was a relative.

Republican Politics

De Maria: He was interested in politics. He was a conservative, and contributed to the Republican party, basically. He always subscribed to the fundraising dinners—the \$100-a-plate dinners. Sometimes he'd get the tickets and not

be able to attend, and he'd pass them on to me because I was a well-known conservative in the office. So I got to meet some of the important people in San Francisco politics at that time. I met Ronald Reagan at one of those fundraisers. It was an interesting side-benefit that I had, because of my relationship with Brunnier.

He used to come in the day before election day. He'd have his sample ballot already marked up. He'd lay it on the desk in the front room, and say, “I'm not telling you fellows how to vote, but if you're interested in how I'm voting, this is how I'm voting.” He always claimed that he voted for the man, not the party, although he always voted the straight Republican ticket. To prove his point that it was always the man, not the party, he cited one instance where he voted for a Democrat once in his life. I think it was Woodrow Wilson. But he never put any more pressure on us than that—showing us his ballot. That was as far as the political pressure went.

United Airlines

De Maria: He was loyal to United Airlines. He had a number of these plaques they gave. I think he had flown 300,000 or 400,000 miles, which was a lot of flying in those days, because people didn't fly as much then as they do now.

Friends in Japan

De Maria: He had his personal loyalties, too. He had quite a few good friends in the Japanese engineering profession dating back to the 1923 earthquake when he had been over there after the earthquake and met Japanese engineers.

Scott: He went to Japan after the Tokyo-Yokohama earthquake in 1923?

77. Mr. and Mrs. Brunnier bequeathed their art collection, acquired over decades of travel, to Iowa State University.

De Maria: Yes, he made a visit there specifically because of the earthquake, to see the effects. He had just missed the 1906 San Francisco earthquake. I imagine a lot of the rubble had been cleared up by the time he came in 1906, because the rebuilt San Francisco was thrown together in a big hurry after the earthquake. It was one of the miracles at the time, I think. Anyway, he wanted to see first hand the effect of the earthquake in Tokyo in 1923.

During World War II, of course, all of these contacts with the Japanese were cut off. But after the war, they were in touch with him, and he felt no ill will toward the Japanese. They were having a hard time of it. So he gathered up a lot of his old suits and shoes and packaged them up and sent them over to his friends in Japan.

We used to smile a good deal about that. Brunnier was about 6'3", and he wore about size 11 shoes. We visualized a five-foot-tall Japanese man putting Brunnier's pants on, rolling them up, and the crotch dragging on the door stoop. It was a picture we had in our minds. But Brunnier meant well, and he maintained his loyalties and his friendships in spite of the war intervening.

Brunnier and Cars

De Maria: Every two years he bought a new Cadillac, so the agency was making money off of him. He never bargained, even for the office cars. You know how car dealers are, you can bargain. He never did. He just paid what they asked, not only for his own car but also the office car. They made money off of him.

He always drove fast. He was good, but he was just fast. You were frightened to get a ride with him. He had a few accidents and totaled a few

cars. If he hadn't been a director of the Auto Association, with their insurance bureau, he might have not been able to get insurance.

He knew that he was an important person, so somebody coming from a different direction ought to give him the right-of-way. Because of his prestige or something, he got away with a few things that the average person wouldn't be able to. He once took a new Cadillac out of the agency, and I think he wrecked it on the way home. There was a car ahead of him, the light turned yellow, and the guy stopped, instead of dashing through the intersection. Brunnier hit him from behind. "That son-of-a-bitch stopped for the yellow light." Brunnier said the Cadillac's brakes were faulty, and they gave him a new car. Maybe the brakes were defective. We always called Mr. Brunnier "Chief," and we figured that now and then two chiefs were going to meet at an intersection.

Antique and Art Collection

De Maria: His wife was a great collector of antiques. She had a great collection of dolls, which was her principal forte. They had some other fine antiques, too. Whenever they took those trips, they'd look around and pick things up.⁷⁸ Brunnier himself became an authority on

78. Ann Brunnier, who accompanied her husband in all his travels, had a passion for dolls and later developed interests in other arts such as glass, ceramics, enamels, snuff boxes, carved ivories, and jade figurines and bowls. The Brunniers gave their extensive collection to Iowa State University, Henry's alma mater, in 1969. What had started as a small collection was delivered to Iowa State in two semi trailers and took nine months to unpack.

antique buttons, and collected them. The antique buttons became part of their collection.

Their whole collection was left to Iowa State. They have a museum there dedicated to Brunnier—the Brunnier Art Museum—and a room specially dedicated to the Brunnier collection. At one time they were going to build a stadium, and were raising money for that. We even looked at some of the preliminary plans for it, to see how it might be built and constructed. As far as I know they never raised enough money for the stadium, but a part of that complex was to be this room for Brunnier's artifacts and museum pieces.

Scott: It must have been a pretty substantial collection.

De Maria: Oh, yes. I think most of their excess wealth, whatever it was, went into the antique collection.

Henry Brunnier Dies December 10, 1971

De Maria: The Chief's last day was a typical one. He arose early and came to the office. Following an appointment with the barber, he had

lunch with his Associates in the Garden Court of the Palace Hotel. He enjoyed a single old-fashioned—in the summer it would have been a scotch and water. Conversation ran the gamut from a discussion of barns, windmills, and cornercribs on Iowa farms to the latest report on nonstructural damage to buildings in the 1964 Alaska Earthquake. Returning from lunch, he ran across New Montgomery Street rather than wait for an approaching car to pass. After lunch, he worked for a time at this desk.

The Chief did not leave much undone. His desktop was clean except for one page of notes, which included detailed plans for a dinner party he was hosting that evening. His calendar was marked through 1972 with all the key meetings of the Structural Engineers, Consulting Engineers, Rotary Club and Auto Associations, including a special notation on his 90th birthday to go to the Department of Motor Vehicles and renew his driver's license! All of his life he stood like a giant redwood in a valley of second-growth timber. The evidence of his work is all around us in the structures he designed, the organizations he founded and built, and the people whose lives he touched.

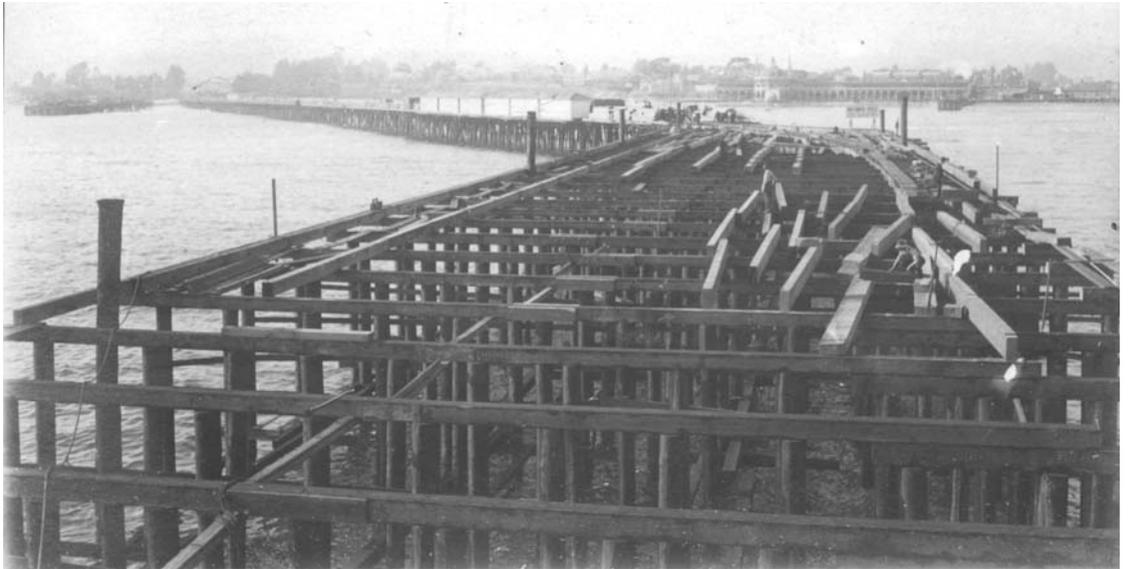
Photographs



During his college career, 1901-1904, Brunnier pitched for the Iowa State College baseball team. After college, he played semi-pro ball for Flatbush while working as an engineer at New York Edison. (photo: courtesy of Rotary International archives)



Section 9 of the San Francisco Wharf. Brunnier designed Sections 9 and 10, which are beneath and south of where the San Francisco-Oakland Bay Bridge stands today. June 21, 1910. (photo: courtesy of H.J. Brunnier Associates)



The new Santa Cruz pier was designed by Brunnier. This photo is taken from the roof of a new warehouse under construction at the end of the pier. The Boardwalk is visible in the background. 1914. (photo: courtesy of H.J. Brunnier Associates)



This photo was taken for the Rotary archives shortly after Henry J. Brunner was elected president of the Rotary Club of San Francisco in 1913. (photo: courtesy of Rotary International archives)



Brunnier designed the 7,200-ton concrete ship Palo Alto during World War I for the Emergency Fleet Corporation. The Palo Alto was the first of only eight concrete ships completed, and was obsolete before it was launched. It was sold for scrap in 1924 and sold again in late 1929 to the Seacliff Amusement Corporation. It was towed to Seacliff Beach (near Santa Cruz, about 50 miles south of San Francisco), and sunk to serve as a dining, dancing, swimming, and fishing amusement at the end of a new pier and resort under construction. A storm in 1932 cracked the hull, and in 1936 the California Division of Parks acquired it, along with the Seacliff beachfront property, as a new state park. In early 1963, winter storms separated the hull. The ship and pier have been closed since 1984. The Palo Alto continues to pull apart more each year.⁷⁹

(photo: courtesy H.J. Brunnier Associates)

79. Heron, David W., *Forever Facing South: The Story of the S.S. Palo Alto, "The Old Cement Ship" of Seacliff Beach*. Otter Books, Santa Cruz, California, 1991.



This photo was taken in the third floor offices of Henry Brunnier in the Sharon Building. Brunnier is on the right in the rear. The date of the photograph is unknown, but it was taken before 1925, when the firm moved upstairs to the sixth floor.
(photo: courtesy H.J. Brunnier Associates)



Seals Stadium (George Kelham, architect; H.J. Brunnier, engineer) was a labor of love for the former semi-pro baseball player in Brunnier. The stadium, at 16th Street between Bryant and Potrero, was the home of the San Francisco Seals of the Pacific Coast League (Joe DiMaggio's first team). The park was proclaimed the finest minor league stadium in the country and was the first ballpark to be designed for night games as well as day games. The San Francisco Giants played their 1958 and 1959 seasons at Seals Stadium before moving into Candlestick Park in 1960. Designed in 1931.
(photo: courtesy H.J. Brunnier Associates)



Construction of the Standard Oil Building at 225 Bush Street, San Francisco. 1921. (photo courtesy of H.J. Brunner Associates)



Shell Building, 100 Bush Street, San Francisco. George W. Kelham, architect; Henry J. Brunnier, structural engineer. 1928.



The H.J. Brunnier caisson being towed out to position, December 1, 1933. Each member of the 5-man board of consultants that oversaw the design of the San Francisco-Oakland Bay Bridge had a caisson named after him. The Brunnier caisson is beneath the second suspension tower from Yerba Buena Island on the San Francisco side. (photo courtesy of H.J. Brunnier Associates)

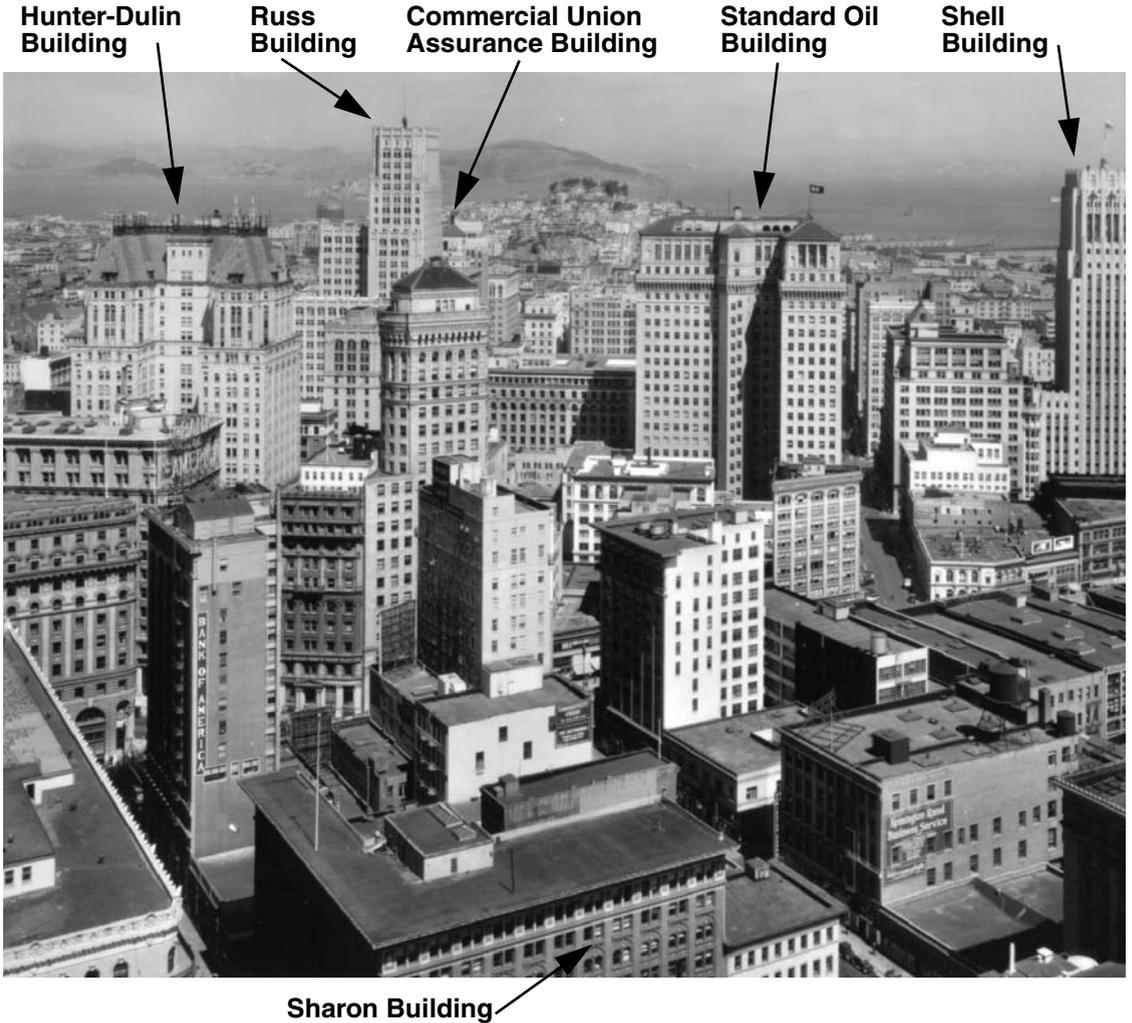
The California State Automobile Association Building at 150 Van Ness was designed in 1924. George W. Kelham, architect, H.J. Brunnier engineer (a member of the CSAA Board of Directors since 1919), and P.J. Walker, contractor (CSAA founder) were responsible for design and construction of the building. (photo courtesy of CSAA archives)



Architect George W. Kelham was trained at the Ecole des Beaux Arts. His favor of open, classical spaces is shown in the ornate lobby of the California State Automobile Association headquarters. After the Loma Prieta earthquake in 1989, H.J. Brunnier Associates helped CSAA restore the damaged ornamentation. (photo courtesy of CSAA archives)



Henry J. Brunnier. 1952. (photo: Moulin Studios)



The Sharon Building is in the foreground against San Francisco's new downtown highrises. The Standard Oil Building, the Shell Building, the Russ Building, and the Commercial Union Assurance Building (barely visible behind the Russ Building), (all for architect George Kellham) and the Hunter-Dulin Building (for Schultze and Weaver, Architects) redefined the San Francisco skyline in the late 1920s and early 1930s. (photo: mid-1930s, Moulin Studios)



“Guided by a turbanned mahout, an Indian elephant carries President Brunnier and his wife, Ann, to a District Conference session in Hyderabad. Riding with them is District Governor Edul C. Eduljee. Note Rotary wheel on pachydermal forehead.” [The Rotarian, March 1953]. (photo courtesy of Rotary International archives)



A monthly meeting of SEAONC with members of the History Committee, charter members, and past presidents. Left to right, seated: Harold M. Engle, S.S. Gorman, Henry J. Brunnier, and Henry C. Powers. Standing: Ray Little, Raj Desai, George Hervert, Ray McCann, Charles De Maria, Thomas Wosser, William Moore, John Sardis, Robert Wildman, F. Robert Preece, J. Albert Paquette, G.A. Sedgwick, Frank Killinger, Robert Dewell, George Washington, Ray Clough, C. Vincent De Nevers, Howard Schirmer. Brunnier is seated in front, De Maria is fifth from the left, and Frank Killinger (Brunnier’s oral history interviewer) is sixth from the right, standing. Photo taken in 1969.

CONNECTIONS

The EERI Oral History Series

Charles De Maria



Foreword

Charles De Maria's long association with Henry J. Brunnier was one of my reasons for asking him to sit for several recorded interviews, as well as for his own knowledge of the history of structural engineering practice in California.

I remembered De Maria from years earlier when we were members of different advisory groups that had been set up by State Senator Alfred Alquist's Joint Committee on Seismic Safety. De Maria agreed to a series of interviews, the first of which was conducted in his Atherton home, and the others in my Moses Hall office on the University of California's Berkeley campus.

