

MEMOIR HISTORY OF CLAIR A. HILL
CH2M HILL

Interviewed February 1984

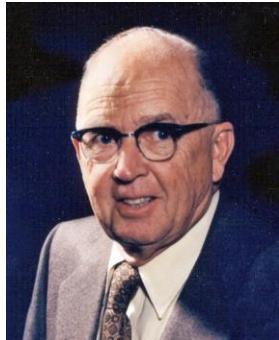
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[Editor's note: The following is a summary of Clair Hill's original memoir. The summary focuses on key events and issues that impacted CH2M HILL's history as recalled by Clair.]

Memoir of Clair Hill, founder of Clair A. Hill and Associates, March and July, 1982, and December 3, 1983.

INTRODUCTION



Clair Hill

Clair Hill was born in 1909 and reared in Redding, California. Owning and managing a business is a Hill family tradition; his father ran his own insurance business, and after his death in 1920, his mother continued with the enterprise. At that time, she was one of the few female insurance agents in California.

She encouraged him and his older brother to enter any profession of their choosing, so long as it was what she termed "nonparasitic." After working in logging camps during the summers, Oregon State College's forestry curriculum attracted him to Oregon where he studied to be

a forester. "I liked fishing and I liked hunting—just basically the outdoors. I went into forestry because I couldn't stand confinement." The job opportunities, however, were mostly with the U.S. Forest Service; and, as Hill noted, "I was never enthusiastic about government employment." Consequently, because of the limited work opportunities, bronchial problems that were exacerbated by Oregon's wet climate, and other economic exigencies, Hill decided to study engineering in California.

After graduating from Stanford with a degree in civil engineering, he obtained his first job with Standard Oil in San Francisco. However, as he explained, "being a country boy, I just marveled at how people could work in a place with phones ringing all over the place. I really wasn't cut out to live in a city and work in a big city office." He was offered and took a job as assistant resident engineer with the California Bridge Department in 1934. During this period, he met Joan Thomas, the sister of a close friend from Stanford; they were married July 4, 1935.

The Hills moved frequently while he worked as a resident engineer, but he recalled that period as being very enjoyable: "Seeing that construction followed the plans was a fine job." Three years later on receiving his engineer's license, he wanted to settle in his home town of Redding, California. Being close to his family—his mother lived in the area—and the desire to live in a rural rather than big city environment drew him back. It was at this time, in 1938, that he started his own business. Between 1938 and 1941 when he entered the U.S. Army, he operated his company with the help of two employees—a head and rear chainman—and did mostly surveying work. "I liked survey work. It was

outside." He noted that he had to work around 16 hours a day to succeed; but, "That was never a problem for me. I enjoyed working and always have."

Hill served 5 years in the Army, most of which was spent in the Aleutian Islands. This period allowed him plenty of time to make future plans regarding his fledgling business. One of the conclusions he made was that he would have to hire an adequate staff to permit involvement in local and state affairs, as well as time to travel about the region to develop work opportunities for the company.

After the War was over, there was a tremendous pent-up demand for engineering work; also there were not many engineers in the rural areas. With the philosophy that, "You'll never succeed if you don't try," in 1946, Hill opened his doors for business in Redding for the second time. The business developed and prospered in the areas of surveying, mapping, water resources, and structural engineering.

One of the underlying principles of Hill's philosophy, since the founding of his business, has been that one should serve in those fields in which he is knowledgeable. Consequently, he has been active on numerous committees and organizations including, among others, the California Water Commission, Chamber of Commerce, Republican Party, California Council of Civil Engineers and Land Surveyors, Citizens for America, and the American Association of Civil Engineers. This professional service has also contributed to the success of his firm.

During the sessions together, the major focus was centered on benchmarks and developments that caused his firm to prosper and grow. Some of the topics he touched upon were qualities he sought in hiring employees, the use of photogrammetry, major firm projects, other corporations he formed, his management style, the use of computers, and the merger of his firm with CH2M.

The subject of politics came up frequently during the interviews. He strongly believes that engineers should be more politically active. "Engineers have to be involved in [giving] advice and [the] education of our politicians." Even though he has retired from full-time employment, he noted that, "I've been so busy at various other things, including politics, that I kind of wonder sometimes when I had time to work."

The interview sessions (March 3 and July 27, 1982; December 2, 1983) took place in Clair Hill's office in the CH2M HILL building in Redding, California. His office walls are decorated with memorabilia including historic photographs of early firm work, awards he has received for contributions to various organizations, scenic views of the area, and photographs of politicians and family members.

The Hills are known to be gracious people, at times inviting over a hundred employees for dinner. An example of their generosity was shown when, at a break in the interview, Mr. and Mrs. Hill invited the interviewer to join them for lunch.

Today the Hills live in Redding, where they lead an active personal and professional life together.

EARLY LIFE, EDUCATION, AND FIRST JOBS

I know you were born in 1909. Was this in Redding?

Yes. On West Street in Redding.

Somebody mentioned that your family came across the plains in a covered wagon. Is that accurate?

No, it isn't. My mother and her family came from the Palouse Country in Washington by wagon in 1895—down through the Cascades, through Ashland and into Redding. The article in the newspaper is wrong.

I stated it wrong. My grandfather was a blacksmith and wagon maker. With the panic of 1892 and 1893, the farmers couldn't pay their bills; and he left Palouse Country, which is out in the Spokane area, to find a new location. That is what he was looking for in John Day, Medford, and Grants Pass; and he ended up in Redding the Fourth of July in 1895 or 1896; I'm not sure which.

Why did he come to Redding?

He was looking for a new location and Redding was booming in those days. It was the rail center for Trinity County, eastern Shasta County, and Modoc County; and it was a very active mining area. He was just looking for a location. We didn't have the communication then that we have now. When they arrived at Redding, it looked like an opportunity here, so he opened a blacksmith's shop. This was my mother's [family] and she is the one that came with the wagon; she rode horseback. She was fourteen I think at the time.

You know quite a bit about your family's history.

Yes. Yes.

How was your father employed?

He spent his early years working in the lumber mills up in the Viola and Shingletown area, about 50 miles east of here. He worked there for some years; and he got acquainted with a Mr. Hare, another Englishman who ran an insurance business here in Redding. Mr. Hare was quite impressed with my dad. My dad wanted to take out some life insurance. So on the weekend, he walked from Shingletown into Redding, 50 miles, to take out the life insurance. And after he got that done, he walked back to his job in Shingletown. It impressed Mr. Hare, and my dad later became a junior partner in the firm of Hare and Hill. When Mr. Hare died in 1918, Dad bought out the firm.

In 1920, he was killed in an auto accident; and my mother took over the business. I think she was one of two woman insurance agents in northern California at the time, and she ran it up until I came out of the Army in 1945 when she sold the business.

Your parents sound like exceptional people.

They were. My mother was really a brilliant woman. It's too bad that she had not had the opportunity to go on to school. She wanted to go to the University of California. She had a scholarship to go to U.C.; but my Grandfather Ashcraft thought that there was no sense in women going to college, so she did not go. After she graduated from high school, she taught school for a while until she was married.

She was a very well read woman and very capable. She was in business through the very difficult depression days, and so it was quite an accomplishment. But one of her goals was for my brother and me to go to whatever university we wanted to.

What were some of your interests and hobbies as a young fellow?

Well, of course, we didn't have the opportunities for those hobbies. I always liked to build things. My mother always laughed because Saturday afternoon the kids would go to the old movie theater down here. And I'd usually last about half way through, then that was enough of that. I'd go home; and she'd hear me building something in the basement, which was a shop.

Engineering is designing and constructing on a larger scale, isn't it? So your interest started back when you were young?

Yes. It is rather interesting. There is a man back in the Midwest by the name of Hill who is one of these that traces family trees, and he contacted my mother. Finally he sent her a report, and he made the interesting comment that, as far as he could trace it, Hills had been in construction and engineering for five generations, which I thought was kind of interesting. I don't know what significance it has, but it was an interesting observation.

Yes. What were some of your favorite subjects in school?

I think that reminds me a little of my grandson. My wife asked him what he liked best about school and he said, "Recess." (laughter) During my younger days in school, school was the thing to be endured. About the only thing I cared for was arithmetic and history. I had no respect for English, and that's pretty obvious as time's gone on and I can't even spell very well. Fortunately, I have had a secretary for most of my business life; and now that I don't have a secretary, I have an awful time with some of my spelling. But, anyway, in high school, I found it much more interesting in chemistry, physics, and the mathematics. I liked history; we were very fortunate in that we had an excellent history teacher.

In those early years, who was influential in guiding your life?

I don't think there was really any guidance except my mother's ambition for us.

And what was her ambition for you?

She didn't care. Just any nonparasitic profession. She really didn't care what we went into. She just felt that we should have an adequate education for going into some profession. But she left it strictly up to us—whatever we wanted to do. In our high school, there were several of the Profs from Oregon State. Two things that interested me in Oregon State were the shop teacher—a man by the name of Lance who was an Oregon State graduate—and also the fact that they had a very good forestry school. There was another thing, I couldn't go to the University of California because I did not have a foreign language; I always avoided a foreign language like the plague.

It was a requirement?

It was a requirement in California. But the basic fact is that, at that time, the best known forestry school was Oregon State. When I worked in the logging camps over in Lassen County, several of those people were from either the University of Idaho or Oregon State.

When did you decide that you wanted to go into forestry?

My last year in high school. That year when I got out of high school I was very fortunate. There were no jobs around Redding at the time. Redding was very much in the doldrums. The economy here went steadily down from about 1910 as the mines closed and the lumber industry had moved out of here, so the population declined from 1910 to about 1933. The result was there was no opportunity here for a high school student, except working in a grocery store or something of that nature, which didn't interest me. I still had the idea that I was going to work outside but not necessarily as a laborer.

I was fortunate when I got out of high school that a family friend who was working in Susanville for a lumber company there got me a job in a logging camp. I worked in that camp for, I guess, 6 years in the summer and 1 year when I was out of school. But I'd about made up my mind by the time I got out of high school that I was going to take forestry, and the fact that I worked in the logging camp made it that much more interesting.

Had you thought about studying engineering at that time also?

I'd thought about it, but I really didn't know any engineers except some people for the Division of Highways. One of our neighbors worked for them. I was just interested in engineering. My boss, west of Susanville, was a civil engineer. He was an Englishman who'd graduated from the same school in London my father graduated from. But he was a civil engineer and responsible for all the railroads, and I worked for him but did not at that time plan to go into civil engineering as such. That decision didn't come for 3 or 4 years later.

You mentioned that you wanted to work outside. Were you thinking about working for the Forest Service or for whom?

I didn't care particularly. I just liked outside work. And I liked the mountains, and that's what appealed to me about the Forest Service. I had been in the

Trinity Alps; I'd lived in this area all my life; and I really felt that forestry was a real opportunity.