Interviewing Charlie De Maria was relatively easy, partly because his responses were so thoughtful and well-organized. A lifelong habit of omnivorous reading showed through in the literacy and style with which he expressed himself and presented the material extemporaneously, speaking with the help of a brief topical outline, which he glanced at occasionally. The transcript of the recorded tapes required only minor editorial tinkering, and almost no reorganizing. His interviews provided valuable information on Brunnier and his activities, as well as the Brunnier firm's operations, and changes in structural engineering practice over the years.

De Maria's account traces the progress of a conservative, thoughtful, and respected structural engineer through a long and productive, but occasionally frustrating professional life. His skeptical and sometimes acerbic evaluation of structural engineering practice parallels that of many other older engineers who see the standards of practice of many of today's civil and structural engineers leaving a good deal to be desired. Readers will detect a wistful "what-might-have-been" note in De Maria's account of the firm's failure to grow, despite its reputation and the recognized quality of its work.

Oral interviews such as these should help students of civil and structural engineering to a better understanding of the profession's history and greater awareness of key leaders who helped shape its development. With their retrospective look at earthquake engineering's past, oral histories like these should lead to a better grasp of how the current state-of-the-practice came into being.

Stanley Scott
Research Associate and Research Political
Scientist (retired)
Institute of Governmental Studies
University of California, Berkeley
May 2001



Personal Introduction

I first met Charles DeMaria when I went to work for H. J. Brunnier in the fall of 1961. I was seeking work because the Earthquake Department of the Pacific Fire Rating Bureau was downsizing. The firm was not sure I could design, since my previous experience had been in checking designs made by others. I began by working part-time in the evenings after I finished work for the Fire Rating Bureau. Charlie was one of the old hands who helped me in my new role. Charlie and the other old hands would often regale “Bru’s Crew,” as we collectively called ourselves, with stories of their experiences in Panama.

Charlie was a natural and practical engineer. His ability to work quickly, and seemingly effortlessly, to size the members of a highrise structure still amazes me. The firm’s basic principle of designing structures that were “buildable” was exemplified in his design and detailing. He was cautious in adopting new techniques and preferred to use old “tried and true” detailing methods until he was convinced the new techniques were sound.

Charlie was a strong supporter of the Structural Engineers Association, both the local Association and the statewide Association. He served on a number of committees and on the board of the local Association. He served as President and is an Honorary Member of the local Association. He also served on the board of the statewide Association. He has been a regular attendee of the annual meetings of the statewide association and he and his wife, Connie, have been very competitive on the tennis court.

I enjoyed the years Charlie and I worked together and I value his mentorship.

Edwin Zacher, President
H.J. Brunnier Associates
September 2001

Background and Schooling

I went to a little grammar school in a little, one-room schoolhouse. We had anywhere from six to about 12 or 13 pupils depending on the years, and that covered all eight grades.

De Maria: I was born November 30, 1918, up in the Mother Lode area, outside of Auburn, in a place called Todd's Valley. It's just a voting precinct. We were out in the country. My father's people were Swiss. They had come to California in the fairly early days. My mother's people were Scotch, and they had also come to California. Her grandfather had come on horseback in 1849. He went back, sent his children out and eventually the entire family migrated to California up in Shasta County. My mother was born in San Francisco.

My father was born in a town up in the Mother Lode area called Yankee Jims. His father died before he was born. He was raised by his mother and by uncles. They were involved in mining. They had some small mines up there. The uncles eventually went back to Switzerland, and my grandmother fell heir to the mine. It was worked by my dad when he was a young man. Through most of his life he worked part-time at this little mine. He had a partner, several partners, over the

years. We also had a little ranch. We raised food, cows and chickens, and vegetables. Sort of a subsistence. We didn't own a family automobile until 1923. I can remember when we used to go places by horse and wagon.

Scott: What kind of mine was it?

De Maria: It was a gold mine. It was a quartz mine, on the American River Canyon near Michigan Bluff, which is where Leland Stanford [who later founded Stanford University] once was storekeeper. That's where he got his start when he came out. The mine is still in existence. My brother owned it until he died in 1990. It is now owned by my nephew and a man who leased it for many years. They're actually finding a little gold right now. It has a long history.

Outside of not having many people around, I had a very calm childhood up to a point. When I was ten years old, I was the subject of some extortion letters that were found. The source was never discovered, but we figured later that it was one of the neighbor women who was probably criminally insane and had done these extortion notes. She wanted \$500 put in a can and left at the crossroads. This really threw a crimp into my childhood, because I roamed the woods like a wild creature when I was a young boy, but my folks thought I shouldn't be out alone with these sorts of threats.

My dad bought me a pistol and a lot of ammunition and I practiced a lot. I actually wore the pistol to grammar school, concealed under my bib overalls, which were the costume of the day. These threatening letters came along for a couple of years, and it was before the Lindbergh law, after which they got the federal peo-

ple in on kidnapping threats. It was just an annoyance.

The other thing that probably affected my childhood was a serious illness when I was about in the second grade. I had diphtheria and I lost my hearing. My mother used to read to me while I was sick and couldn't read anymore. I had a little phonetic background in the first grade, and I started to read. I became a very proficient reader. I read everything from then on. I think that probably helped me later on, because I was an avid reader and I read everything, starting at about seven years of age. It was sort of a side benefit. I was sick for half a year and missed a half a year of school. I was deaf for months. I almost died, I guess, but I had the side benefit of being a very good, fast reader. I understand that until you're about 12, your eardrums will repair themselves. I'm losing my hearing now, but that's probably from advanced years.

I went to a little grammar school in a little, one-room schoolhouse. We had anywhere from six to about 12 or 13 pupils depending on the years, and that covered all eight grades. My dad was on the school board. They sometimes used to look for a teacher that had a couple kids of her own, so they'd have enough kids to keep the school going. I can't say that our education suffered because of this little "red schoolhouse." It wasn't red, but it was the equivalent little one-room school.

The high school was in Auburn, California. There was a bus that took us in. It was a long trek each day, probably an extra hour each way, going and coming to high school. I really will say that I was not an outstanding student in high school. I was not much on homework

after that long ride. We had chores to do around the place. I got by without doing any homework except what we did in the study periods. I had better-than-average grades, but not outstanding, and I wasn't able to participate in any extra activities because those took place after school, and I had to take the bus right after school was out.

The Depression

De Maria: I started school when I was five, and I'd skipped a year in grade school. When I got out of high school in 1935, I was just 16 years old, and it was in the middle of the Depression. There wasn't much to do. I couldn't get a job for a while. We raised hogs, but that was a very poor choice because of the economic conditions. We bought little pigs for five dollars a head, spent a lot of time and effort vaccinating them and raising them. They'd get to be 200 or 300 pounds and they'd sell for maybe six cents a pound at the most. If it was 200 pounds that would only be \$12 a head. Seven dollars a head for all the effort put into raising them wasn't very good.

Then I had always been very small in high school. I was always the smallest kid in my class. We had a lot of Japanese in that area in the fruit-growing district, but when they lined us up for gym classes, they'd have the big kids, the medium-sized kids, the little kids, then the Japanese, and I was always at the end of the line. Then I began to grow. I grew probably six inches in my last year in high school, and I grew another six inches very rapidly after that. So I got to be a pretty good size, and I got a job in a mine when I was 17.

Junior College

De Maria: I worked most of the summer in the mine, when there hadn't been any opportunity to go to college because we didn't have any money. But that year, they started a junior college in the high school in Auburn and I could attend without any particular cost by riding the high school bus into the junior college, and continuing my education. So I quit the job in the mine and enrolled in the junior college.

I spent two years at Placer Junior College [now Sierra Community College] in Auburn and got an A.A. degree. My major was chemistry, because the one man they had as a science teacher had a good background in chemistry and he taught the chemistry and math courses. I took all those courses as sort of college preparatory, but with a major in chemistry. I was a little bit interested in mining engineering, but I'd seen a number of mining engineers starving to death up in the mining area during the Depression, so I wasn't too much onto it, although I took a mining course or two, and I took surveying.

As I mentioned, my high school years were very unremarkable. But after I had been out of school for a year and worked as a miner, I attained a lot of physical maturity. Junior college was a much more rewarding time of my life. I was a member of the tennis team, played in the band, and belonged to the ski club and other social activities.

I had an NYA [National Youth Administration] job working for the assistant dean, where I kept the attendance records for the school. I was president and life member of the scholastic society, Alpha Gamma Sigma, and upon gradu-

ation I was voted the school's outstanding scholar by the faculty.

I graduated in 1938, and the chemistry professor had contacts in Richmond. He had worked for the Richmond refinery of Standard Oil. He said, "If you'll come down to Richmond, I can get you a job in the refinery." I went down to Richmond, and he tried to make good on his promise. He took me over to see the personnel director, but there wasn't any job forthcoming. It was really tough. This would be a job as anything, a flunky, anything.

I stayed in Richmond a few weeks and tried to get jobs. I think Certain-teed Products had a plant over there. There was fish or sardine canneries there, and a few other places. Sometimes you'd hear a rumor that there would be an opening in one of these places. You'd dash out there, and there would be 200 people at the

gate at starting time. This was in 1938. I think there had been a little improvement in conditions, then it had sunk back into another pit in the Depression at that time. But you'd go to these show-ups where they were supposed to be hiring, and the management would come out and look over the crowd and they'd single out ones they knew and that was the end of it. That was the hiring for the day.

I had a job cleaning up a bar after hours, and I painted a little for a lady there, but then I ran out of funds. So I went back to the hills. My brother wasn't doing anything, and we went out to my dad's mine and started mining. Lo and behold we struck a nice little pocket, and we got enough to sort of help with the family's debt, which had built up, and I got all of \$1500 to attend the university. Five hundred dollars a year, which wasn't a lot of money, but it was enough to make a start at the University.

College Years at U.C. Berkeley

I had a little trouble at first, because I was pretty fresh out of the sticks.

De Maria: In the fall of 1938, another boy and I—one that I'd known in junior college—came down to Berkeley in an old jalopy. By that time it was about three weeks after the University had started, but we had been good students in the junior college, and the dean at the junior college made some contacts so that we would be admitted.

On the way down I had to pick a course. I decided I didn't want anything in mining engineering, so I flipped a coin between chemistry and civil engineering and it came up civil engineering. So that's how I got into civil engineering. I flipped a coin. I would have gone either way. It was that close. I had quite a background in chemistry from all the courses taken in junior college.

I had a little trouble at first, because I was pretty fresh out of the sticks. Also, I had not had one of the key courses I should have had. I should have had mechanical drafting, but I'd never taken that. I did get into descriptive geometry the first semester, which supposedly required a background in mechanical drafting, which I didn't have. I'd had the surveying, however, for which also you're supposed to have mechanical drafting. Since I had the surveying course prerequisite they let me in,

although I didn't know how to letter or draft. I got through the course.

I hadn't had geology, which is usually a freshman course. I took Geology 1A with that famous Professor Ethan Allen Hinds.⁸⁰ We were right over here in Wheeler Hall. There were 1000 people in the class. He was a noted character around the university. We were then assigned to a section, I think it was in old South Hall. I went to my section, and they passed out a paper and asked questions. I had heard the lectures, but the section material was all unfamiliar, and I did the best I could. Then they passed back the papers that had been corrected from the previous time, and of course I hadn't had one, being late.

This went on for a few weeks. I was most confused. I got a cinch notice, one of these pink notices. I expected it, because I knew I hadn't done well on these exams. I went in and talked to Professor Hinds and said, "I understand I haven't done very well on these exams." But the reason they had given was failure to attend my sections. I said, "I've been there. I know I

80. "Professor Allen Hinds was one of the most popular professors at Berkeley in the 1930s. His introductory geology classes would fill Wheeler Auditorium with over a thousand students, riveted by his lectures. He kept long office hours and always found time for students. He was part Navajo, spent a portion of each summer living on the reservation in a New Mexico hogan, and decorated his office with Navajo rugs and other works of art. Professor Hinds died in 1961. Even today, old Berkeley graduates will ask me about him. 'The best course I ever took in my four years at Cal,' is a frequent observation." (Professor Emeritus Garniss H. Curtis, Berkeley Geochronology Center, August 9, 2000.)

have." It turned out I had gotten into the wrong room, and I had been attending an upper division section. For God sakes—that's how green I was. He took pity on me, and gave me a little credit, and I ended up finally getting a B in the course, which wasn't bad.

When I went to UC Berkeley, they did not at that time have a structural engineering option. So I took a transportation option, and learned more about railroads than anyone would want to know. All of the options included the basic foundation steel and concrete design courses.

Later, however, I found out that I missed the best design course given at the university at the time, the course in irrigation. It was taught by Professor Bernard A. Etcheverry. It was a wood-design course, but I missed it. Whatever wood design I know, I picked up either from my experience in rough carpentry as a miner, or what I picked up after finishing school. So I really missed the best course. All of my friends who took it say that it was the best wood design course.

Scott: The best wood design course was in irrigation?

De Maria: Yes. I believe it was a course where they did a wood design of a flume structure. But in the process they also learned about wood design, which I didn't get at all in the university.

I had a job as a waiter all the time I was at the university to supplement my meager budget. After the first year I also had jobs as a reader. That would have been in 1939 and 1940. I worked for Martin Duke, Harmer Davis and Howard Eberhardt. I also worked for Dr. Baldwin Woods in mechanical engineering, on the mechanical engineering course. It was actually

statics and dynamics, which the structural engineers or the civil engineers had to take.

Honor Societies and Graduation

De Maria: I was a member of the honor societies, Chi Epsilon, Tau Beta Pi, Sigma Xi, and in my senior year I had a Howard C. Holmes scholarship. It was a small scholarship, but it helped out. I did my thesis under Professor Howard Eberhardt, and developed a method of analyzing statistically indeterminate structures, using wire models.

Scott: Wire models of buildings?

De Maria: Frames, bridges, statically indeterminate structures. By working with the curvature of the deformed models I was able to determine what the stresses were. It was a little different wrinkle on what had been done before.

I persevered, and it took me three years to get my degree, because I'd only had one year of the higher mathematics, the calculus. Before you get into the junior courses you needed to have the second year of math. I sort of marked time for a year, really. I took some courses in mining and took what other courses I could, so it really took me five years total to get my degree, which most people were getting in four years. I graduated in 1941.

Scott: You got a degree in civil engineering?

De Maria: A bachelor of science degree with a major of civil engineering—that is what it was called then.

World War II

We ended up in the European theatre, and operated lighters from ships to the beach and did some work on airfields.

De Maria: The war was on in Europe then. It had been on for a year or so, since the fall of 1939. Things were picking up. The Army engineers were around recruiting people, and I took an exam from them. I think I had a job offer. I had taken a State civil service exam during the Christmas vacation, and I had a job offer from the State [of California]. I even took a physical. But lo and behold one of the engineering professors, Clement T. Wiskocil, had been in touch with Brunnier's office. He knew they were looking for people. He got a hold of me and another fellow named Al Collin, and talked us into going over and seeing about this job in Panama.

Joined Brunnier Firm, 1941

De Maria: I went over and was recruited by Henry Powers to leave for Panama immediately after graduation—fresh out of school, about one day after graduation and I was on my way to Panama with this other fellow, Al Collin. Brunnier had a contract for Navy design for all the naval district down there. He was doing all the design. I guess the Navy smelled our entrance into the war in the offing, and they were trying to modernize their facilities. There had always been naval bases down there, but they were left over from World War I. There was a lot of wood

frame construction, and no money had been spent down there for new facilities since World War I. Pretty decrepit. There was a big program of construction. He had the design of all the structural work. Another firm had the mechanical design and another firm had the architectural design. They had a big joint office on the submarine base at Coco Solo, outside the city of Colon. They also had a contractor's camp nearby and we lived in the contractor's camp and we had our subsistence from the contractor's mess. We lived first in a tent camp and then in wood framed barracks that were built for the employees.

When I first got there, my particular task was making ink tracings of drawings that had already been done in pencil. Construction was underway on them, but the Navy required ink tracings on linen for their permanent records. It was kind of a frustrating job, because first off your sweat tended to drip. You had to work with a towel over your work. Then they found that after a few months these ink tracings began to mildew. They got brown spots. So some of them were discarded and had to be done over. Then they found that after a certain period of time the whole thing mildewed to sort of a brown texture, instead of the bluish texture, but you could still make prints of them. So we stopped doing them over and let them mildew.

Then, even more frustrating than that, after Pearl Harbor we found out that the Navy had put these all in wooden crates and was going to burn them if the Japanese came to attack the canal zone. That was a little frustrating. But it was mostly just drafting. Later on I got into a little design, and we had another contract with the Army when we were down there designing

a dock, and I got involved in design on that. But it was mainly a drafting job.

Return to San Francisco, 1942

De Maria: After about a year, the work finally drew to close. In the middle of 1942, I guess, they had decided the Japanese weren't going to attack, and anyway the facilities were designed and the money they had for that was spent, so they were closing down the office, and I was one of the ones that was pulled back.

Brunnier had a lot of government contracts going on in the San Francisco office, designing things like laundries for some of the bases and we did gun emplacements around the hills in San Francisco. And we did design several big bases out in the San Joaquin Valley at Lathrop and Tracy. As well as doing the design, we had the construction supervision and the inspection, so I was sent out there on inspection work, mainly of paving work, and spent I guess until the fall of 1942 out in the valley on inspection. Then I came back in the office in San Francisco.