In 1927 you went to the Oregon State Forestry School?

To Oregon State, yes.

What did you think of the school?

Oh, it's a great school. I went there in 1927, 1928, and spring of 1929. Then in the summer of 1928, I was an Oregon State graduate who was the logging superintendent.

What were you doing?

I worked for quite a while on the railroad construction as a laborer.

It was a wood-burning donkey engine and wood-burning steam shovel, so I split wood for a steam shovel. And I "bucked" wood for them, big 6-foot logs that'd take me 10 hours to make four cuts. Then I fired the steam shovel; and then I worked on a rig-up crew, which was moving donkeys—worked as a choker setter on that, and worked some assisting the powder monkey in the quarry. I had an opportunity to work throughout a lot of the logging activity, and to me it was fascinating work.

And is this what you had in mind? Working outside and doing these things?

Yes.

And you felt you needed a degree to do these jobs?

Oh, I didn't intend to work as a powder monkey and a choker setter all the time. I wanted to be a logging engineer, a railroad locating engineer, or a logging superintendent. Those were the kinds of jobs [for which you needed a degree]. You didn't need any education to be a powder monkey; you had to be pretty experienced so you didn't blow yourself up. But those years working on rig-up that is cables and so on stood me very well after I got into the construction industry — knowing what could and couldn't be done. And, at one time, I was a cat Skinner. But for several years, I worked on a survey crew starting out as low man on the totem pole and ending up as the chief of the party, which I was for 3 years on logging railroad locations.

Was this for the Fruit Growers Supply Company?

That was for the Fruit Growers Supply Company. In Oregon, it was for the Inman-Poulsen Lumber Company. But I worked for the Fruit Growers Supply Company in 1927, 1929, 1930, 1931, 1932; and 1933 they didn't open—all the mills were shut down during the Depression. In 1934, after I had an engineer's degree from Stanford, there were no jobs. I couldn't find a job. So I wrote to my old boss; and I went back there to the Fruit Growers Supply Company, the lumber company, and worked until October, when I got a job for the Engineering Department of Standard Oil in San Francisco. One of my profs at Stanford had been chief structural engineer for Standard Oil; and he wrote me a letter and said that he understood that, after several years [of

little activity], Standard Oil was hiring engineers. They were building a pipeline from Rio Bravo to Estero Bay; that's from around Bakersfield to the Coast. I got the letter one evening and talked to my boss, and the next day I was sitting on the curb in San Francisco waiting for the doors to open. And I did get a job. I was supposed to go down on the pipeline; but, instead of that, I had to work in the office there.

Why didn't you want to work for the government? What were your reasons at that time?

I really don't have a good answer for that. It wasn't working for the government. I felt that you should have options. And a forestry graduate in those days didn't have an option; you either worked for the U.S. Forest Service or you almost didn't work. A few of the graduates worked for private industry, but very few. And I felt that to have only one opportunity for employment was pretty limiting. If you are going to go to a professional school, you'd better have some options for employment; whether it's private industry, whether it's other government entities.

And you hadn't realized the lack of options when you started?

I had no idea that was the case. Two of the top people in the company I had worked for at Susanville were graduate foresters. And when you consider that just 2 out of 500 men were graduate foresters, it didn't look like much of an opportunity.

Back then, did you ever think about starting your own business?

Not then; no.

Why didn't you consider taking over your mother's insurance business?

Well, she wanted me to. In fact, after I came back to Redding, which I'll get to a little later, I did take the examination and got an insurance solicitor's license so I could help her. But, I really was never that much interested in that type of work. And to ask why, I couldn't tell you; I don't know. But, I guess, part of it was that I was so familiar with growing up in the Depression and the fact that my mother had a real struggle, that I just didn't see the opportunity in that field. I was wrong. Some of the people in town have been very, very successful in both real estate and insurance; but back in the '30s, none of them were very successful.

So the Depression affected you?

Oh, the Depression affected all of us who were starting out at that time. It was hard to see the opportunities when everybody was just getting by if they were fortunate.

You saw opportunities in engineering though?

Yes; in fact, I did. Engineering is such a broad field that there was quite a lot of opportunity although it was very difficult to get a job at the time. But looking at the graduates, the civil engineers were much better equipped for

jobs than the electrical and the mechanical engineers were because of the narrowness of those fields. At Stanford at that time, you got an A.B. in engineering, as they did not give a master's degree then. You had to go 2 years to get an engineer's degree, and I had friends who got engineer's degrees in electrical and mechanical engineering then went to work selling appliances for \$60 to \$75 dollars a month. And the other factor is basically I like the outdoors much more than the indoor work. I like the construction activity; and, if the opportunity had been there, I'd have probably worked for a contractor on actual construction. But jobs were pretty scarce, and you took what you could get.

And that's why you worked for this logging outfit?

Well, I liked that work in the summer; but the lumber industry was an 8-month season, so you didn't have anything to do during the winter. Then when I went to work for Standard Oil, in San Francisco, I was working on a design desk in an office. It was different than it is now. There were 65 people in that one room including the head of the Civil, Mechanical, and the Electrical Department. Each one had a corner of the office—it was the philosophy then—and being a country boy I just marveled at how people could work in a place with phones ringing all over the place. I really wasn't cut out to live in a city and work in a big city office, and so I spent practically every Saturday morning for a year looking for another job. The first year I worked there, it was a job; it was fine. But the longer I stayed there and looked around, the more I concluded that I didn't like the confines of a big city office.