Commissioned by the Navy, 1943

De Maria: In the meantime I had made application to the Navy for a commission. It came through in January of 1943. I was called into the Navy in the Seabees, the construction battalions, where I spent three years. We didn't do a lot of construction, but did a lot of training and a lot of standing by. We ended up in the European theater, and operated lighters⁸¹

81. Flat-bottomed, pontooned, transport boats that ferry equipment, supplies, and/or personnel from offshore ships to beachheads.

from ships to the beach and did some work on airfields.

The formal name is U.S. Naval Construction Battalions. The acronym Seabee was coined from the abbreviation of Construction Battalion, either CB or C.B., depending on which yeoman did the typing. There was also an insignia showing an angry bee carrying both weapons and tools. The term Seabee was not used in official orders, but was widely used in publications, publicity and recruitment. Construction Battalions were authorized in January of 1942. All of the officers except for supply officers, medical officers, and chaplains were members of the Naval Civil Engineer Corps, and were under the direction of the Chief of the Bureau of Yards and Docks. In March 1942, authority of military command was given to the Civil Engineer Corps officers by the Secretary of the Navy. This authority had previously been reserved to line officers.

Supplying Beaches After Invasion

Scott: You mentioned operating lighters—was that in connection with the invasion, or after the invasion?

De Maria: It was on the invasion beaches, shortly after the invasion, when they were still bringing the supplies in onto the beach. These lighters that I spoke of were what they call rhino ferries. They were made up of pontoons that the Navy had. They could be assembled to make lighters and wharves. At one time we made a wharf in the harbor at Le Havre of these pontoons. The lighters had a marine diesel outboard motor in the rear, and were pretty big and unwieldy; they didn't have much top speed. They moved stuff around. It was very

difficult operating on the beach, because of the tides. You had to arrange to try to come in as the tide was nearing its peak, so you'd come well up on the beach and the vehicles and what-not could roll off. Then you had to get back off the beach before you got dried out on the beach. We had bulldozers out there that operated in the surf, which kept pushing you back as the tide receded so you didn't get stuck.

It was very hard on those Caterpillars, working in the sand and the salt water, and their clutches began to go. We had a lot of what we called "dead" Cats. They were out of commission. I ordered replacement clutches, but months went by and they never came. When we finally secured the beach, we only had about one or two of these Cats left operable. We dug a big hole in the sand and pushed the others in and buried them. Taxpayers money. We couldn't move them.

Technical Mission for Europe

De Maria: In April 1945, I was detached to what was called the Navy Technical Mission for Europe and was part of the housekeeping staff for that. Because I had been over there since the middle of 1944, I had been over there quite a while when this mission was formed. When they began to get into Germany, I was supposed to be the local man who knew the terrain, so I led this group up into Germany to a place they had selected for headquarters, which was an estate of the Busch family, the beer people from St. Louis. That was the headquarters. We had a lot of technical people—some of them were Navy officers, some of them were recruited from industry, scientists from industry. Whenever German factories were taken, they would

get in there and try to find out what were the most recent developments the Germans had been working on. We crated up samples of this and that and sent them back to the States.

At one place I went on a mission to get a whole truckload of German Navy records. I thought they were current, but they were World War I Navy records. But they were all crated up and sent back to the United States. I had a job of scrounging up lumber from little lumber mills out in the woods and making crates.

I had some of my Seabees with me, and kept the [Busch] estate running. At the end of June 1945, after the war in Europe was over, our Seabee group, which during this time when I was out in Germany had been at Orly Field

near Paris, got orders to go back to the states. We were first pulled back to England and then to Scotland and shipped home. We were sent to the base at Davisville, Rhode Island where we were decommissioned, but we were supposed to be reassigned to a unit to go out to the Pacific. While we were out on our recuperation leave, the Japanese surrendered, so we were never formed into a unit, and just put in a little time until we accumulated points and I was shipped out to the West Coast in charge of a draft of pretty green recruits that were going out to replace some of the people who had been out in the Pacific islands for some time. But I was detached from them and sent down to station duty at Port Hueneme, where I waited out my discharge.

Return to the Brunnier Firm After World War II

Until the end of my days, I never got completely away from drafting.

De Maria: After I was discharged in January of 1946, I returned to San Francisco and went to Brunnier practically the next day. So immediately after the war I was back in Brunnier's San Francisco office, and stayed there ever since, until I retired at the end of 1983.

Starting in January 1946, and from that time on, I was principally a designer. But in Brunnier's office, designers did their own drafting a good deal, too. So you would make a design and draw it up yourself. Later, on bigger jobs you'd do the design, and have two or three people helping with the drafting. But until the end of my days, I never got completely away from drafting on some of the work. I always enjoyed it, because in working out details, three dimensional things, it was very important to visualize how things were going to go together and make the details work so they could be built. I enjoyed that part of it.

Civil and Structural Licenses

De Maria: On my return to Brunnier, I immediately started studying for my license. I took the civil engineers exam in the early summer of 1946 and passed it. Then I immediately applied for the structural title, but was advised by the board that I did not have enough experience. They did not count the “Boy Scout” experience during my service in the Navy, and also did not count some of my other experience. I don’t think they wanted to give any credit even for the inspection experience—inspecting paving. So I was really short on qualifying experience. I was optimistic that I could bluff my way through immediately after getting the civil license, but I didn’t succeed. “You’ll have to wait,” they said.

Meanwhile, in 1947 I took a State civil service examination, sort of a tune-up for the structural examination that I was preparing for, and also because I wasn’t too certain about the direction I wanted my career to take. Basically, however, I just wanted a little experience taking exams, but in fact I did pass as number two on the State list. So I was offered a job in the Office of the State Architect, in the Schoolhouse Section. I didn’t accept it, but if I had taken the job, I might well have become the Jack Meehan of the Schoolhouse Section [of the Division of Architecture, State of California].⁸²

I actually waited three years before taking and passing the structural examination in 1949. Passing was quite an accomplishment, because only two of us passed out of about 70 people

who took the exam at the time in northern California. That exam was a tough deal.

Active in SEAONC

De Maria: After getting my license I became active in the Structural Engineers Association of Northern California (SEAONC). In due course I served as chairman of a number of committees and then as vice-president and finally as president in 1959. I also served several terms as a director of the Structural Engineers Association of California (SEAOC). During the same time I was on the SEAOC Board of Directors, I worked several times for the State of California preparing and grading the structural engineers examination.

Outstanding Young Bay Area Engineer Award, 1955

De Maria: In 1955, I was honored during Bay Area Engineers Week as the outstanding young Bay Area engineer, selected by my colleagues in the Structural Engineers Association of Northern California. Since that time, instead of honoring adults, they have been honoring outstanding students at Engineers Week. But back in 1955, that was possibly the first time they had a program where they honored engineers from various disciplines in the Bay Area. I was the structural honoree.

Work During 1946-1963

De Maria: During that period, I was basically doing design and drafting—turning out plans. At that time I wasn’t doing much specification. Henry Powers had been doing the specifications, and then about 1946 he turned the whole business over to Herb Lyell—washed his

82. John F. (Jack) Meehan was a structural engineer employed by the Office of the State Architect from 1949 to 1987.

hands of it. So Herb Lyell did most of the spec writing. I wrote a few specs, but most of the specifications we did were just on the structural materials. For the industrial work, however, we had to write anything that needed doing. We did the roofing specs, siting specs, paving specs, and whatever—if they had a little toilet room in an industrial plant, we wrote specs for the toilet fixtures and everything.

But on the jobs with architects, specification writing really was not such a chore, because we just did the structural materials part. We did four or five sections of specs. We did a little field supervision, but not much. Occasional visits to jobs, unless they happened to be in downtown San Francisco, then we did a lot of lunch-hour inspections.

On-the-Job Inspection

Scott: What about the on-the-job inspection? Is that something that the engineers do not often do, or do not all do? Or does it depend more on the individual contract?

De Maria: It depends to some extent on the contract. That is also something that has grown over the years. On school jobs, of course, under the Field Act, the Office of the State Architect has its own inspectors who do basically all the inspection on school construction. If we did work for the U.S. Army Corp of Engineers, they did all the field work, all the inspection.

If it was work for the University—for example, we did a lot of work at the Davis campus and some work at the Berkeley campus—an outside resident inspector hired by the University would report to the engineers. He would do the inspection, and occasionally the engineers

would come out and discuss problems with him or give him some direction. But he was basically not employed by the engineering firm, he was employed by the University.

Usually there was an inspection laboratory, particularly on steel and on concrete testing, that would send people out from the testing laboratory. Even though they were recommended by the engineer, usually they were hired and paid for by the owner. They were a separate entity, even though they were taking some direction from the engineer of record and were cooperating.

On some jobs we did hire inspectors that we put on the job full-time. Some jobs received very little inspection, besides occasional visits of the engineer. This kind of thing—jobs being built without any real inspection—has, however, gotten to be more and more a thing of the past. Today, even very little jobs usually are inspected.

If you were doing work in the city jurisdiction, like the city of San Francisco, the city's building inspection bureau had inspectors, and they visited jobs from time to time. Then they also required special inspections, which came in a little later. They would require that either the engineer of record certify that something was done under his direct supervision, or the testing laboratory have a man there who would certify that he had actually seen this work being done. Special inspection was required for certain things, such as welding, reinforcing of block masonry, and fabrication of glue-lam beams. There were a lot of problems with glue-lam beams that were not being properly glued in the factory, so inspectors used to certify that the work had been properly done.

Scott: I take it this is mainly San Francisco that you're talking about now?

De Maria: Yes, but it was true in various cities. Outside of Los Angeles, San Francisco was the most organized of the city building departments. Some of the small towns, of course, had very little inspection. They might have had one man who was the city building inspector, and who supposedly checked on many of these things. But it was not a continuous thing, because he would have a number of jobs he'd visit. Undoubtedly, a lot of construction got done that was not exactly according to plans and specs, and I think it still goes on today, especially on smaller jobs and less important work.

Scott: You said you hired your own inspectors on some jobs. Why were those jobs done differently?

De Maria: Yes, we did hire our own inspectors on some of the work. For example, we hired our own resident inspector for United Airlines work. He was there on the job every day, all the time. It was done that way because the owner did not want a lot of separate contracts to deal with, such as a separate contract with an inspection agency.

When we did work with United Airlines, we were the prime contractor, whereas ordinarily the architect would have had the contract and would have hired us, or we and the architect would each have had separate contracts. United Airlines did not want that. They wanted one contract for the entire job. They wanted to deal with one person.

So when we got those kinds of jobs, we hired the subcontractors, including hiring the architect as a subcontractor to us. Those were the

jobs where we also hired an inspector who worked on our payroll, but was full-time on the job, and reporting to us. We also still had testing laboratories that did the special inspections. They were engaged by us and we paid them, but we were then reimbursed for their services through our contract. There was only one basic contract—the one with the prime designer. That's the way our client wanted it. Different clients had different requirements.

I think as the years have gone on there has been more and more emphasis on field inspection. I also believe experience with failures has indicated the need for this. I am speaking not only of failures occurring during earthquakes, but also of run-of-the-mill failures that happen in construction. I mean unsatisfactory results brought about by things not being built exactly as the drawings indicated. So one of the gradual changes in the profession has been more emphasis on construction supervision and inspection.

Another gradual change has been more and more involvement with the structural design of so-called architectural items, such as curtain walls, window glass, partitions, and ceilings. Even steel stairs used to be the province of the architect, and still are to some extent, but we always developed the procedure for checking them out. So even if the architect drew up a steel stair and showed it on his drawings, we always checked it out structurally and counseled him on details.

We would even check the shop drawings for the stairs, because as far as I can see they are part of the structure the same as the floor. If they fail, the blame falls on every professional connected with the design. If someone files a

lawsuit, they will look up the names of every design professional who had anything to do with the job and name them.

Earthquake Code for Ecuador

De Maria: I had many varied and interesting jobs during my early years at Brunnier. One of them was preparing an earthquake code, in Spanish, for the Republic of Ecuador. Brunnier got that job through his contacts in South America, after an earthquake down there. When he came back, he asked the secretary if anybody in the office spoke Spanish. She knew my name, De Maria, and said, “Sure, Charlie speaks Spanish.” Well, I didn’t really, although I’d had high school Spanish.

Anyway, that is how I got the job. I translated segments of the Uniform Building Code into Spanish. I also translated the famous “Separate 66” paper, the early dynamic seismic code worked out by a committee of San Francisco Bay area structural engineers.⁸³ As far as I know, Ecuador is the only place in the world where Separate 66 actually became the law of the land.

Seismic Resistance for Adobe

De Maria: We also wrote special sections for their code. We had a consultant in Ecuador, an

83. Anderson, Arthur W., John A. Blume, Henry J. Degenkolb, Harold B. Hammill, Edward M. Knapik, Henry L. Marchand, Henry C. Powers, John E. Rinne, George A. Sedgwick, and Harold O. Sjoberg, “Lateral Forces of Earthquake and Wind,” *Proceedings, American Society of Civil Engineers*, Vol. 77, Separate No. 66, April 1951. Published the following year in *Transactions* Vol. 117, 1952.

architectural firm, that got cold feet about applying UBC standards to the local villages where there had been a lot of destruction. They realized that the local people could never build to the standards of the United States. So to accommodate those concerns and appease the local people, we finally did a section on construction with adobe block and native materials, using mud mortar.

They just mixed mud and water, and that’s the mortar—they called it “choco,” which I think is the local term for chocolate. Anyway, we tried to put some seismic resistance into the type of construction they used, in order to improve it somewhat. We tried at least to improve it over what had been destroyed in the earthquake.

Scott: How did go about putting some minimal seismic resistance into adobe?

De Maria: By providing certain ties of the roof to the wall, and by tying the corners together—that sort of the thing—using wood or split bamboo or whatever they had. The aim was to have something better than what they had before. The heavy roofs were the main problem with much of the construction in which many people were killed. Heavy tile resting on framing, without rafter cross ties. Even without an earthquake, just from the weight of the roof, the framing was already trying to push the walls out. So when the earthquake came, many of the roofs fell in and killed a lot of people. That kind of construction is still a problem virtually all over the world.

Consulting Job in Chile

De Maria: I had a job consulting in 1953 on a building in Chile. At that time, Santiago was

using reinforced concrete. A steel company down there hired Brunnier as a consultant, because they were trying to move in on the market for steel for most of the construction there. The company had a steel plant down there, but it did not produce regular shapes—it produced angles and smaller shapes, not what was really needed to construct a major steel building. Nevertheless, it could be done by building up sections out of these small angles and so forth.

Scott: The original idea was to build a steel building using structural steel sections built up out of the smaller pieces by bolting or riveting them together?

De Maria: Yes, using plate and angle columns. That project finally fell through, however, and the building was built out of concrete. So that was another not-too-successful project.

Roof and Building Collapse: Roberts Brothers Building, Portland, Oregon

De Maria: In 1960 I went to Portland for a conference on structural failures, at the Pacific Northwest Conference of Engineers. While I was there, I met a friend who worked for the Equitable Life Assurance Society. He was representing the lender on a job being built in Portland at the time. He was attending the conference, and told me they were having problems on the Roberts Brothers Building. It was a precast concrete department store building, and they were having cracks in some of the members. He was very concerned and wanted me to take a look at it.

I was there attending the conference, and did not want to take on a job in Portland. I checked back with my office and they said, “Go ahead, look at it.” So I went out there. There was a party of us, the man from Equitable, the local man, the contractor, the engineer who had designed the job, and myself. We all went out there one afternoon and climbed up above the second floor and onto the roof.

While we were standing there discussing the cracking problem, a part of the roof just collapsed. Not the part we were standing on, but a part adjacent to it. A huge cloud of dust rose up, and everybody stood there quietly. I was expecting to hear screams from workmen and so on. Not a sound. We had walked in there at about 4:00 o'clock or so, and by the time we'd made our tour and had gotten up on the roof, it had been just after 4:30, so everybody else had gone home. It was an interesting experience to be on a roof of a building when it partially collapses. Not too many engineers have actually been in a building during its collapse.

Scott: What caused the failure?

De Maria: Very poor engineering. There were serious design deficiencies in the joints of the precast members. The building did not have any seismic engineering. There were lawsuits, and later I went up to testify as an expert witness. We did not do the rehabilitation, but they got a local firm there that did a good job of rehabilitation, and managed to save a lot of the building. So before that building had even been finished, they had to spend a lot of money for its rehabilitation.

Scott: The original design must have been poor engineering indeed, to get that result.

De Maria: Yes, very poor, although this is actually not too uncommon. There are lots of construction failures, many of them being form-work failures that occur during concrete pours—that is a very common kind of construction failure.

Insurance and Litigation

De Maria: We were involved in litigation a few times, such as where there was a partition failure, or even when some mechanical plenum did not work right. Someone got caught in the door of a mechanical plenum and would just sue everybody. I'm sure that in the early years such litigation was an unheard-of thing.

Nobody ever sued the engineer. Later, however, designers had to carry insurance, and it got more and more costly.

I don't know when Brunnier first started to carry liability insurance, but I do know that he did by 1960. He was probably one of the first to carry it, because he had gotten the insurance idea from working with the California State Automobile Association and their auto insurance bureau. I believe he was one of the principal founders of what they called the Interinsurance Agency of the Automobile Association. Because of that experience, he was probably more of a mind than most to protect himself. He may also have felt that, not having his personal hands on everything the firm worked on, he needed a little protection from what his staff was doing.

Lawsuit Over a Grain Elevator

De Maria: I know that by 1960 Brunnier had liability insurance, because at that time a lawsuit was filed in which I was involved. It was a very

unhappy phase of my career. We had been called to Stockton to look at some grain elevators that were having problems of cracking and leaking. This was one of the out-of-town trips that I made with Brunnier. In Stockton, he, of course, went to the Rotary lunch, and I looked over the grain elevators and got the necessary information.

We concluded that the elevators were under-reinforced. They had been designed very skimpily to begin with, and then in construction a lot of reinforcing had been left out. So when the high cylindrical elevators were filled, they would expand and crack. They had problems with leakage, and from one filling to the next were getting contamination from stuff that lodged in the cracks and on ledges.

The construction had been a slip-form job, which is a continuous concrete pour, lifting the forms as they go. It is very easy to omit reinforcing when you are on the night shift. We took magnetic readings to determine where the reinforcing bars actually were. With that information and knowing the number of days it took to raise the forms, you could figure out where the night shifts had been. In those portions there were gaps in the reinforcing because less reinforcing had been put in during the night shifts.

Scott: I presume that was because they thought they could get away with it at night.

De Maria: Yes, probably because they could get away with it, or maybe they had an inspector who only worked days. Anyway, we made plans and had the elevators repaired by putting a new gunite liner inside, with lots of reinforcing. Well-designed.

No sooner had the elevator repair job been done and they started to fill the bins, than

another problem showed up. There was a built-in steel hopper at the bottom of each of the elevators, with a conveyor running underneath to unload the contents into railroad cars. One of the hoppers underneath the tubular section collapsed, and there was a big to-do about that.

We had never thought to question the hoppers, as no previous problems had been reported with them. So we had not examined them during our first inspection of the elevators. Just looking at them, they seemed substantial enough, but they turned out to be deficient, and the owners blamed us. We made a report and found the hoppers to have a design and construction deficiency—they had lousy welding and improper bracing in the design.

We made reports, but the owners were dissatisfied with what we reported, and also got two or three other engineers to make reports. We sent them bills for our services. They were unhappy and didn't pay. They were losing money because some of the elevators were out of service. I think Brunnier threatened to sue them, or maybe he did file a suit for our fee, and they immediately sued us for all of their problems with a huge lawsuit. That's when I found out that Brunnier had some liability insurance.

I had signed the reports and signed the drawings. I was merely an employee in status and I should not have done that, but we did it consistently, because Brunnier was never around. Anyway, the process-server walks in the door and hands me this notice of a lawsuit, and I'm named as well as Brunnier. That was a very unhappy circumstance. Brunnier assured me that I had nothing to worry about. He checked with his lawyer and with the insurance company. They both told him I had nothing to

worry about. I didn't quite believe it, however, because his insurance policy protected him from anything his employees might do. It did not specifically protect the employee.

I was so concerned that I got my own lawyer. He told me, "You're not really covered. In case there's a huge judgment that exceeds the amount of liability insurance that Brunnier carries, they could come after you personally for your assets." That really shook me up, because they were asking for quite a few times what his policy limit was. This went on for five or six years before it was settled. Depositions and whatnot went back and forth. It was finally settled out of court.

Need for a Part-Time Occupation

De Maria: At that time, in 1960, I was getting a bit dissatisfied with my position in the Brunnier organization. It was a nice place to work, and I had sort of an implied promise that I was one of the heirs apparent to Brunnier, and one day would be a partner in the business. But that did not seem to happen. Meanwhile, I had been doing a little moonlighting—I had done a few little jobs for friends, and then they would come back with something a little bigger.

It looked to me as if I could maybe make a go of my own business if I went out on my own, although I certainly did not have any resources to tide me over for very long. Then I got involved in the lawsuit and did not dare make any switch. So, partly because of the lawsuit, I had to drop the idea of striking out on my own—I had to stay to see the litigation through. Before that was over, 1963-1964 had come, Brunnier made his long-promised gift,

and I had become one of the owners of the Brunnier firm.

As a part owner, it would have been a conflict of interest for me personally to do outside consulting. So I immediately had to stop the outside moonlighting work in engineering that I had been doing. I brought some of this work into the H.J. Brunnier Associates office with little jobs, but none of them panned out very well—they were a pretty poor collection of clients. Anyway, I quit cold on anything that would have been a conflict of interest with my partners. So in addition to being an engineer, I became involved in quite a bit of real estate

development and land management as a part-time occupation. My first small real estate investment was in 1962.

Scott: Why do you say you always had to have two jobs? Did you feel it was an economic necessity, or did you simply want to have a sideline?

De Maria: The need for two jobs was an economic necessity at that time. It was very difficult to build a nice home and raise a family on a designer's salary. I believe this is still true today. Now the norm seems to be for the wife to work to provide a second income. [See also Chapter 7, De Maria's Real Estate Investment Activity.]

Brunnier Firm: Organization and Ownership

Jobs came on the basis of our reputation...

Scott: You have mentioned the change in ownership that occurred in the early- to mid-1960s when Brunnier made stock gifts to selected long-time employees. Would you give a little of the background on that, and on the organization and management of the Brunnier firm?

De Maria: Yes. When I first came to the Brunnier organization in 1941, things in the office were handled by the office manager, Henry Powers. Brunnier would meet with architects, discuss fees and bring the jobs in. I'm sure that some of the jobs came in through Mr. Brunnier's associations. A lot of the jobs came from past business—repeat work. Jobs came on the basis of our reputation only. People would make inquiries asking about the good engineers in San Francisco. Some people just walked in the door—that did happen in those days.

The people in the office who worked on the jobs were not really aware of the financial aspects of things. My role and that of the other people who worked there was to produce the drawings, the specs and so on. Our job was to get the work done, but not be much involved in the negotiations.

I do not believe that Brunnier himself had done any detail design work for many years, going back way before my time. Much earlier, of course, in the first few years after he started his office, he did design and made drawings. But he told us how in his early years of practice he found his business going in peaks and valleys. The valleys occurred when the office had gotten a job and he was working on it personally, not out seeking more work. Thereupon he would go out to find work and bring it in, after which they'd hit another peak.

He decided that his role should be to keep the work flowing into the firm on an even basis, keeping the designers and the draftsmen in the office busy. That is the way he operated for most of his career. So during my time in the firm, starting in 1941, Brunnier never did any calculations, never made any drawings or wrote any specifications. His role in the firm was contacts and liaison with some of the clients, and Henry Powers was running the office. I'm sure they had discussions about the jobs, because the two of them used to hold conferences, but I was not aware of just what those discussions entailed.

Firm Did Not Grow

De Maria: The Brunnier firm never took the steps of expanding and growing, as some companies did. Over the years we had a lot of young engineers come to work in the firm, maybe right out of school. At first they would not know much, but would stay a few years and become valuable. Then in a few more years they would be licensed. After that, however, with the nucleus of older people ahead of them in the office, they could not anticipate much of a future at the firm unless it expanded.

Instead of waiting for another generation to die off, they chose to go out and start their own businesses, while our firm remained about the same size. We never grew, staying at a very constant level—basically between 15 and 20 people—instead of expanding and keeping the younger people by providing enough incentive. Many other firms chose growth, the opposite of what we did.

It is true that some of the other old firms, like Henry Degenkolb's, grew slowly (although I think the Degenkolb organization is a quite a lot bigger now). But some of the other firms grew rapidly. They got into computers and specialized things and government work, and one thing and another. They took on added work, hired more people and rented more space. Dames and Moore is one of the older firms that grew very rapidly. Other examples of growth firms would include URS/John A. Blume & Associates, Woodward-Clyde Consultants, T. Y. Lin International, Keith, Feibusch Associates, and CYGNA.

I think our firm could well have done better. I think we had more talent available than some of the other firms that expanded and did well. We had a cadre there that could have handled a much larger firm, and we lost a lot of good talent among the people who came and went. We could have kept that talent in some way. Some of the ones who worked for us are still doing business in the city and doing it very successfully.

Of course, even as things were, it wasn't a bad living at the Brunnier firm, and for the most part I enjoyed it. During my last years there, however, I enjoyed it less and less, because of problems such as liability insurance and all the added complexities of practice. I enjoyed the

straight engineering part, but not so much the management or the responsibility of meeting the payrolls.

Scott: Was the Brunner firm's decision not to expand pretty much a conscious choice, or did it just sort of happen?

De Maria: I think it just sort of happened. There was nobody with the drive to make it happen otherwise—nobody with the ambition to expand.

Scott: To expand successfully, you probably needed at least one or two people in the organization who would really push to bring in additional work.

De Maria: Yes, we would have had to search wider for work. My personal feeling was that Henry Powers, who was in charge for so long, was responsible for this attitude. He did not have the ambition or the energies to make the effort, and instead sort of kept a damper on things. You see, in 1963 Powers became one of the partners, and for a time had a majority interest. He was very inactive after 1963, but stayed on for some time, and with his controlling interest his policy could not be changed much. Also, by that time, and certainly by the time Powers was gone, I guess the fire had gone out for most of us.

Scott: You yourself continued actively in the firm for about 20 years following the ownership change?

De Maria: That's right. We did a lot of design work and had a lot of big jobs, which kept us busy. I think our weakness was in lacking some way of going after new work. That was something all the firms were taking hold of

at the time—assigning someone on the staff specifically to look for work, or hiring a business manager. We did not do that—we struggled on.

Later, Mr. Brunner was getting older, he had his many other activities, and Henry Powers was gradually losing interest. He [Powers] did less and less—he was then of the age where he did not have the interest—and things drifted a little. Long before the 1963 ownership change, he had begun to put the burdens on Herb Lyell, the oldest of my partners.

I also sometimes had the idea that Henry Powers and Mr. Brunner were not always together on everything. If Mr. Brunner had not specifically told Mr. Powers to do something, he did not do it, or would do something else, whatever he thought he should do. When Brunner was gone for long periods of time, sometimes things like billings for small jobs were not sent out. On a few occasions when Brunner came back there was no money in the bank, and he would begin to look through accounts receivable.

He would immediately ask the secretary—a girl—to send out bills, some of them on jobs completed a couple of years before. Those people would get bills they had long forgotten, or thought had been forgiven, but that still had to be paid. There was a little hard feeling about some of those. In short, I think there was a period when the business wasn't run in a very businesslike way.

De Maria Becomes Partner in Firm, 1963-1964

Scott: Describe the ownership changes that took place in connection with the formation of H. J. Brunnier Associates in 1963.

De Maria: Brunnier had a very good rapport with the post-World War II group of employees, and over quite a few years had made representations to us that he was going to turn the business over to us. It was sort of a promise, but years went by and it just didn't happen—not for quite a long while.

Scott: What prompted him to act in 1963?

De Maria: Brunnier would have been 80 years old then, and I think some good-sized jobs were coming along. The owners could see they'd be dealing with the firm for a few years, and I suppose the question arose as to who they would be dealing with if Brunnier passed out of the picture. Those thoughts may have been voiced to him by others, or maybe came to him on his own, but I think that was the reason for the changeover. Certainly he already had it in mind to reward some of the people who worked for him with a share of the business. I think it was a matter of getting older that led Brunnier and his wife to make the gifts when they did in 1963 and 1964. During this same period, the Brunniers also arranged the gift of their art collection to Iowa State University, Brunnier's alma mater.

He was the sole owner of the business, which was an individual proprietorship. In 1963, he formed a stock corporation—H.J. Brunnier Associates—and stock was issued to him and his wife. Next, the stock was given to a group of

long-time employees. At least he considered it a gift. It went hand-in-hand with a contract to engage and pay him as a consultant, although he really wasn't doing much consulting. So I sort of thought it was like buying a business on the installment plan. But he considered it a pure out-and-out gift.

Scott: He and his wife must have had substantial income from other sources for him to be able to give his entire firm to the employees in 1963-64.

De Maria: Yes, he was financially comfortable, no question about that. He had a few investments, including one very fine investment—he bought IBM stock when it first came out. With IBM, he got in on the ground floor, and that was probably the principal source of his personal wealth. So he made at least one good investment, although he had also made others, such as investing in a mine at Grass Valley that did not pan out. The maps of that mine were in the office and we used to look at them. But the IBM investment worked out well, and was the source of a considerable amount of money in his estate.

Under the tax laws, an individual can make a tax-free gift to another individual up to a certain amount each year. So the Brunniers arranged it so that near the end of one calendar year his wife gave gifts to each of the named employees, and he also gave similar gifts. Then they repeated the process in the next year. That way the stock was all distributed without their having to pay a gift tax.

Scott: So he and his wife gave all the corporation stock to selected employees over a rather short time?

De Maria: Yes, one hundred percent was given away near the end of one year and the beginning of the next. The gifts were made in October, 1963, and January, 1964, so they fell into two calendar years for tax purposes. The whole thing was transferred over a period of three months.

Scott: How were the stock gifts distributed among you, and how were the percentages determined?

De Maria: Henry Powers received 40 percent, Herbert Lyell 20 percent, and the rest of us got 10 percent each. The percentages may have been determined by discussion between Powers and Brunnier, whose relationship went way back to 1917. Powers had by far the longest association with Brunnier, and was also the oldest of us. Under Powers, Herbert Lyell was the leader, who was somewhat older than the rest of us. He also had more experience. The rest of us were on the same level—a slight notch below Herb Lyell in status. You could call it a pecking order.

Except for Powers, we were all about the same seniority, having all been recruited at the time Brunnier had the Panama contract in 1940-1941. Some of us were then just out of school, although Herb Lyell had some previous years experience elsewhere, and had a little seniority based on that prior experience, not on longer experience with the Brunnier firm.

Scott: After Brunnier gave you all the firm's stock, his main direct connection with the firm was as a consultant?

De Maria: Yes, and that was only for a few years. It wasn't excessive. Brunnier still came to the office almost daily, but he mainly tended to

his personal things. He had all of his other activities, lots of Rotary functions, the Auto Association, and all those things, which he had been doing for some time anyway.

Scott: Yes, according to his obituary, he was in his office at the Brunnier firm when he died quietly at his desk one December afternoon in 1971, not long after his 89th birthday.

Transition a Little Rough

Scott: How did the transition go after the change in ownership?

De Maria: When H.J. Brunnier Associates incorporated in 1963, we were just sort of dropped into a void—dumped in cold on our own. We had not been given much background in how to get work in, handle negotiations, and deal with the public relations end of the business. Brunnier had been doing those things, such as they were. Whatever was done, he did personally. Then all of a sudden we were put in a position for which we did not have much experience. It was difficult to pick up what needed to be done. I tried, and most of us tried to do the necessary things, but we were not as successful as he had been. And we started a bit late in life.

Scott: So I guess the transition was a little rough—it hadn't been that carefully planned.

De Maria: No, it was not well prepared. Henry Powers was doing these things, or was supposed to be doing them, and he was really dragging his feet, because he was also quite old at the time, though not as old as Brunnier. He was about 12 years younger than Brunnier, who was 80, but he had lost his drive and fire. He was content to let things sort of drift, status quo.

When the stock was turned over, he got the biggest portion, 40 percent, giving him practically a controlling vote. His policies continued for a while, until he dropped out completely.

In short, before incorporation, the firm had sort of been drifting along, and continued to drift for five or six years afterward. When Henry Powers finally did relinquish control in 1969 or 1970, we did attempt to alter course. I brought in my own attorney, and we updated the corporation records. We initiated a buy-sell agreement among the partners. We instituted an employee health plan, and a profit-sharing plan.

We tightened up on the record-keeping and billing, and trying not to lose money by slack business procedures. But we were not well trained in this—we were basically engineers and not managers, so it was a little difficult. Meanwhile the firm went on, sort of in limbo. We were working hard, turning out a lot of work, and were getting by, but we were not expanding. If there had been somebody with drive and leadership, we might have been something different than a small, one-office, structural engineering firm.

Scott: In addition to you, who were the other principal partners at this juncture?

De Maria: Henry Powers, Herbert Lyell, Stan Teixeira, Andrew Stevens, and Melvin Klyce. Trying to emulate Brunnier in his philosophy of participation, I became active in my community's civic affairs. I joined the Atherton Civic Interest League, a community watchdog group of citizens. I served as a director, vice-chairman, and chairman of that in successive years. I also joined a tennis and swim club.

Reputation Excellent, Income a Subsistence

Scott: The firm really had a very good reputation, didn't it?

De Maria: It had an excellent reputation. For the size of the firm, we handled a lot more work than most, but it was a struggle. We did a lot of big jobs, but it took us a lot of overtime work to do that.

Scott: Was it reasonably lucrative?

De Maria: It was basically a subsistence, and while the extra income from overtime made it a little better, I think that is kind of a poor incentive. Before the transition to H. J. Brunnier Associates, the firm did pretty well in some years, and Brunnier always gave a Christmas bonus. There was always a bonus, but it varied in amount. So in some years we had a nice bonus, which maybe made up for salaries not being so great. But then in some other years there was not any extra money, and the bonus was small.

The same thing happened when we became owners and partners. In some years there was money to distribute at the end of the year—aside from the salaries we took straight through—and some years there wasn't. We had a few good years and some bad ones.

Small Firms Trying to Compete

De Maria: A number of other small firms were facing the same difficulties we did because they were small and not able to compete for some of the big projects. So about 1969 or 1970, ten firms, including ours, got together to form what was called Engineering Research

Associates. We wanted to call it ERA, but Economic Research Associates had that acronym and filed objections. So we just called it Engineering Research Associates. Among ourselves we always referred to it as “ERA,” but we couldn't use that as an official acronym.

Scott: Whose idea was it?