Did you want to stay in the Redding area or anywhere in California?

No. I didn't.

Did you have a preference?

I didn't have that much preference. The fact is I applied to the Tennessee Valley Authority. That was getting underway at the time, and I thought that was a fascinating project. But in the meantime, I had passed the junior bridge engineer examination and had been offered a job with the California Bridge Department; so I went to work on a bridge, as an assistant resident engineer. We lived in nine communities the first 3 years Joan and I were married. I worked on bridges as an assistant resident engineer. Then in 1938, by the time I got my license, I decided that I was going to open an engineering office.

Before we get to opening your own office, I want to ask this question.

Did you know Fred Merryfield when you were back at OAC (Oregon State Agricultural College)?

Fred Merryfield was one of the first people I met on the Oregon State campus. It was interesting. I was a poor lost freshman walking up the street there by the



Fred Merryfield

Engineering Building, and this man smoking a pipe came walking up alongside me. I was kind of looking around and he spoke to me, and I walked along and visited with him and I said, "Are you a student here?" He said, "No, I'm on the faculty." And then I really never knew him the years I was a student there; but all the engineers I lived with were taking hydraulics and sanitary engineering from Fred Merryfield, and I heard enough about what a tough Prof he was. I knew him to speak to, but I was really never acquainted with him particularly.

You knew him to speak to because of that first encounter?

That first encounter was all.

What characteristic made you remember him? Usually when you bump into somebody you forget him.

Well, I probably wouldn't have remembered him that well if these fellows I lived with hadn't been in his classes. But, here was an 18-year-old in a strange environment, kind of wondering what it was all about, and a man on the faculty comes walking along and visits with you for a couple of blocks. You don't forget it, that's all. It was rather impressive that a professor would even talk to a lowly freshman. I'd never been around a university environment before. I found a lot of the profs were very fine people and were very interested in the students, but I didn't know that at the time. If I'd visited with him before, I might have gone into engineering; I don't know. How many people, male or female, graduating from high school really know enough about any field to say, "I'm going to be a doctor or a lawyer or what have you"? You don't know much about it. That's one reason why, for years we have invited students from Chico up here and spend a full Saturday with them, taking them from one end of the field to the other; and the engineers have been very fine in devoting a Saturday to laying out what the engineering field is. We've also had students up from Davis and, of course, a lot from the [other] colleges and high schools. But, really, I don't think very many getting out of high school know where they are going.

And you were the same way?

Yes. And at the time, you know, it was a different world. There weren't too many who went to college at the time. Most of us went to work. In fact, in the county here, there weren't too many that went to high school. The only way they could go to high school was to live in town; there were no buses then, and there were just two high schools in the county. And, so I'd say the bulk of the people who lived in the rural communities and on the ranches didn't go beyond the eighth grade.

And I'm sure the Depression affected the number of people going to college.

Very much so.

The cost and also the lack of jobs available to even college graduates?

That's right. And, of course, in transferring from Oregon State as a forester into engineering, I had not had calculus, physics, or chemistry; so I had to take those as a junior. The result was, when I graduated, I hadn't been into very many of the professional courses; so I felt that I really had to go an additional year into the graduate school. Fortunately by that time, I was able [to do so], with what I was able to earn in the summer. And, I was a hasher and a good dish washer; and I had a cleaning agency that paid for my cleaning. And one year I was a librarian; and then I ended up managing an eating club, where I worked, that gave me board and \$60 a month. So my last 2 years weren't all that bad.

You had hoped though that, as an engineer, you could get a job?

I knew I would. I'd just have to work at it.

Did engineering meet your expectations?

Oh, yes. I think the thing that I really enjoy as far as engineering [is concerned], I can look around the state at things that I have been involved with as an engineer—whether it's a bridge, dam, building, roads, water systems. I've been very involved in California water resources; for 18 years, I was on the California Water Commission. I could show you some slides that Joe Patten and I put together. In California, we have developed one of the greatest water systems in the world, the California Water Project; and I've been involved in it for 35 years. And, to answer your question, our standard of living is based on what engineers do, not only in this country, but worldwide; so I think it is a fascinating profession. And I've found it very interesting and enjoyable, and enjoy seeing some of the things that we've accomplished.

What an engineer has to learn, and learn pretty early, is the fact that just designing the project doesn't get the job done. It has to be tied in with the legal aspects of it, and it has to have public support and acceptance.

So should engineers assume a role in society as politicians and leaders?

I think they have to be real active in politics, and I thoroughly agree with Earl Reynolds in the activities that he is doing in working in the political arena. I think that is one of the things that engineers with their knowledge and background better get involved in and not only support it with their time and effort, but with their money, and support the candidates who are really sound business people.

Do you think that engineers are properly trained to be in leadership positions?

I think you only have to look at the major corporations around the country to see that. Many of the major corporations are managed by very competent engineers. Union Oil Company Chairman of the Board Fred Hartley is a graduate chemical engineer. The president of Pacific Gas and Electric Company, which is the largest utility in the country, is an engineer. Presidents of Standard Oil have been engineers; I don't remember the one now. But many of the large firms are managed by engineers, and there are a

few of them that go into the political arena. It is very difficult for an engineer to go into the political arena. As an elected official, you have to give up so much to take what may be a 2-, 4-, or 6-year program, and then start over again.

That's not the case with engineers, then?