De Maria: The guiding light was John Sardis, who had a small structural firm, Sardis and Associates. Like the rest of us he could see that any one of us alone did not have the stature to get some of the big jobs that were coming along. The group was fairly heavily weighted toward structural engineering, but also had soils people, testing engineers, mechanical engineers, and electrical engineering firms.

We all put in a little money and hired a manager, who we hoped would bring us work. Our selection was not a very good choice, however, because what the manager wanted to do was get some leads on jobs, and then direct us to go out and make the contacts. We did not want to do that, however, instead we wanted our time free, and for someone to bring the work in.

Scott: Do you think the original executive or manager didn't quite have what it took?

De Maria: He was a retired person, it was a part-time job, and he didn't really devote himself to or understand exactly what we wanted, or maybe he didn't have the background for it.

Scott: Basically you wanted him to drum up business?

De Maria: Yes, that was the main thing. Not just to get a lead on a job, but also to follow through. Leads were easy to come by—you could get leads by looking at the *Commerce*

Daily Journal. But he just wanted to send the principals of the member firms out to do the follow-up, so he was not really accomplishing much for us on his own.

It was never very successful. We spent a lot of time putting together proposals, and did make proposals on a lot of major projects, but only got one or two small jobs. We tried to get a job with HUD, for example, to design many typical apartment buildings in different seismic zones and evaluate the costs of building them, and other big jobs like that. We finally did a little work for the Portland Cement Association, setting up a column testing program and evaluating it, but we never really made any money. This went on for years, trying to make ERA go. We finally got rid of the man we had originally hired as manager, and tried another man for a short period.

The other principals in the firms did not want to devote a lot of time to ERA, because they each had their own firms and were each independently busy on their own work, although some of the people actually did put in a great deal of effort. Nevertheless, a lot of the principals were not too enthusiastic about it because it meant giving up a little of our independence to work as a member of this ten-firm group. My own partners began to refer to it as my “luncheon club”—we met every month to discuss ways and means.

Then we had several deaths among the directors of ERA, including John Sardis, one of the prime movers. Ken Oliphant also died suddenly. He was an acoustical engineer and electrical engineer who had a lot of contacts in Washington and had worked pretty hard to make ERA go. Frank McClure's firm of McClure and

Messinger split up. ERA sort of fell apart gradually, and finally we discontinued it. It was pretty active for five or six years, but after that it sort of faded out, probably in 1975. It was an attempt to meet the changing conditions in the competitive world at the time—an idea that might have taken hold and that we tried to make work, but which was not successful.

Scott: You had some good names in the membership. In addition to those you have mentioned, I see Henry Degenkolb, of Degenkolb Associates, and Bob Preece, of Preece/Goudy.

De Maria: Yes, we had a lot of high-powered people.

Specific Projects

Some of the buildings are more like sculpture rather than practical buildings. Yet you, as an engineer, have to try to make a structural system work within the constraints of the sculpture.

Scott: Discuss the work of the firm. I believe there were some industrial-type jobs that the firm specialized in.

De Maria: Yes, we did a lot of specialty work. One specialty was glass furnaces. A glass furnace is sort of a freestanding piece on legs, you might say—a heavy thing. The legs and the platform can be well-designed and well-braced, but the glass furnace itself can have no metal. It is made up of all these ceramic blocks. All you can do is bind the furnace on the outside with sort of a basket-like framing, but you cannot tie that to anything very easily, because a furnace expands with the heat. If you fasten it to the building in some way, you'll risk pushing the building over. Even at best, the seismic stability of the furnaces is very questionable. In 1971 a glass plant in the area of the San Fernando earthquake had several furnace failures.

While we spent a lot of effort on the so-called binding steel for glass furnaces, in a big enough earthquake I don't think that they'll contain the glass. In case they rupture from whatever cause, the furnaces are built with a pit underneath to contain

the molten glass. After a certain period of time the furnaces tend to get a little wobbly, cracks form in them, and they sometimes fail just from age. They need to be rebuilt about every five years. That was one of our firm's specialties.

Another of our specialties was printing plants, which are different from most things. There is heavy equipment that has to be very precisely aligned. There should not be differential settlement between parts of the line doing the printing, or it won't work. So they're supposed to be quite precise, and they also have millwrights who can shim them up if they get out of line.

We did a lot of work on aircraft facilities, hangars and shops. This type of work was the most satisfying because basically in our industrial work we were not working for architects. We had direct contracts with the companies. It was almost all engineering, although we also had one or two people in our firm who were capable of doing architectural work, so we did some marginal architectural work on some of the aircraft facilities, and on industrial plants. We also designed food processing plants, including doing the architecture on some of them.

Our other work was mainly through architects, but the industrial work was kind of fun.

Scott: Why was the industrial work more satisfying?

De Maria: Because we were in charge. When you are working for architects, you are subject to their whims to a certain extent.

Scott: You worked with architects on the nonindustrial jobs?

De Maria: Yes, most of our commercial work, and the highrise buildings, were all

involved with architecture. You are more constrained as to what you can do when working with architects. They may give you a layout that does not lend itself to a really sound design. Then to make things work, you have to stretch your imagination and improvise. You do the best you can with the layout they give you, although you are probably still not satisfied.

Scott: You often did not have much say about the layout?

De Maria: That's right. Sometimes architects have an idea in their minds that they have already discussed with the client. Some of the buildings are more like sculpture rather than practical buildings. Yet you, as an engineer, have to try to make a structural system work within the constraints of the sculpture.

Not Just the Code Minimum

De Maria: Architects went through a period where they wanted buildings to look as if they were floating on air, with nothing in the first story except glass. Well, those buildings are difficult to design and probably not too satisfactory. Although you can make them satisfy the code, they are not as good as if they had another configuration, a more practical configuration.

Scott: The concern about a practical configuration is mainly a seismic concern, isn't it?

De Maria: Yes, mainly seismic. Those structures lack the reserve that might very easily—and without spending a great deal of money—have been put into a structure with a different configuration. In our designs, we always tried to put a little extra in here and there, and not just hew to the minimum of the code.

It started out in steel frame buildings, where they were not designed for any lateral force, except possibly some wind bracing. Well, the beam-to-column connections are typically a web connection, a row of bolts. Brunnier's policy was always to put in a top and bottom connection, which would give a little moment resistance to the frame. It was not calculated, it was just a little extra that we put in. The bottom clip angle was an aid in erection, because they'd land the beam on it. The top clip was really just a little extra that added a good deal of secondary strength to a structure.

We did a lot of little tricks like that. When they said Brunnier "designed heavy," it may have been a little bit true, but the client was getting a lot better job because of it. It didn't cost that much, and as I say, I think it was entirely made up by the clarity and completeness of the design jobs we turned out. With some of the jobs having incomplete drawings, the contractor would come to a point where something wasn't shown. He'd then have to have a supplementary drawing made, and he would charge extra.

Firm's Reputation for Good Drawings

Scott: Say a little bit more about the drawings. I've heard before, and you mentioned earlier, that the Brunnier firm had the reputation of doing very good drawings. How did you get that way?

De Maria: That was part of Brunnier's standards. I'm sure it resulted from his training at the American Bridge Company. In that work, if you did not have a complete drawing, or made a rivet hole in the wrong place, there would be repercussions from the field when it was

erected, and extra charges. So the policy was to show everything in complete detail and complete clarity, so the structure could be built without question and without guesswork, or without the need to come back for supplemental details.

Scott: So the Brunnier firm maintained that policy and that quality pretty much throughout?

De Maria: Yes, pretty much throughout, although I think we lost a little in the later years, when buildings got more complicated and we hired people who had different drafting practices and so on. It's hard to maintain strict office standards. They did in the early days. And buildings were simpler then. They didn't get involved with things that we did in later years, like partitions, that were strictly architectural, and ceilings that were strictly architectural.

Golden Gateway

Scott: Previously you mentioned some of the individual jobs you worked on in the earlier years. Why don't you continue now by taking up some of the other engineering jobs and related activities in which you have been involved while you were at Brunnier?

De Maria: Yes. As far as the structural work in Brunnier's office is concerned, we did many design jobs. Some of them were very big, and of course my responsibility became greater and greater. I was in charge of the design of Tolman Hall here on UC Berkeley campus. We also designed the Crown Zellerbach Building in San Francisco.

Tolman Hall is a concrete frame building, and the seismic resistance is in concrete shear walls, which are possibly not ductile shear walls like

today's code requires. But there are quite a number of those walls, and I think it's a satisfactory building.

Scott: There would be a lot of strength in those walls?

De Maria: Lots of strength, yes. We also designed the Golden Gateway Project in San Francisco.

Scott: That was a very big project.

De Maria: You are right, that was a big project. I worked on part of it, but was not in charge of the whole thing. I was in charge of the Standard Oil Building on Market Street—the 555 Market Street building, which was built about 1960.

Scott: Describe the project a little more.

De Maria: The Golden Gateway Project is in the area formerly occupied by the old Produce District. It comprises six city blocks, bounded by Battery Street on the west, Jackson Street on the north, Drumm Street on the east, and Clay Street on the south. The project contains four highrise apartment buildings. Two of them are rectangular slab buildings: Richard Henry Dana, 550 Battery Street, and William Heath Davis, 440 Davis Street. The other two are square “point” buildings, or towers, Bucklelew House, 150 Jackson Street, and Macondray House, 405 Davis Street.

Some of the buildings were repetitious in plan. There were two basic types of highrise apartments. There was a great big base structure with parking and so forth underneath all of it, and some bridges across streets and other incidentals. There was some residential-type housing built on top of the plaza. It was a big

project, and we designed everything done at that time, except the Alcoa Building, which was also part of the project, but was designed by Skidmore, Owings, and Merrill. The Alcoa Building is at One Maritime Plaza, and faces Clay Street.

They were all designed according to seismic codes, to whatever was applicable at the time. A lot of attention was put on the seismic design. The codes have changed, of course, since they were done, and the buildings may be deficient according to current standards, which are still in a state of flux. The ones I mentioned were pretty good buildings.

1960 Squaw Valley Winter Olympics Sports Arena

De Maria: The main arena, Blythe Sports Arena, for the 1960 Winter Olympic Games in Squaw Valley was an interesting project that I designed. It was an interesting structure—a cable-supported roof, actually one of the first in the country. The job had a very limited budget, for which they wanted a 300-foot span over the skating rink and arena, and wanted it roofed. So it was a question of how to take care of the heavy snow loads that they have at Squaw Valley. At that time there were no criteria for snow loads, so we had to arrive at our own criteria. Since that time, of course, standards have been developed. For our criteria, we took measurements of snow for the year before we finished the design.

Scott: When would that have been?

De Maria: We started the design in 1957, maybe even 1956, to be ready for the 1960 Olympics. You could not do much in the winter

up there, so the building period was short, but even so we had trouble during the construction because of the winter conditions. We had frozen concrete and all sorts of other problems, but they put the games on there and they were successful.

We decided that there was not enough money to design a roof to support all the snow that we anticipated, which was actually only a small fraction of what is currently required up there. The scheme that was finally evolved used a heating system in the cellular deck of the roof to melt the snow, so as not to allow it to build up too much. It was a unique system that used heat from the reverse cycle of the refrigeration equipment, pumped through the roof. They had the rink in the arena, two outdoor hockey practice rinks, and a 400-meter oval speed-skating rink. So there was a huge refrigeration unit whose reverse cycle provided plenty of heat to pump into the roof.

There were a series of masts on either side of the structure. The cables came down from the masts to the main support girders, then they were tied back to footings well outside of the structure, so it gave a little bit of the appearance of a suspension bridge, except it wasn't connected in the middle. The two halves were independent. So there was a big problem of keeping the closure, as the roof moved up and down according to load and temperature changes. We had some ingenious connections to keep the weather out. We also had connections at the ridge, which would transfer uneven loads from one half of the structure to the other. It was a very interesting design, a unique design. I was always proud of it, but it did not stand the test of time too well.

We did not have money to provide for anything more than what was needed for putting on the Olympics. We could not make a permanent future facility out of it, although we cheated a little bit on the arena by using permanent materials like concrete and steel to achieve the 300-foot span.

After the Olympics, I think it belonged to the federal government at first. The Forest Service managed it for a while, but it wasn't economical to run this huge refrigeration unit, so they dismantled that and put in a new heating system. The outdoor rinks were all demolished. The speed skaters weren't able to get enough political clout to keep it as a permanent facility.

Then the State [of California] became the owner through some various procedures. The State leased it to an operator. The maintenance was bad, and they didn't quite know how to operate the heating system to remove snow from the roof. Eventually a portion of the roof collapsed when there was a very heavy accumulation of snow.

I'm not sure what caused that failure. We were not actually involved in investigating it—some other engineers were. It was heavily loaded with snow, no question about it. What apparently failed, however, was something that would have been the strongest part of the structure. I think that in removing snow they had previously used snow cats on top of the roof, and they damaged one of the connections of a supporting cable. That is only my opinion, but I believe that was why it failed. The cables were heavily designed to limit deflection of the roof, and they would certainly not have been the weak point of the structure, yet apparently it was a cable socket connection that failed.

Scott: You think that they might well have hit it with a snow cat?

De Maria: Either that, or there was also the possibility that it was sabotaged. Later the arena was demolished, but it lasted some 25 years in spite of not being designed as a permanent structure. And it could have been a permanent structure. At one time the Olympic committee was thinking about making Squaw Valley a permanent training center. We did plans for rehabilitating the arena and expanding and putting in other facilities, but they did not have enough money to do that. So they settled for a single training facility in Colorado. So in the spot where the arena was, there is now a big parking lot.

Bank of America

De Maria: In the middle or late 1960s, I was in charge of the Bank of America project, which was an intensive effort of about three years duration. In 1968, I wrote an article about the welding on that project for a national competition. My article won a national award of fifth place, including a cash award, from the Lincoln Arc Welding Foundation.⁸⁴

Scott: What was the Bank of America project's location?

De Maria: The Bank of America Headquarters Building is at 555 California Street, in San Francisco.

Scott: Was there something special about the welding?

84. De Maria, Charles, *Modern Welded Structures*. James F. Lincoln Arc Welding Foundation, Vol. III, 1970.

De Maria: The building was a fully welded structure. Kaiser Steel Company had the contract for the steel, and when they got the contract they encouraged us to go to all-welding, because, unlike some of the older firms, like the American Bridge Company and Bethlehem Steel, they did not have the shop riveting equipment. At about that time steel construction had gone through changes from rivets to high-strength bolts to a good deal of welding.

Kaiser was not set up to do a lot of the shop riveting that the other firms were doing. At that time, even the other firms were converting all of their field connections from rivets to high strength bolts. The last field-riveted job was probably done around 1960, because riveting just went like the dinosaur. But Bethlehem Steel and the American Bridge Company were still doing shop assembly with riveting. By then, welding was sort of in the forefront, but there were several special techniques.

We did a lot of innovative things on the Bank of America job—used new techniques in welding. One of the difficult things that we finally figured out how to do involved box columns—square or slightly rectangular columns. We had to get plates welded inside the box, on all four edges, and that was a real trick. We got help from the Kaiser Steel in developing the details.

Alquist Committee

De Maria: I was on an advisory committee to the Alquist Committee—Senator Alfred Alquist's Joint Committee on Seismic Safety—which was active from about 1969 to 1974.

Scott: Yes, I was on the Advisory Group on Governmental Organization and Performance,

and recall seeing you at some of the meetings when they got all of the Alquist Advisory Groups together.

De Maria: I was on the Advisory Group on Engineering Considerations and Earthquake Sciences. I worked with Jack Meehan on that group in writing the first legislation to bring the hospitals under state control. There were a couple of bills. I think the first one was Senate Bill No. 352, which didn't pass the first time it was tried. Senate Bill No. 519 was the final bill.

Scott: Those bills were introduced following the San Fernando earthquake.

De Maria: That's right. The committee was formed in 1969, then the San Fernando earthquake came along in 1971 and gave a big impetus to the workings of the Alquist Joint Committee.

Scott: What was the work of the Advisory Group on Engineering Considerations and Earthquake Sciences?

De Maria: We discussed many things—buildings, dams, utility lifelines, and so on. My particular activity was on buildings, and the hospital legislation was the main product of my efforts. A number of other bills were introduced, and some of them became law. For example, there was the Priolo bill, the Alquist-Priolo Act on construction near fault zones.

The Advisory Group covered the whole gamut of the seismic problem. We met regularly, I think at least once a month, for a number of years. There were also some special meetings where all of the groups came together. Some of us went to Sacramento a couple of times to testify.

We took a tour through the old Capitol, and looked at the problems there, which I think came to light as the result of the Alquist Joint Committee on Seismic Safety. The seismic rehabilitation of the State Capitol Building was actually one of the jobs I tried to get later on. I was interviewed for it, but John Blume's firm got the contract.

The joint committee also put out a number of publications, including one that brought together the reports of the individual Advisory Groups.⁸⁵

Scott: Do you have any general comments about the Alquist committee process or about your Advisory Group? Any particular controversies?

De Maria: I don't think we had any great controversies. The experience pointed up to me the difficulty of getting legislation enacted through the political process. I know Senator Alquist tended to get a little discouraged at times, because the bills didn't pass or were put over, tabled and so on. But as far as I know in the end, most of the program was enacted. I'm not sure whether the Seismic Safety Commission was a result of that effort, but I think it was.

Scott: Yes, the Seismic Safety Commission came out of that Alquist Committee effort.

Steel Testing at UC Berkeley

De Maria: In the early to mid-1970s, I served on a number of task forces of the Amer-

85. State of California, Joint Legislative Committee on Earthquake Safety, *Meeting the Earthquake Challenge: Final Report to the Legislature By the Joint Committee on Seismic Safety*. Sacramento, California, January 1974.

ican Iron and Steel Institute on several research projects being done at the University of California at Berkeley, mainly under Professor Egor Popov's direction. I was on an Advisory Group to several task forces on testing of steel assemblies, joints of beams and columns, and that sort of thing.

Scott: This was basically testing for seismic resistance?

De Maria: Yes, it was related to seismic performance. They were testing things into the inelastic zone of steel, cyclic testing with multiple reversals of members. Later on, some of that research evolved into fairly large-scale models on the shaking machine over at Richmond.

St. Mary's Hospital

De Maria: Other jobs during that period included St. Mary's Hospital, 450 Stanyan Street, San Francisco, which was done in 1968, before the enactment of the more rigorous hospital standards after San Fernando. Nevertheless, we did a good job on it, as it was later evaluated and found to satisfy the new Hospital Act requirements, partly because we designed for a few extra stories that were never put on.

Scott: Why were the extra stories not added?

De Maria: The failure to add them was probably due to finances. There were two sets of plans, one with the additional stories. The latter was bid as an extra to the basic design, but that bid was not accepted by the hospital administration, probably because of financial limitations. But the basic building was built as if it had the extra stories on, so it was a little heavier than it might have been otherwise. So when it was evaluated more recently, they

found nothing deficient about it under the Hospital Code [Hospital Act of 1972].

Philosophy of the Firm: A Little Extra Strength

De Maria: In fact, a lot of Brunnier firm structures are seismically pretty well designed. We never tried to cheat or hew to the very minimum of the code. Our philosophy was to do a very good job, to put a little extra—a little extra strength—into what we designed, if we could do so without great additional cost. Brunnier's engineering philosophy was pretty simple. He said, "Honest design. Tie everything together." This was based on his experience in looking at earthquake damage around the world. He wasn't really high on the mathematical end of it. In those days there was a feeling among engineers that the proper lateral force coefficient was somewhere between 1 percent and 10 percent of the weight of the structure. Nowadays, it seems to be the feeling is it's somewhere between 10 percent and 100 percent. The firm designed for lateral forces, earthquake forces, before the code required it.

Scott: Things like a little redundancy?

De Maria: Yes. Dual systems, in case something gave way. Not putting all your eggs in one basket, you might say. Not designing something where one single failure could cause the collapse of the entire structure. Some buildings that have perhaps only four columns and huge spans worry me a good deal—if one column should fail, the whole structure is gone.

Our policy, and particularly my policy, was to spread the seismic resistance of a structure to as many of the structure's places and elements as

possible. We tried to look at a structure as a unit, rather than as an assembly of individual parts that you design one by one and then throw together. Instead, everything should be tied together.

Consulting for National Iranian Oil Company: A Difficult Configuration

De Maria: Consulting on an Iranian oil project was another job that was of considerable interest. I went to London for about 10 days in 1969 to consult with some British engineers on a huge building for the National Iranian Oil Company in Tehran—a project that fortunately was never built. They were working with Iranian architects, and they had a very wild scheme, sort of a Y-shaped tower of steel. The tower sloped in a Y up from a huge base, and it was in a seismic zone.

The British engineers were trying to get up to speed on what our seismic practice was, and we had a lot of discussions. I did not entirely convince them of certain things, and they did not have very good communication with their Iranian counterparts. The budget and everything else didn't work out, and finally the project was abandoned, which I think was fortunate.

Scott: Do you think the basic design itself made it very difficult?

De Maria: The basic configuration made it very difficult. Also, because it was a huge structure, the British engineers had very fixed ideas about dividing it into sections, with expansion joints at very frequent intervals to take care of temperature changes. But the worst thing you can do in a seismic design is to have a lot of independent parts separated by joints. I never was

successful in proving to them that you could get away with much greater lengths between joints than they visualized. Of course, it depends on the climate and temperature changes.

When we were talking about seismic design of structures, our policy at Brunnier's office was pretty much to ignore the necessity for expansion joints. Of course, we are in a mild climate here in California. Once you get a building enclosed, there's not a great deal of temperature change, so we are fortunate in not having any serious problems with temperature changes, except for a few problems with very long exposed steel structures before the buildings became enclosed—not, however, on any Brunnier jobs.

I think Tehran has a fairly mild, temperate climate, not too much different from say the foothills of California. So I think they could have gotten by without the expansion joints, and that would have improved the seismic behavior of whatever they were trying to do.

Scott: How did Brunnier Associates and you get involved in that work?

De Maria: We got involved through the firm of Dames and Moore, which had done the soil work in Iran, and was working with the British engineers who were designing the building. Bill Moore suggested that they get somebody to consult with them on seismic problems. So I am indebted to him for my trip to England and an interesting experience with the British engineers.

It was a major consulting job. The British engineers had an in-house computer, and were just coming to grips with it. It worked with a tape, and they had problems with the tapes jamming

and so forth. They had some kind of a genius, who had been merely a draftsman for the British Railway. But when they got this computer, and they all tried to learn how to operate it, it just seemed to click with this draftsman. He had the kind of the mind so that it just worked. He was putting together subprograms into major programs, and really expanding the capability of this computer beyond what it was intended for.

They had a program for designing and detailing reinforcing steel, where it actually made up the cutting list, made up the drawings and everything. But I think he cheated a little, because I went in there one night, and he was working on something of his own, something he wanted to submit, some design for a prize or something. He was working with a T-square and triangle in his little cubbyhole where the computer was.

But he was a remarkable person. The company wanted to reward this draftsman of theirs who knew all about the computer, when none of the principals knew. They wanted to give him a car as a bonus, but he wouldn't take it unless it was one of the most expensive ones.

Coastal Commission and a K-Mart Store

De Maria: In 1975 I served on the advisory committee to the California Coastal Commission, to settle a controversy on a K-Mart store being built in Sand City, near Monterey, California. I don't think the Coastal Commission really understood buildings, because they wanted to apply to this K-Mart the kinds of standards that you might apply to a nuclear generator plant, rather than what the engineers

felt was a reasonable standard according to the Uniform Building Code.

The Coastal Commission was insisting on higher standards, probably because at the time they had been dealing with nuclear plants and that sort of thing. They were holding up the permit, and finally SEAOC and ASCE got involved. They also had seismologists and foundation people. We had a committee and made a report, recommending reasonable standards of the kind one would use for a building in a seismic zone.

Scott: I remember that early in the life of the Coastal Commission it was involved in a controversy relating to the San Onofre nuclear power plant on the southern California coast.

De Maria: Yes. The Atomic Energy Commission was setting very high standards for nuclear plants. So the Coastal Commission thought, "If those standards are good for a nuclear power plant, they would be good for a store building." But of course it was quite a different situation. Our committee resolved the issue after a number of meetings and after several reports.

Scott: Was this a one-shot ad hoc committee set up specifically for the K-Mart store, or did it also consider other cases?

De Maria: The committee study and report dealt only with this particular project, but it may have set a precedent.

Quality Certification of Steel Plants

De Maria: In 1975 I also served on the board of review for the American Institute of Steel Construction (AISC). They were setting

up a quality certification program for their plants. Their aim was to improve the quality, and certify the quality, so when they had a steel job, outside inspectors would not have to be brought into the plant. They had this panel of about 15 engineers from all over the country, of which I was one.

We reviewed their program and made recommendations, and that has finally been set up. There are certified plants, they have quality certification. Engineers may or may not accept that, but on much work I think the quality of the in-plant fabrication is accepted—in welded construction and so on. There were a number of categories according to the importance of the work, all the way from simple structures to nuclear plants.

Scott: Was this a quality control process that you and your group were instrumental in helping them set up?

De Maria: Yes, an in-house quality control process that we were helping them set up for their member fabricating plants. We set up criteria, checklists of certain facilities that the plant had to have, and certain procedures to go through in order to be qualified. We reviewed that. There was some question, for example, whether the man in charge of in-house quality control had authority to stop the work, or whether he would just note the deficiencies. I was always in favor of his having the authority to stop the work.

Then an outside entity was set up to make surprise inspections of the shop. Some of the people argued that it was not fair to make a surprise inspection, because some of the key personnel might be gone. I argued, “If the key

personnel are gone and the work is still going on, somebody has to be responsible.”

Scott: Did they accept the surprise inspection idea?

De Maria: I don't think they did. Ours was a minority report. The program might have been a little less than we would hope for, but at least it was a step toward improved quality.

Simplified Steel Specifications: Never Adopted

De Maria: Starting about 1980 I was involved in another activity of the American Institute of Steel Construction—membership in a committee set up to develop simplified steel specifications. Dr. Lynn Beedle of Lehigh University was the head of our committee, and he had some high-powered people on it. He was one of my classmates in Berkeley when I went to school there, and I presume that's how I got involved in it. Anyway he asked me to be on the committee.

The old specifications had sort of grown over many, many years, new things being added first here and then there, instead of things akin to each other being put together. In the process the specifications got so complicated that I'm sure many people just did not understand how to work with them. True, a designer following every nuance of the specifications probably would have a better structure. But engineers in many places are not that technically inclined, and cannot spend the amount of time needed to go through all those formulas and refinements. I thought a set of simplified steel specifications would be a great boon to many

engineers, especially those in little out-of-the-way places.

Anyway, our committee rearranged and simplified the whole thing. It is, however, not easy to simplify something—and the task was very difficult. We had college professors, researchers, practical engineers, people who wanted to put everything on a computer, and a lot of other things. We met and worked on that intermittently for four years, and finally turned out a pretty decent document, having rearranged the AISC specifications so they were in a logical order. Nevertheless the project finally fell through. Rather than go ahead with the simplified steel spec that we had worked on so long, the AISC board of directors preferred to devote their funds to the load factor resistance design method. We were very disappointed.

Scott: Why was the committee's idea not accepted?

De Maria: I'm not sure, but I guess it was a matter of allocation of funds, and the specifications we recommended were not all-inclusive. In order to simplify the steel specifications, we decided we would write them for A-36, the common structural variety of steel, whereas the AISC general specifications cover many grades of steel. In their design formulas they have formulas to determine working stresses and other various things, which take three or four equations to arrive at. But for the basic A-36 structural steel, you could in effect just put a number down for a working stress of 20,000 pounds per square inch.

We had problems within our committee, because one or two light-gauge A-36 steel members were being rolled that, if the flat

20,000 per square inch figure were used, would be 1 percent to 2 percent shy of having the proper safety factor. That just worried the hell out of those people—the fact that simplifying the whole specification would mean two little members would be 1 to 2 percent “unsafe.” The proposal was then made that we drop down to 18,000 psi. Well, if you do that on everything, you lose 10 percent of economic advantage, just in order to take care of those two little members that might possibly be marginally short of what you set as a safety factor.

Scott: Despite those differences of opinion, I take it you were able to get a committee consensus.

De Maria: Yes, we got a consensus of our committee, but the end result did not receive the blessing of the AISC board of directors, who had to put up the money to publish it and disseminate it. They didn't think it was that valuable. But I think it would have been. I was very disappointed that our recommended specifications were never published and made a standard document.

Scott: Could somebody look up your committee's recommendations, if they wanted to?

De Maria: The document does not exist, except in the final draft form that the AISC Chicago headquarters would have.

ATC-7: Wood Diaphragms

De Maria: Our firm got a contract for ATC-7, which was funded by the National Science Foundation, and I was principal in charge of the project, which had to do with plywood diaphragms. We worked on that for a

year or two and turned out the ATC-7 document in 1981.⁸⁶

In wood frame construction, plywood diaphragms are often the main resisting elements. The project did not involve research in terms of developing anything new, but was research of the literature, bringing all the latest thinking into one place where it would be convenient for designers. It included design examples to show how different configurations should be designed, or mathematical solutions to different configurations. It also included a bibliography.

Scott: It was basically a literature search for information on the best ways of using plywood?

De Maria: Right. The main point was to get the most current information into designers' hands—to produce something that was state-of-the-art. It was, of course, basically directed toward seismic design, inasmuch as diaphragm and shear walls of plywood are the main elements in many wood frame structures.

I also represented the Building Seismic Safety Commission to the National Bureau of Standards for its review of ATC 3-06, and was a member of Technical Committee No. 6 on steel.⁸⁷

Licensed to Practice in New York

De Maria: Near the end of my career I finally got a New York license, because we had a newspaper plant job in New York, and had to have somebody to sign plans on that. But that job fell through after the foundations were started. It was never finished, but I did get the New York license as a “professional engineer.”

Scott: How do you obtain a New York license?

De Maria: New York is apparently a difficult place to get a license. At that time they would give reciprocity to California, but the people you gave as references had to have New York licenses. So I had to locate people who were already licensed in New York, and also knew something about me.

Scott: Was that difficult?

De Maria: Not too difficult. I found them here in the Bay Area. I also had a few friends in New York that I knew from my days in the Navy, and could have gone to them, but did not have to go that far. While New York is apparently one of the most difficult licenses, I think California was considered the number one difficult place to get a structural licensing.

86. ATC-7, *Guidelines for the Design of Horizontal Wood Diaphragms*. Applied Technology Council, Redwood City, California, 1981.

87. ATC-3-06, *Tentative Provisions for the Development of Seismic Regulations of Buildings*. Applied Technology Council, Redwood City, California, 1978.

De Maria's Real Estate Investment Activity

We did a historical renovation of a hotel...From an architectural point of view, it turned out very well.

De Maria: Just about the time I became a partner in the firm [December, 1963], I had an opportunity to get involved in some limited real estate partnerships, which I took. In 1964 I became vice-president of a real estate management company, which managed quite a number of limited partnerships. I would usually have a small interest in each one, but not necessarily. We managed eight or ten limited partnerships. It wasn't a very time-consuming thing, because the management company was a wholly owned company by the entrepreneur, who contacted people, raised the money, made the investments and so on. It was a wholly-owned corporation, and I was an officer of the corporation, although I had no stock in it.

Scott: What was your role?

De Maria: Advisory. Judgment as to whether something might work. I wouldn't say I had much expertise in this either. We had regular board meetings, and discussed pros and cons,

and made decisions whether to do this or not do that.

Scott: How did you get into that?

De Maria: Through a friend of the entrepreneur. The friend was actually an engineer that had worked in our office, and was neighbors with the entrepreneur. This opportunity came about when the entrepreneur was trying to raise a little money to buy a piece of property out by Walnut Creek, and he was soliciting people to contribute. Through this mutual friend, I put some money into it and that's how I became acquainted with him. I found out later that we had a great deal in common. He was a younger man than I was, but he had been raised in the Mother Lode area and had been through the Depression.

This went on, and it's still going on to some extent. In 1985 this man died and we had all these things, many, many limited partners and many things in the works, and some of these partnerships hadn't panned out too well. They were supposed to be finished up in 10 years but they dragged on and had been extended. Then one of the major projects in Fairfield was sold in 1988. Anyway, when he died his widow became the sole stockholder of this management corporation. She was the president, and I continued as vice-president until 1989, when she reorganized the board of directors. I have been involved in this real estate investment activity for almost 35 years. It's worked out quite well for me from a financial point of view.

Industrial Park Development

De Maria: When the big commercial and industrial plot we had in Fairfield was sold, it

was very rewarding. A lot of money that came out of some of the smaller ventures went into that one, so there was a lot tied up in it.

Scott: Say a little more about the nature of the Fairfield project.

De Maria: It was an industrial park, a commercial and industrial park, and in order to keep things going we sold off pieces of it, where other people built. We built a building ourselves, and sold this off to close it out. We built roads, and unfortunately had a flooding problem up there, which put a crimp in it. There has to be quite a bit of capital put in it and flood protection work done and so on to complete the development. That still has to be done. I understand the buyer has been unsuccessful in completing the project, and in 1997 sold it to another developer at a considerable loss.

Other Real Estate Development Projects

De Maria: We did some interesting projects. We did a historical renovation of a hotel in Pittsburg, California. It was the old Liberty Hotel. We converted it into offices upstairs and a restaurant downstairs. From an architectural point of view, it turned out very well. From a financial point of view, it turned out not so great—this project ended up in bankruptcy.

We had a commercial building in Dublin that has been sold. We have a joint venture on another property in Fairfield. We entered into a joint venture with some people who built a commercial and office building. It is now fully rented and is producing income. Hopefully, it is also appreciating in value. Since my retire-

ment I have made quite a few additional investments, with mixed results.

Retirement

De Maria: That pretty well brings me up to my retirement in 1983. Since retirement, I have been made an honorary member of the Structural Engineers Association of Northern California. I've been a little active in politics, you might say, in government in my town, Atherton. From 1985 to 1993, I was a member of the planning commission, and in fact was the vice-chairman of it. During that same period, I was also a member of the General Plan Committee, composed of two Planning Commissioners and two city councilpersons. We looked at what legislation we might need to keep our town going on an even keel.

Anyway, I've kept busy on the side. Right now I'm ostensibly a consultant, but I don't consult. Shortly after I retired I did a few little jobs for my son, who's a general contractor and sometimes gets involved with a client that needs a little engineering. But I don't like to do that now, because I do not carry liability insurance for structural work. I don't want to carry such liability insurance.

In 1988, I was given an honorary degree from Sierra College [formerly Placer Junior College], basically for being one of their first students and for having survived for 50 years. I'm now living in Atherton with my wife. We have two children. We travel a little. I play tennis. I still ski, read, and have a few little activities, but am taking it pretty easy.