I don't know what Oregon Legislature is, but I can only think of one engineer in the California Legislature. Most engineers are working for either public agencies or corporations and can't very well give up their career to be a senator or a legislator and expect to go back to their job. It's been filled by that time, and there isn't the opportunity to go back. Now, some of our legislators are business people who can have somebody else run their business while they are away. But, I think the California Legislature is no different than most of them. In the engineering field, you're involved with economics continually; a project is either economically feasible or it isn't. So you really have a different perspective.

Excuse me, but that brings up a question. How and when did you meet your wife?

(Laughter) When I was going to Stanford, her brother and I, he was a Stanford student also, became very good friends. And one Thanksgiving, when we had 4 days off, he asked me if I'd like to go home with him for Thanksgiving. And he asked his sister, who was a school teacher, if she'd go with me to a dance they were all going to. I'd never been particularly involved with girls in school. I didn't have the time or the money and probably the interest. So I was very impressed by her, and my impression has borne out over 50 years. It was 2 years and a half before we were married; I always kid her and say it took me 2 years and a half to sell her a bill of goods. But, really, you have to remember that it was depression times; and she had some medical and dental problems that she insisted she was going to pay for before we were married, which she did. We couldn't get married until I got out of school anyway, and then we couldn't get married until I got a job. So it was 2 years and a half. And there were very few wives who worked in those days. She could have taught school, but she would have had to stay in Woodland, CA, because teachers were an oversupply; and besides the job I was on, we never stayed in any one place. I think we stayed one place for 6 months.

You were married then July Fourth?

I went to work for Standard Oil in the fall of 1934, and we were married the Fourth of July in 1935.

You chose that date for a specific reason, didn't you?

Well, the Fourth of July came on Thursday, and you didn't ask for a day off [then] because they might not need you anymore; but I did feel comfortable asking for Friday off, so that gave us a four-day weekend. So we were married the Fourth of July. You didn't ask for time off just for a foolish thing

like getting married. (laughter) Anyway, you got days a year vacation and certain holidays and that was it. I did get a vacation that fall, but I wasn't anxious to wait until fall to get married. So after we were married, we lived in Berkeley; and I commuted to San Francisco until along in March, when I got this job with the State Bridge Department. The first job I had was on a grade separation. To put people to work, the federal government, among other things, developed this grade separation program, which happened to be an underpass at Soledad in the Salinas Valley. So we went down, and I was assistant resident engineer there until that job was finished. We went from there to a bridge job over at Kernville, which is up east of Bakersfield.

Did you like this type of work?

Oh, yes. I liked it very much. As resident engineer seeing that the construction followed the plans was a fine job. I liked it very much.

At that time were you thinking about starting your own firm?

Not at that time, no. But, I really felt that I had to get back to this area if I could because my mother worked real hard; and she was alone, and it was very difficult. So I hoped to work in this area but with the State Bridge Department. You went where the job was.

You have to remember, too, that I couldn't go into business until I got my license; and I had to work for 3 years after getting out of school before I could take the examination for registered civil engineer. So, after I passed that, then I decided that I'd open an office. The economy was also picking up here. In 1933, the price of gold was increased from \$20 an ounce to \$35 an ounce.

And your goal when you got to Redding was to find some work in engineering or had you thought about starting your own firm?

Yes, I did. The fact is, frankly, at the time I tried to get a job with the U.S. Bureau of Reclamation on Shasta Dam. But there were too many other people who wanted jobs, too. So I wasn't successful at that. I thought, when I came here, that I might get a job there. But I started doing surveys, subdivisions, property surveys, I designed some bridges for the county, just anything I could find in the way of engineering work.

You were working for yourself?

Yeh.

CLAIR A. HILL AND ASSOCIATES AND THE WAR

I know the date that you officially opened the Clair Hill office was 1938. Were you doing projects on your own before that?

No, 1938 was when I started, June 1, 1938; and I stayed here doing this. Then I became deputy county engineer, and they furnished me with an office. I did the bridge design for the county and some road design as well as doing work on my own of building design surveys. I stayed with it until Uncle Sam caught up with me in January of 1941. That's when I went into the Army.

When you opened the doors on June 1st, were you thinking that it might turn into a firm of this magnitude? What were your goals and dreams?

Oh, no. My goal was to make a living, if you want the honest truth of it; and I liked the idea of working for myself. During those years, the maximum number of employees I had was two—a head chainman and a rear chainman; and the head chainman became the transit man after a while. We worked largely with a two- and three-man survey crew; and if I had office work, then the two of them would go out in the field. I knew the other engineers here. There were two or three of them; and they made a living, and that's all anybody did in those days. I'd changed my mind in the 5 years that I was in the Army when I had to think about things, and I felt that I would do things differently if I ever started again.

When you started you mentioned that two other people worked with you in the surveying. So there were really three of you?

Well, I just hired them. They were on the payroll.

Did you ever consider taking partners at that time?

No, no. It wasn't that big an operation. One of them who worked for me was Jim Lonneberg who went to Hawaii with the Corps of Engineers when I went into the Army, and was over there 5 years. After I came back here, I wrote to him and asked him if he was interested in coming back, which he was; and he headed up the Survey Department for a long time, finally retired here a few years ago. The other one was a fellow by the name of Bill Skeen who joined the local National Guard Company; he was killed in Italy. Those were the two people who worked for me during that period of time.

Can you recall your emotions when you opened up your office? Was it dramatic or exciting or?

No, no, I wouldn't say so, it was just sort of—it was just that's what I was going to do and that was it.