Changes in the Practice of Structural Engineering

Twenty or fifty years ago there were great variations between the best standards and the worst or marginal standards of engineering practice, and I think those variations still prevail.

Scott: What kind of changes have you seen in the practice of structural engineering during your long career?

De Maria: Almost everything has changed. The whole design field has gotten more complex. You have to do a lot more things. There are all these new systems, new materials and so on to deal with. It's more difficult for even the most qualified person to deal with. It's hard for one person to be an expert on everything. There are aids, of course. Computers help you. You can have data for this and that in the computer, but I am of the age where I look carefully at anything that comes out of a computer. We've gone from the slide rule to calculators to computers, then to computer-aided design, and now computer-aided drafting. Sometimes it's good, sometimes bad—it all depends on what goes into the computer.

New Materials

De Maria: It seems like something new is coming up all of the time. In materials, a lot of this is done in the interest of economy. The various materials are always competing with one another for advantage, such as steel frame buildings versus concrete buildings. The materials people sponsor research to show their material is more economical. The journals put out by the respective materials sources show pictures of buildings and say that steel is more economical, or that concrete is more economical, depending upon which publication you're reading. The engineer is in the middle, and has to make up his own mind. Working stresses are constantly increasing, so designers can use less material, use high-strength concrete, high-strength steels. But we are also now getting into more of a brittleness problem, which is not necessarily so good for structures in a seismic zone. With a more brittle material or combination of materials you lose some ductility.

Materials being used now include such things as high-strength steel, high-strength reinforcing bars, high-strength bolts, welding, metal deck, and high-strength concrete. It used to be that concrete was basically 2,500 or 3,000 pounds per square inch—now we are using concrete up to 7,000 and 10,000 psi. We are also designing in aluminum.

Other new things include precast concrete, prestressed concrete, post-tension concrete. Plywood is also new, at least in general use in construction. I'm not sure when the first plywood was made, but 50 years ago it was not used in construction. Diagonal sheathing was used instead. Glue laminated beams are relatively new, sprayed fireproofing, modular metal

partitions, epoxies, admixtures. As far as materials are concerned, everything is new and different from the old days.

Also, some things that were once in common use are no longer so common. For example, forming with lumber for poured concrete has gotten so expensive it's only done if absolutely necessary. Plastering is pretty much a thing of the past, if you can get away from it—plaster partitions—because the plasterers union has gotten pretty expensive. Sheetrock has been substituted for plaster. Bricklaying has also gotten expensive, although for architectural effects there are still some very nice brick buildings being done. Riveting is gone, as far as the structural business is concerned.

New structural systems include ductile moment-resisting steel frames, eccentric braced frames (another new type of steel framing), and a lot of tilt-up construction. There are lift slabs, flat plates, folded plates, and hyperbolic paraboloids—curved plates used for roof segments. Other new things include composite construction, such as the mating of structural steel and concrete into single members—structural steel, not reinforcing steel—and cable-supported roofs. Air-supported roofs are new, like some of these big arenas with the fabric roofs that are kept up by internal air pressure. They use pumps to maintain a higher air pressure inside, which keeps the roof up. To reduce on-site costs, there's also a lot of prefabrication, trusses and that sort of thing.

Seismic Concerns

Scott: Do you see any seismic concerns with systems such as precast concrete and tilt-up?

De Maria: Precast concrete members are made in a plant in reusable forms, shipped to the job, and connected together on the site to make a framework. The joints—the connections from one member to the next, or from a beam to a column—are the weak points. Those are the places that get the greatest stresses. In an earthquake, however, those are the very points that should be the strongest instead of the weakest. So those newer structures are more economical than the poured-in-place structures, but are not as good for seismic resistance.

In tilt-up construction, the panels are not made in a plant, but are made on the ground at the job site, then tilted up and joined together in some fashion. That is not as good as if the whole wall had been poured monolithically. We try to overcome the tilt-up method's deficiencies, but it is difficult, and does not achieve the degree of success of a monolithic poured job. There are more joints, there are problems with the joints, and none of the various methods of compensating are perfect. So what we have achieved is to build a structure much cheaper, which the client can afford, and which can rent for less. But it is not as good a seismic risk. That's true of a lot of the things that have been done.

Scott: Many of the measures taken in trying to overcome basic deficiencies also require good workmanship and close on-the-job supervision during construction, don't they?

De Maria: Yes. In fact, the more complicated the solution to the problem is, the more dependent it is on being done correctly in the field and on the job. That boils down to construction and workmanship.

Scott: How do you feel about our current standards of performance on that score?

De Maria: I'm sure they are better than they used to be, but I'm not too optimistic that everything is rosy. I think a lot of things go on just as they always did. The contractor is looking at his costs and trying to build quickly—if somebody isn't watching the job, he will cut a few corners, especially on something that does not show in the finished structure. There are lots of smaller jobs all over the country that do not individually get careful attention from an inspector and a building department. Things go on as they have in the past, with deficiencies built in—I'm sure of it. Some plans are very well done, very good. Some are not.

Scott: The Northridge earthquake in 1994 has also raised a lot of questions about the adequacy of some earthquake engineering measures, hasn't it?

De Maria: Yes. Following the Northridge earthquake, many brittle fractures of beam-to-column joints were discovered in buildings with steel moment frames. The use of the welded connections for these heavy members was based on wide extrapolation from successful tests of a very small number of modest-sized members. These failures caused great consternation in the design community and the steel industry, and a consensus is lacking on all the causes of failure.

Much new research is being done on welding procedures and joint configuration. The results of the new research suggest ways to alleviate the problem in new construction, and ways to repair damaged buildings. There is, however, a whole generation of welded steel frame build-

ings for which behavior in a strong earthquake will be less satisfactory than anticipated by their designers. The economic impact of retrofitting all these buildings would be enormous. This is a black eye for the structural engineering profession.

Design Codes More Complex

De Maria: So you have new materials and new systems. In addition, the codes have gotten much more complex—by geometric progression, I'd say. I think part of the increase in code complexity stems from the academic community. A professor of engineering has to do research as well as teach. Each research project has to have some new wrinkle to it. So out of it comes a little embellishment on engineering, which eventually finds its way into articles and journals. If the idea seems to have some merit, it then finds its way into the code as another complication.

I guess that's life, but in the practicing engineer's view, the academics are not always very practical. Theoretically, they may have some good ideas, but when you try to implement them, solving one problem may create another unforeseen problem. It's been a continual flux and change.

Scott: Do you think the structural engineers themselves have helped add a good deal of complexity to the codes?

De Maria: Yes, I do believe that structural engineers themselves, either as silent partners or as active participants on code committees, are partly responsible for the increased complexity of codes.

We also mentioned the need for greater emphasis on the supervision of construction.

There has also been a big increase in litigation in the engineering fields, with its accompanying increase in professional liability insurance costs. We have new techniques, such as design-and-build, where contractors hire the engineers, and make a package deal for a client, rather than the old system, where the client hired the engineer and architect.

“Fast Track” Construction

De Maria: We've gotten into what is called “fast-track” construction, with people thinking they can save time by starting construction before the plans have been finished. It is one of the big headaches as far as the engineering profession is concerned—one of the worst things that has come along in many years. You have to make some early rough guesses, and start the foundations before finishing the design of the superstructure. The contractors are gambling on what the ultimate cost will be. So the contractor will be trying to influence the designer to keep the cost down, instead of letting the designer do the best design he can for the owner. So there is a conflict of interest in fast-track construction.

Construction Management

De Maria: There is a new thing called “construction management,” where for huge projects, in addition to the contractor, the engineers, and the architects, the owner may hire a separate entity as a construction manager, to try and oversee everything. Or he may hire one of the parties—either the contractor, the engineer, or the architect—to act as a construction manager and supervise the work of the other people involved in the project.

I think some of this came about because we really were doing construction management all along, but we weren't getting paid for it. We used to do construction management on jobs, and now there's a way to get an extra percentage of fee by saying we're doing the design, and we're also doing the construction management. Construction management is coordinating with the other people involved in the project.

Scott: That is an important function, isn't it?

De Maria: Yes. It is a function that somebody has to do, and it always has been done. In the old days the architect was the master builder. If there was construction management, it was not called by that name, but the architect did it. He helped the owner with the contracts, with the contractors, saw that the work was built according to the plans, and so on. That is construction management, but it is now a new discipline, which introduces another complication—one more party being involved in a project.

Inefficiency of Competitive Bidding

De Maria: It used to be that you got a job on the basis of your reputation. People came to you. You got work from people you knew, or by references from clients with whom you had successful projects. Now, however, competitive bidding is widely used, particularly with much work coming through the government, and in order to be fair in giving everybody a chance at getting a job.

Everybody who is interested in a job has to submit a proposal. All the proposals have to be evaluated, and then screened down to five or six. Those bidders are called in for interviews and to make presentations. An awful lot of

effort goes into this kind of competition, which is not spent on design. You may have to prepare 100 proposals, and may get one job out of all that. You may spend more time working on these 100 proposals than you would on the single job that you get out of it. It is a very inefficient way of operating.

Scott: Yes, there are some real problems with competitive bidding.

De Maria: It is one of the things that draws engineers away from their primary task of designing. Of course, very large companies have specialists who make up brochures and draft proposals, and can turn them out pretty fast, but still a lot of effort goes into it. At one time we were doing work jointly with Kennedy Engineers, and they took the lead in making up some of these bid proposals. They had a supply of the standard forms used for government jobs, which had spaces for indicating the numbers of staff members: how many in the whole organization, how many architects, how many electrical engineers, how many mechanical engineers, and so forth.

Lo-and-behold, however, presumably through a secretary's error, they had shown ten mining engineers in place of ten mechanical engineers. The figure 10 was put in the box for "mining engineers," which was adjacent to the box for "mechanical engineers." This all went into a computer in the process of selecting the firms for the final interview. So we weren't getting many jobs, because there weren't many mining jobs listed!

Scott: How long did that go on before the error was caught?

De Maria: For months and months.

Big Firms and Formalities

De Maria: We've seen the rise of some very huge engineering offices which have professional managers, attorneys, accountants, and more formal procedures. In the old days we used to do without an attorney. We very seldom had written contracts. It was often done with just a handshake, maybe followed by a letter confirming the agreement—and that was it, even on major jobs.

Later on when I got involved in contracts, we had formal contracts on some of the major jobs but some of them we still did with a handshake, with people we knew. Actually we got burned the worst on a job where we had a formal contract. We had a job with an architect, and we had a very good fee, which I negotiated, but they didn't pay us. Through their inefficient operation, when they had gotten their payments from the owner, they spent the funds on their own payroll.

When the end of the job came, they just didn't have the money to pay us. What are you going to do? You can sue them, sure, but it won't get your money back. They just didn't have it. We finally settled for something less than our full fee. In contrast, some of our handshake jobs turned out very well. It all depends who you're doing business with.

Because of all of this, I think a smaller and smaller part of time is spent on the actual design and the details of the job. You're dependent on the underlings on the staff in your office. I think I mentioned earlier that Brunnier always depended on the engineers working for him to turn out the good work that he did. As for me personally, having basically been in

design all my life, I found that having to do the administrative part of running a business detracted from my efforts. Nor was it something I was particularly well trained for.

Scott: You liked design and felt more comfortable with it?

De Maria: I had a better background in design than I did in administration. So I knew more about what I was doing in design.

Scott: That is probably true of many engineers.

De Maria: Yes, I think it is very common, even today. I think most of the engineering students that come out are very technically oriented. I don't know what else they get, whether they get any more than we did on the business end of engineering—on management, accounting and contracts.

Licensing and Exams

De Maria: I have a feeling that something has been lost—some quality—in the licensing of people. There are concerns when a certain proportion of the applicants don't pass, or if they do not come up to certain racial and ethnic proportions. There may be moves to lower the standards to get some of the people in who have been failing. Maybe they were trained in another country, and perhaps have problems with English. Yet unless a certain percentage passes the license exam, there is political static, flack.

Passing the civil engineering exam allows you to do almost everything in the structural field—except hospitals and schools (there are also some exceptions in Los Angeles where certain buildings require a structural engineer).

But the civil engineering exam isn't a very difficult exam, not very difficult at all.

Scott: If that is the case, then does it really test for the basic skills really needed for structural design, especially seismic design?

De Maria: Well, as I say it's not too difficult to get a civil engineering license, and the structural engineering license used to be much more difficult to get. I also think the structural license was probably more difficult to get previously than it is now, because of the higher percentages now passing. Possibly, of course, bigger percentages are passed now because they are better qualified or better trained. I have no way of knowing.

Here is another way of looking at the matter of examinations and passing grades. Suppose the exam problems are well-thought-out, and a grade of 70 percent is required to pass. That means a person can make mistakes on 30 percent of the problems and still pass. If you went out into practice, however, and made mistakes in 30 percent of what you did, you would be in trouble. Admittedly, of course, when you are in practice you have much more time to look calmly at what you've doing than when you are in the heat of an exam. Also, exams are simply difficult for some people. I've known some pretty good engineers who could never pass the structural exam—they just went to pieces.

Standard of Perfection

De Maria: There is more and more litigation now. In the old days if you poured a sidewalk in front of a building and it cracked, everybody accepted that concrete tends to crack. Now if you get a lot of cracks or a little

settlement, they'll sue you. A lot of buildings experience settlement. A lot of residential houses are built on adobe soil and get cracks in the sheetrock. My own house, which I designed myself, does that. But now there are whole subdivisions where people are suing the builder.

Scott: In some cases, of course, the cracks can get pretty bad.

De Maria: Yes, in some places they *are* bad. But what I'm saying is that people used to be more willing to live with defects than they are now. Of course, now you pay a lot for whatever you get, and people tend to expect perfection more. It used to be that if your competency were challenged, you only had to show that you were as competent as the general level of practice in the profession in your geographical area of practice.

Now, however, if you get called into court, you can be challenged by the top expert in the world, who can be brought in as an expert witness against you. So now you are called on to be up to the highest state-of-the-art. You're called more to a standard of perfection, rather than an average standard in your work.

Standards of Practice

Scott: Have you seen standards of engineering practice change over the years?

De Maria: Twenty or fifty years ago there were great variations between the best standards and the worst or marginal standards of engineering practice, and I think those variations still prevail. There is no uniformity, and a lot of substandard work is going on. You would only have to spend a few days in a building department, looking at the quality of the plans coming

in day-after-day, to see the wide variation in the quality of work that professionals turn out. When I sat on Atherton's [California, where De Maria is also a resident] local Planning Commission, I saw a lot of plans, mostly for residential construction—some were good and some were terrible. The disparity between the best and the worst in the profession is probably as great as ever—maybe more so. It is a little scary.

Peer Review and Continuing Education

Scott: What ought to be done about the disparities in engineering practice?

De Maria: One thing being pursued by the American Consulting Engineers Council (ACEC) is peer review, which is something like the quality control in the steel industry that I mentioned earlier. The idea of office peer review is to set up a panel of very well-qualified people who go into an office and look at the quality of the work turned out, the method of operation, the standards, the checking, and everything the office does. If they were found deficient in some way, the peer review would show how they could upgrade the quality of their work.

Another thing that's going on is also called peer review—project peer review. Having another entity, or one of your peers, review your work on a project or specific job-by-job basis. This kind of peer review would be something like a building department review, but perhaps done by better qualified people.

Project peer review, which probably will be used only for major projects, would be most advantageous if the peer reviewer(s) are

brought in at the beginning when the basic decisions are made on the concept of the project. I do not mean a careful detail-by-detail peer review of a job is needed, only a review of the concept. That is why peer review would be most advantageous if done at the early stage of the game when the concept is being developed. Peer review could, of course, lead to hard feelings if the peer reviewer and the principal designer simply cannot agree on something important.

I think ACEC has a pilot program of peer review going somewhere in Arizona.⁸⁸ It's an interesting concept. Jim Stratta was involved in that.

Scott: He was. Before his death in 1994, I did a number of oral history interviews with Jim. He mentioned working on a peer review pilot project, but unfortunately because of his illness, we were unable to finish the interviews or record anything on the peer review project.

De Maria: I am not current on what is going on with peer review, but I believe my comments here are valid.

Scott: Continuing education, and requiring continuing education units as part of the relicensing process, is another way of trying to improve and maintain the standards of a profession.

De Maria: Yes, here in California for many years they've talked about continuing education for engineers, but it has not come about. There are courses that you can take, and they give you units, but there is no requirement. When I last renewed my license they did not

88. American Consulting Engineers Council, *Project Peer Review: Guidelines*, 1990.

ask me to show any units of continuing education. I think there may be requirements in some of the other disciplines.

Scott: I believe some professional fields are pretty rigorous about it—such as health care, dental care, and accounting.

De Maria: I think the universities are pushing for these continuing education units, because there are all the special courses and night courses that they can give, which would keep them busy. But as far as the engineering profession in California, any requirement for continuing education is nonexistent.

My Pessimistic View

Scott: Has what you've said here covered some of the main themes you wanted to bring out?

De Maria: I've covered a lot of my pessimistic view of the state-of-the-art, and the need for things to be done better.

Scott: I believe you discussed those matters in two papers, one presented at SEAOC and one at EERI?

De Maria: Yes, the SEAOC one is in the *Proceedings*,⁸⁹ but I don't think the EERI one was published, so there's no record of it except for my written paper, which didn't have everything in it I actually said in my speech.⁹⁰

89. De Maria, Charles, "Trends in Structural Engineering: A Designer's Viewpoint." Paper presented at the 1963 Convention of the Structural Engineers Association of California. Published in *Proceedings of the 30th Annual Convention*. Structural Engineers Association of California, October 3-5, 1963.