Did you think that you would continue being self-employed or did you think that eventually you would have to work for somebody else?

No, I figured I could make it.

You were optimistic then about the future of your firm?

Well, I never believed in being a pessimist. I don't think that gets anybody anywhere.

What made you think that you could succeed where others obviously had failed? What qualities did you possess that others don't?

People fail in all businesses. Farmers fail. Well, you have to recognize that I had to work about 16 hours a day to make a go of it. In fact, the years I worked in the logging camps, you know those were 12-hour days by today's standards. And farming was daylight till dark. People worked 6 days a week and long hours. That was never a problem to me. I enjoyed working and always have.

Probably most people, especially since the Depression was still going on, would have gone an easier route of continuing to try to find a job and work for somebody else and not try to start their own business? You were different and I was hoping you could explain what it was that made you different.

You know, I knew an engineer in San Francisco who was a very fine man. When I was a student in school, our prof used to bring different people in to talk to our student chapter ASCE group; and I remember Walter Huber, a very prominent civil engineer who ran a consulting engineering firm in San Francisco. It was a small firm; they were all small then. He was a terrific photographer, and he showed us slides of projects that he had designed. It was after the Long Beach earthquake; and he showed us pictures of Long Beach, and I remember particularly he showed us pictures that [indicated] not a building that he'd designed had failed in that earthquake.

But I also remember him making the statement that he was a member of a vanishing breed because, instead of going to consulting engineers, cities were hiring their own engineering staff. And companies were hiring their own engineering staff and irrigation districts [were hiring their own engineering staff]. His statement was that he was a member of a vanishing breed. I thought about that a good while, and it was almost true at the time. When I came out of the Army, I was going to take a good look to see if Walter Huber's statement made back in the early '30s was still true.

But it was apparent, at that date, that there was a lot of work that was not going to be done in the civil service and the corporate offices because of peak loads. And somebody had to do those peak-load projects. And, in addition to that, it was apparent that I was city engineer here at one time for a while. And there was no way you could have a staff [large enough to be] qualified in all the complex engineering design of today, and there was a real opportunity for consultants. I would say that, prior to the war, there was not [the same opportunity] because there wasn't that much going on. But you have to remember that in the '30s there were fewer and fewer graduate

engineers; and in the '40s, it almost went down to zero. So in 1946 when the war was over, there was a tremendous pent-up demand.

When I first started, it was very difficult to get competent help because there was just no one available. I really had to wait until people graduated from college, and then I started hiring them. Harlan Moyer was one of them in 1952. I think we're getting well ahead, but in the 5 years I was in the Army, being in the Aleutian Islands in Alaska, I had quite a bit of time to think about what I was going to do when I got out. I can imagine. And I came to the conclusion, coming back to your earlier question, that when I was here in the '30s, I was too small to handle good sized jobs that came along.

Did you ever think about applying for them?

Yes. But the trouble was, by the time I heard about them, it was too late because I was working day and night just to make a go of it. So one of the conclusions that I came to was that, if I went back into the engineering business, I would do it on the basis of hiring an adequate staff to work so I would have the time to be active in community affairs where a lot of the work comes from, and also promote work. The fact is that I set up a little organizational chart with three engineers and an architect and two survey crews; that thing is still around someplace I suppose. And that was my goal, to serve these five northern rural counties.

But in traveling around—and I used to do a lot of traveling—I found there was lots of work but very little money to pay for it. And it wasn't until all these various programs of funding these projects developed that the areas had become viable. But I came to the conclusion at that time that I had to get out of this area into other parts where there was money available. And one of the big jobs that I got was for Glenn-Colusa Irrigation District, who is still one of our major clients. They have about 150,000 irrigated acres and over 100,000 acres of rice. They have been our client since 1948. We have a tremendous pumping plant under construction down there today; it's the biggest one we've ever designed. So, that was the start.

So really in 1938 or until 1941 when you went into the Army, it was a three-man operation; and you were basically doing surveying projects. You weren't seeking out other work because you didn't have the time or the manpower?

Well, and I was doing the bridge design and road design for the county. And I inspected buildings, and I did anything I could find.

What were people's reactions when you started your own firm or do you recall? Were they receptive to you being a new engineering firm?

Oh, yes, that was no problem.

So then in 1941 you went into the service—in the Army—and I know you were stationed in Alaska.

I ended up getting a second lieutenant's commission. When the war came on, I still had this commission; and I got word to report for active duty at

Benicia Arsenal where I worked as the construction engineer for the buildup of the arsenal. The Benicia Arsenal was started about 1850, and it was the only arsenal on the West Coast. So I was there for a year and a half and from there went to bomb disposal school in Aberdeen, Maryland, and then after that, on August 22, was sent to Alaska; I was in the Ordnance Department there. The last 13 months I was post ordinance officer on Adak, which is an island. It was the main base, and is still the main base, in the north Pacific; and we were the closest to Japan.

What kind of engineering activities did you do there?

Didn't do any engineering activities. All I did was run an ordnance outfit. We had about 3,000 vehicles to maintain; we had all the armament, the coast artillery guns, the rifles, and the watches and the field glasses. We had a machine shop, a blacksmith's shop, a welding shop and an automotive shop, a small arms shop, and a large weapons shop besides responsibility for all the ammunition storage. So it was an interesting job.

But it was nothing to do with engineering? That must have been discouraging?

No, it wasn't. It was wartime, and you did what you could. It wasn't discouraging at all. In fact, it was a good job and an interesting job. And people would ask about the Aleutians, and I would say I don't enjoy snow to this day; I've dug too much of it out to get into my tent. You could only see 4 feet of my tent for 4 months. We felt so fortunate that we weren't in New Guinea. We had no [enemies]; we had no bugs; all we had was weather. And we had a pretty good deal, really.

Has this philosophy of engineers being involved in politics changed over the years? Have you always felt this way?

Oh, yes. I've always felt that way. But, frankly, back in the '30s, I didn't have any time that I could devote to it. But, since 1946, I've devoted a lot of time to public service in one form or another. I was president of the Chamber of Commerce here; I was the director of the State Chamber of Commerce for 12 years; I chaired the Water Committee; and I was chairman of the California Water Commission for 3 or 4 years—I was on it for 18 years, a member of it. I think it is very important that those who have knowledge in fields served in those fields. You're not making a living at it; it costs the company money—but I think it is a contribution that we have to make; and I've felt that for years.

So these are some of your thoughts then even when you were in the service? You wanted to get involved in public affairs like in the Water Commission to support your beliefs. This when you were in the...?

I did not conceptualize that because I didn't even know it existed at the time. But, when I came home, an example is this Trinity River project, which is the development of the water on the Trinity River into the Sacramento River where it is used to generate power and conserve water for irrigation and other uses. Two-thirds of our state is desert, and it has to have supplemental

irrigation. I read the report on the plan for the development of the Trinity River, and I felt it was absolutely wrong in that it was not of benefit to Shasta County. And, in talking to the board of supervisors, I showed them what the problem was. It is a little too complicated to really get into in depth, but what the Bureau of Reclamation was doing was bringing water from the Trinity River through into the Sacramento River; they were not putting storage on Clear Creek, which they crossed. So, where I really started getting involved in the water picture after the war was in that I disagreed with the way the federal government was building the project; and, with the help of a lot of people, was able to get it turned around. But I had to give them the facts.

Did you retain the same clients that you had had previous to the war? You had to start, really, all over again?

Yes. Had to start over again.

And did you plan, at that time, to take partners in it or were you planning to just start like you had in 1938 and build up?

I tried to get one of the fellows I knew in the Army who was a very good engineer to come in with me. He came up and spent a weekend, and he was interested in going in with me. His father-in-law, who was a very intelligent businessman in the Bay Area, convinced him that there was not the opportunity for two people in the engineering business in the little town of Redding. On the basis of that, he didn't join me. I tried to get two or three fellows to come in with me, and I couldn't sell them.

They just didn't have the guts that you had or the optimism?

Well, I think too many of them had lived through the Depression and really wanted something secure instead of something that was not that secure. I had other friends who were in the private engineering business, but they were in San Francisco and Sacramento. They felt that Redding was too small a community to support an engineering business, and I didn't agree with them.

You had none of these reservations? You grew up during the Depression, and you knew the problems of not having enough money, too.

Yes, but, you'll never succeed if you don't try. So, there are chances in it.

You are obviously an unusual man.

Well, I don't know about that. I wouldn't put a dime on a card game; but to be in any business, you have to be a gambler to a certain extent. Now Jim Howland might disagree with that cause Jim is a very conservative individual; but he had five partners, so they had a pretty good balance. But, to me, a business, any business, I don't care what it is, is a gamble. And if you're going to get ulcers over it, you'd better not get into that business.

How did you yourself sell the firm in those early years starting in 1946 and the late forties? How did you get projects and convince the people involved that you were the one that should do them?

Well, just talk. First, I learned what their problems were and then figured up how I thought they could be solved and then talked to them and really promoted the project. Or, I'd hear about a bridge that had to be built; and I'd go and tell them that I would like to design it for them. I will say that, in the early years, there weren't too many engineers around in the rural areas. Most of the private engineers were in the metropolitan areas, and so you just really worked at it.

And I'll say this; in the years I spent on the California Water Commission, I met lots of people all over California; and especially when I chaired the Commission because we used to hold hearings throughout the state on the development of this California Water Plan. So I met lots of people and was able to talk to them about projects. And, if I'd hear about a project early before it was known, I'd go talk to the people involved and sell them on, or attempt to sell them on, doing the project for them.

You'd get the project and then if you needed other engineers or other people, you would seek out these people?

Right, that's how I got to working with CH2M. I mentioned it in that article there. We were working on a housing development over at Brookings, Oregon; and CH2M was doing work for Brookings. And one of the fellows who worked for me met the fellow [Archie Rice] from CH2M, and he told me about it. He had known him when he went to Oregon State in the '30s. We got a job to develop a master sewer plan for the city of Redding. At that time, we'd had very little experience in treatment; so I needed somebody to work with us who had treatment plant background. Obviously, I didn't want people from the Bay Area who were my competition. So I called Fred Merryfield and asked him, "How about helping us out on this?" And that's when I met Ralph Roderick. He came down and helped us on that plant.

A little while later, we got a big housing project down at Beale Air Force Base. We designed a new city, in effect—the roads, the streets, the houses, the whole thing; 1,700 houses, I guess, there were. And we got CH2M to design the electrical system for us, which included transmission, and a substation, the TV system, and the electrical system for the houses and the heating and air conditioning. So we worked on that for quite a while. And then after that, we got the work over at South Tahoe; and we got CH2M to help us out on the treatment plant and some pumping stations. We were the engineer for the South Tahoe District for quite a while. And they subcontracted to us on that project.



Ralph Roderick

When did you add the "and Associates" to your name Clair Hill?