90. De Maria, Charles, "Problems in Seismic Design and Construction." Paper presented to the EERI State of the Art Symposium on February 6, 1968. Earthquake Engineering Research Institute, Oakland, California.

Observations on Seismic Design

A lot of the actual properties of a structure are not really determined until the structure has been built.

De Maria: In design, more and more emphasis is placed on the seismic resistance of structures, which is a plus for seismic design and safety. And in general, greater attention is paid to the seismic safety of structures. Research has tended to lead to use of higher factors for the seismic forces, greater seismic forces than the older structures used to be designed for.

Scott: That builds in greater lateral force resistance?

De Maria: Yes, greater lateral forces—that's a trend.

Scott: Do you consider it a good trend?

De Maria: It's hard to say, because you do not gain everything you may think you do. That is, the stronger you make a structure, the more force it attracts, whereas if the structure is more flexible, it doesn't take as much force. I recall a quote I think from Dean Charles Derleth, of the University of California, Berkeley.⁹¹ After the 1906 earthquake he said something to the effect that while the rocks were shattered, not a willow tree was harmed.

Shaking Table Testing

De Maria: I think useful information has been developed, particularly from the shaking table assemblies at the University of California at Berkeley. Some fairly large-scale frames and models have been used. We certainly have improved the joining of structural members, like beams to columns, but then again it's a question of where you stop.

In the research projects, they make up an assembly and test it until something in the assembly breaks. That is the weak point. So you strengthen that part of the assembly, go through another series of tests, and something else will break. In a testing machine you can always break something if you distort it enough, in enough cycles. It's a question of where you stop. Then you get to the theoretical problem of how many cycles, and the degree of distortion you would get in a normal lifetime of a structure. Also you consider the importance of a structure, the extent of loss in case there is a failure, and all that sort of thing. There are no final answers.

91. Charles H. Derleth was Dean of the College of Engineering at the University of California at Berkeley from 1907 to 1942. Derleth consulted on many major engineering projects in the Bay Area, including the San Francisco Civic Center, both the Golden Gate and San Francisco-Oakland Bay Bridges (Brunner was also a consultant for the Bay Bridge), the Carquinez Bridge, and several other bridges and dams in California.

Liquefaction and Soil-Structure Interaction

De Maria: Some new things have come out. Soil-structure interaction is one of the newer theories, in which Harry [Professor H. Bolton] Seed of UC Berkeley was very active. There is certainly a lot to be said about the local effect of the foundation material on what happens during an earthquake. The type of soil versus the type of structure, and the interaction, if you will call it that. Some of it is still not well understood and hasn't gotten into a lot of the codes as yet. They're trying. Right now they have about four different soil classifications that lead to modifications in the design forces on structures. But this may not be enough to take into account all of the things that can happen as a result of the foundation conditions.

Fifty years ago I don't believe soil liquefaction was given any consideration. The phenomenon does exist, however, though perhaps not to the degree that the researchers imagine, as far as the effect on structures. Professor Harry Seed used to have a barrel of wet sand on which he put a little model building and shook it, and all of the sudden the building would go right down through the sand. That building was a little steel block, I believe, so it wasn't really an honest test of what would happen to a real building, but it was a very dramatic test.

Scott: Yes, I saw one of those demonstrations, too. Harry Seed did a lot of work on liquefaction, stimulated by the 1964 Niigata earthquake, when there were some spectacular examples of it.

Oakland's BART Station

De Maria: When we worked on the BART system, their consultants on the soils problem—one being Professor Nathan Newmark—came up with design standards for the BART with which we had big problems. In doing the underground station at Oakland, depth to bedrock was one thing we had to put in to determine the seismic forces and distortion. But as there were no borings that went all the way to bedrock, and we had to make some assumptions as to the depth of bedrock, which at that site was thousands of feet.

After we got through with that, we got the distortion between the base of the structure and the top. Their [the geotechnical engineers'] recommendation was to design articulated structures that would take the shape of a parallelogram. But that just wouldn't work, because when you get to the end of the station, you have a rigid end wall, which has to be made waterproof because it is below the water level. To be honest with you, we just ignored those recommendations—they just would not work.

Scott: They had not concerned themselves with those aspects of the problem?

De Maria: Theirs was a theoretical approach, and did not cover the practical conditions of a rigid structure under water. We did the best we could.

Base Isolation

De Maria: There is a fairly new concept in seismic design being implemented now, called base isolation. Some engineers have long had the theory that you could isolate a structure from the ground, and in theory, it sounds very

good. To do it practically, however, is not so easy. There was one old engineer who said even if you are on rock, you should excavate an additional four or five feet and put in a gravel base of rounded rocks, so the structure could roll back and forth, like on ball bearings or marbles. That wasn't a very practical solution.

One of the early uses of the isolation idea was something that was pretty common in the early years of the century. It was called a flexible first story. It was thought that a flexible first story would certainly protect the portion of the structure above the first story. But it was a very dangerous concept, because if you had a first-story collapse, the fact that the remainder of the structure above the first story was not distorted does not help much. By the time it fell a story, it wouldn't be any good to you. Something like that happened to the Olive View Hospital in the 1971 San Fernando earthquake. The first story was flexible. It didn't quite collapse, but came close to it. There was, however, not much damage in the several upper stories.

As the name suggests, base isolation puts all of the flexibility at the base of a structure. This is done by installing thick rubber and steel plates at the base that can distort a good deal—they are capable of quite a bit of movement. In addition, however, there are problems associated with that movement. What do you do about the joint between the sidewalk and the building? What are you going to do when the wind blows? You don't want the building moving around in the wind. Some designers have what they call frangible connections, which resist up to a point, but in an earthquake would allow the building to go ahead and move with respect to the base.

There are other problems. To begin with, you have to select the earthquake that's likely to happen and determine the maximum movement you want to provide for. For moderate earthquakes, this is a very reasonable thing. What about a big earthquake? Will base isolation be adequate for a large earthquake? I'm not sure.

So people are currently worrying—if you isolate the base, does that mean you do not have to design the upper part of the structure for such big forces? They're arguing about whether you should or shouldn't provide for the normal forces in the upper portion of the building, in case something happens that exceeds the limits that the base isolation takes care of, or if something else goes wrong. Maybe the joint around the building fills with dirt and the base doesn't get a chance to isolate.

Scott: Would a dirt-filled joint keep a base isolation system from working?

De Maria: It certainly would, to some extent. Anyway, there are questions about base isolation. You could achieve economy by designing the upper structure lighter than if it had to resist the full earthquake forces. But some people aren't sure, and think you shouldn't take that chance. They think you should design the whole building for some pretty good seismic forces anyway, in addition to having it protected by base isolation.

Scott: That would be another form of redundancy.

De Maria: Yes, you would then have redundancy, but you would have lost some of the possibility of economy. So the matter gets more and more complicated.

Firm Designed Elastically During H.J. Brunnier's Day

De Maria: In Brunnier's days, we designed according to the elastic theory. The forces we used were obviously less than you would actually measure in an earthquake. They were code forces, however, and we designed elastically for them. On top of that, of course, there was a safety factor in the strength of the materials that would give you allowance for bigger forces. And after that, there was also whatever redundancy and ductility you could build into the structure, so that while you might have some damage to a structure, it would not be fatal damage.

In his later years, Brunnier expressed some disappointment that, after spending most of his life chasing earthquakes and designing buildings for earthquake resistance, there had not been an earthquake strong enough so he could see how his designs stood the test.

Now, instead of, or in addition to, elastic design you also have a dynamic analysis. Most of the dynamic analyses are based on an elastic program, and then the results are scaled back. The final results are not too different from the static analysis.

The engineers have not been able to come completely to grips with the gap between the forces that can actually be measured in earthquakes, and the observed behavior of buildings. It never seems to match. We haven't been able to come to grips with this completely. Ductility, inelastic action, energy absorption, are all a part of it, but it's very difficult to evaluate.

Anyway, we now have dynamic analysis—a quasi-dynamic analysis, not a true dynamic

analysis. The problems involved, of course, are modeling the structure so that you get in all of the elements. You can't do it just with the frame of a building. If you look around a building, there are all the partitions. They may be massive and imponderable. Also, how many pounds of live load are there in a building? All this affects a building's period and a building's response. But I suppose dynamic analysis is a step in the right direction.

The main benefit of dynamic analysis is to show the effects of nonuniformity in a structure, of eccentricities in a structure, or varying stiffnesses between one floor and another. It will give a qualitative picture of the distribution of forces, even though they may be scaled down so that you don't have a full quantitative application of the forces. It shows you the places in a structure where you have to pay more attention or less attention. It's good from that point of view.

Quantitatively, I think it's still a matter of conjecture, whether or not we're anywhere near estimating the full forces that will act on a building during an earthquake.

Scott: In modeling you have to do quite a lot of simplification, don't you?

De Maria: You either have to simplify, or have to use a more and more complicated program. It gets out of hand. A lot of the actual properties of a structure are not really determined until the structure has been built. So to do this in the design phase is not all that accurate. An example is the dynamic analysis we had on the Bank of America Building's design. The fundamental period came out to be 7.0 seconds for one cycle, which is just the building swaying

over and back, without any nodes in between for other periods.

Then when the building was built, we had actual measurements of the building's period made from the transient vibrations. We found the period of the building was about 5 seconds, so there was a disparity between the 7-second theoretical period and the 5-second actual. With a 5-second period, the building would probably have a greater response to an earthquake. On the other hand, after it shook a little bit, things would loosen up and it might go up to the 7-second period.

That was a fairly simple structure to analyze. Just beam and column, and many bents were the same. It wasn't that complex a building, even though it was many stories and had many members. It was considered a simple frame structure, and was very symmetrical. Some smaller structures would actually be much more difficult to model.

Concluding Comments

De Maria: These recollections of mine were recorded in 1988, and Stan Scott has asked if I would like to add anything more now. It has been almost 30 years since Brunnier's death, 17 years since I retired from the firm, and 12 years since I first started working with Stan Scott on the Brunnier history. While I must admit that my recollections have not grown sharper with the years, there are some points that I would like to emphasize.

My association with Henry J. Brunnier had an extremely beneficial impact on my own successful career. There must also be countless others who over the years have also benefited

from his leadership and efforts on behalf of the structural engineering profession, and from his strength of character and the example he set for others to follow.

Photographs



Charles DeMaria and his brother, John, pose in front of their family mine, the Mad Canyon Mine. 1939 or 1940.



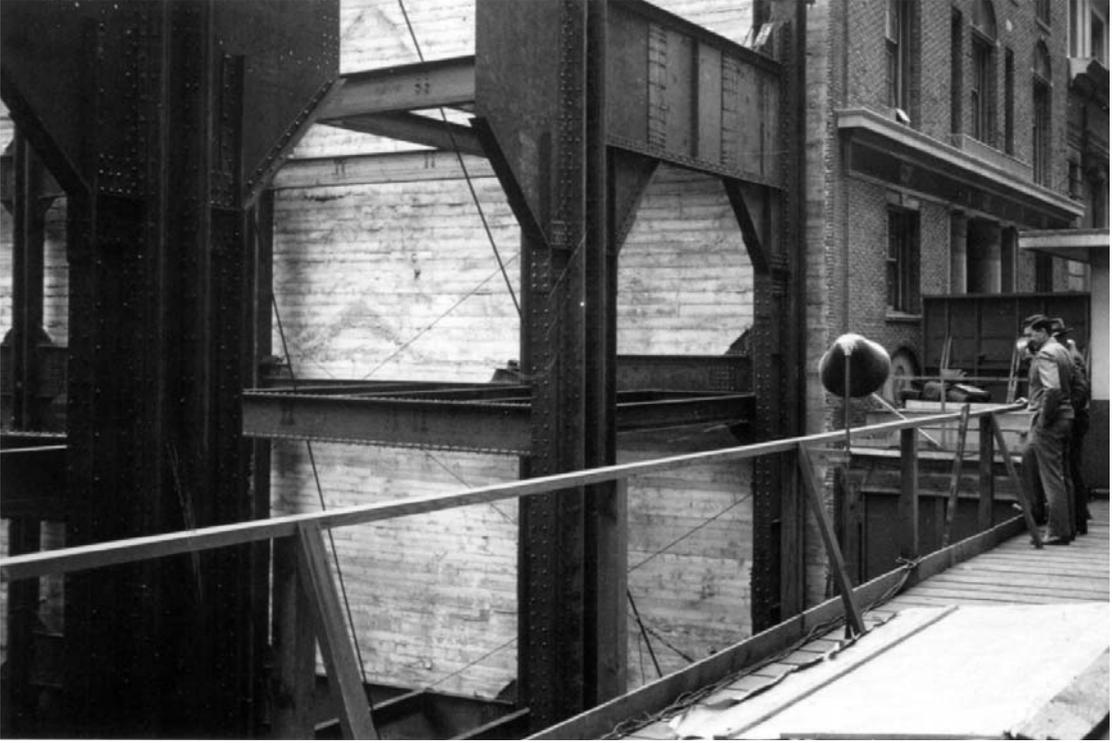
Charles De Maria, graduation from the University of California at Berkeley. 1941.



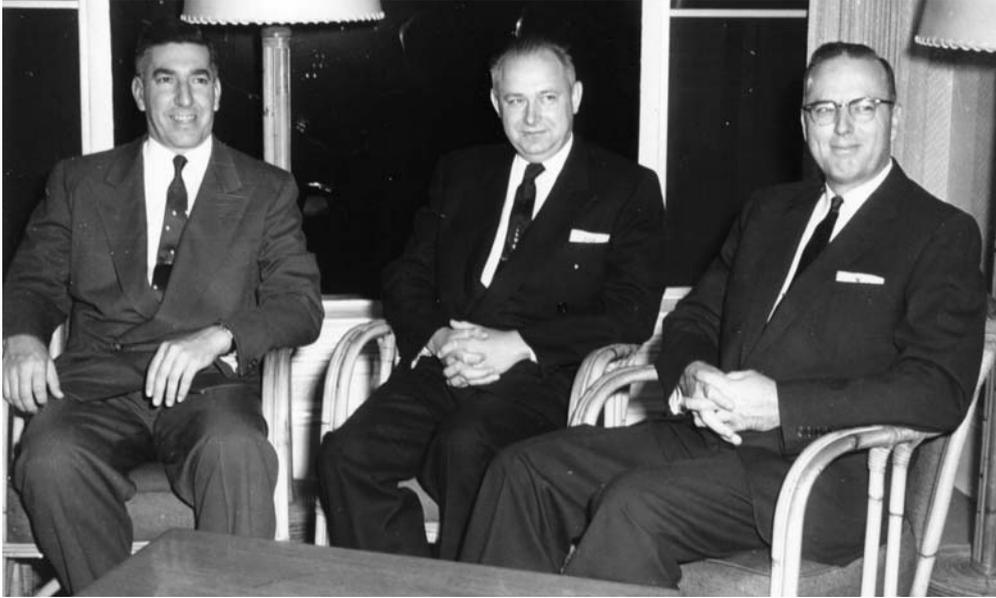
*Ensign Charles De Maria.
Summer 1943.*



*Herbert L. Lyell (left, rear) and Charles De Maria in the sixth floor
offices of H.J. Brunnier. About 1949.*



Charles De Maria, structural designer of the addition to the original Standard Oil Building (the original was designed by the Brunner firm in 1920), inspects during construction. 1949.



Charles De Maria, Henry J. Degenkolb, and William T. Wheeler, 1958 officers for the Structural Engineers Association of California (taken at the 1957 convention).



1959 SEAOC Convention, Technical Session: A Progress Report on the Manual of Practice for Earthquake Design and New Developments in Seismic Design of Multistory Reinforced Concrete Buildings. Left to right: John A. Blume, Charles De Maria (presiding), Herman F. Finch, John E. Rinne, Nathan M. Newmark, Leo H. Corning.



Blythe Sports Arena and rinks. The cable-supported roof, designed by De Maria, was one of the first in the country. 1959. (photo: Bethlehem Steel)



South view of cable-supported roof, Blythe Sports Arena, 1960 Winter Olympics, Squaw Valley, California. (photo: Rondal Partridge)



Bank of America World Headquarters Building, 555 California Street, San Francisco, California. The 52-story highrise is faceted to provide views from every window. Skidmore, Owings, & Merrill/Wurster, Benardi and Emmons, Architects, Charles De Maria for H.J. Brunnier Associates, Engineers. This view, during construction in 1968, was taken at the southwest corner near the top.



American Institute of Steel Construction (AISC), Architectural Award of Excellence. Left to right: James Dinwiddie (Dinwiddie-Fuller-Cahill); Robert Towle (Wurster, Bernardi & Emmons, Architects); Mark Goldstein (Skidmore, Owings & Merrill, Architects); Al Tokola (Manager of Construction Division, Kaiser Steel Corporation,) Charles D. De Maria (H.J. Brunnier Associates); Howard Lief (Building Manager, Bank of America Trust & Savings Association); Francis J. Murphy (General Manager, Fabricating Metal Products Division, Kaiser Steel Corporation). February 1971. (photo: C.H. Crandall)



Three buildings designed by De Maria dominate the San Francisco skyline: 575 Market Street Building (center), the 555 Market Street Standard Oil Building (midrise office building to right of 575 Market Street Building) and the Bank of America World Headquarters at 555 California Street (dark tower at top left).



Charles De Maria. 1968. (photo: Morton-Waters Co.)

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