(chuckle) I really don't know for sure. It was in the early '50s. We never did officially file for a fictitious name. We just adopted the name and used it. We became known as Clair Hill and Associates. It's just kind of like CH2M. Their official name was Cornell, Howland, Hayes and Merryfield; and I don't think they ever did, in the early days, adopt the fictitious name of CH2M. That was the same way. Later when we formed the corporation, we made arrangements for some like Les Shoupe, Harlan Moyer, and others to buy stock.

In 1946, CH2M in Corvallis was just a fledgling firm also. Did you know about them in the late '40s at all? Had you ever heard of them?

No. No.

Was it Archie Rice whom you met in Brookings?



Archie Rice

Archie Rice, yes.

Okay. And it was through that contact, made by the employee YOU had working for you, that you hired CH2M?

Well, I was thinking who was I going to get who was in the sanitary field, when Ed told me about the firm. He had talked quite a bit to Archie; they were both working over there. And I realized that they were a very leading sanitary engineering firm. I did some further checking on it. I knew the head of the Civil Engineering School, Holcomb. He was very active in the ASCE, American Society of Engineers; and I was active in it at the time. I was president of the Sacramento Section; and, I think, he was president of the Oregon Section. And I talked to him about this firm, CH2M.

And all that you heard was favorable?

Yes, yes. And I just felt that anybody with Fred Merryfield's background wouldn't be connected with something that wasn't a good firm. There was something else, too. Fred was very active in the cleaning up of the Willamette River in a job similar to the one I had for the California Water Commission, and I knew something of that because of my involvement in the water development.

But you had never seen or known about him since that time back in the 1920s when you were a forestry student at OSC? Or had you had any contact with him since that time?

I had had no contact. I was trying to think—I did have a contact with him in that he was on the accrediting team and was accrediting Chico State College. And I was on an Advisory Board to the Dean of Engineering down there, but I don't remember just when that was. I guess that was after I had gotten acquainted with Fred. But it's not that hard to check up [on the date] through the societies.

So your first real contact in a working relationship was with Ralph Roderick?

Yes, yes.

What was your impression of Mr. Roderick?

Oh, he's a fine man, a fine engineer, a man who loved to design projects. He liked to be involved in the design of sewer systems, sewage treatment plants, water treatment plants; that's what he liked, and that's what he should have kept doing in my view.

Can you talk a little more about his contributions? This is what I would like you to elaborate on.

Well, I think, as I said, he worked with us in the development of the City of Redding Master Plan; and, at that time, we did not have a strong sanitary engineering staff. And he was a real help to us. And so from then on, any time that we had a problem—many of the projects are sometimes too big for you and with the time schedule we needed help, and we would work with the firm—not necessarily Ralph.

His strong bent was treatment plants and sewer systems, pumping plants, and so on. So, a lot of the work was later taken over by Sid Lasswell whom you rode down with. Sid headed up a lot of the work that we did at Tahoe. So, after the relationship developed, we didn't have that much contact with Ralph as we had with certain other members of the firm like Sid and Russ Culp and various others. Bob Chapman who is here now and several of the younger people who were involved more down on the project level, because later Ralph was more up in the management level. We would have loved to have continued to work with him; he was great to work with.



Sid Lasswell

And by the 1950s, you had built up enough clients and enough projects to have the momentum to keep employees on your staff?

Gradually, as fast as we could, we developed our staff. During the '50s, any engineer graduating from a university had at least three or four offers.

Why were engineers attracted to your fledgling business?

Why don't you ask Harlan Moyer? Harlan was a graduate of the University of Nevada in 1952. Harlan came from Modoc County up here, Alturas; and he had an offer from the PG&E in San Francisco. PG&E, Pacific Gas and Electric Company, are a good company to work for. In fact, they have been one of our major clients over the years—still are a client. And I met Harlan at an ASCE meeting in Sacramento.



Harlan Moyer

Once a year, the head of the [Nevada] Civil Engineering Department used to take the senior students on a tour of projects including California. And they always ended up joining the Sacramento Section of the ASCE there, and I

used to be active in that. In fact, in 1960, I was president. I met Harlan there. I met all these students. I think there were 17 or 18, so I talked to all of them; and then I asked Harlan if he would be interested in coming to work for us.

What did you look for in new employees?

About all you could look for then was a graduate in civil engineering with a good record. You know, contrary to what some people might think, my philosophy is that to be a good engineer, you have to be well-trained technically; you have to have good judgment; you have to be able to get along with people, which many engineers can't do; and, of course, this all goes without saying that you must have integrity or you don't fit in any field.

And then you have to have experience; the only way you can get experience is by working in the field. And if you don't have good judgment, you're going to end up in more disasters while you're getting your experience. So what you looked for was a good level-headed young man graduating from a university with a reasonably good academic level. I wasn't after a 4.00 graduate. The fact is, the only 4.00 graduate I ever hired was an absolute disaster because he couldn't get along with people for one thing, and he had poor judgment for another. So I want a good record, a good 3.00 average is just fine. The fact is, I have never considered an academic record as being overriding over other factors.

I think one of the problems is trying to recognize whether people are capable of working with others; and if they can't do that, they are a disaster. But anyway, I had a Stinson airplane at the time. There is a picture of it in there [in an album]. Harlan rode home with me; and I showed him our little office, which was—there is a picture of it here—it was a little house that is still part of this building. And he came to work in 1952. Later he brought in Jack Jensen whom he had known at the University of Nevada. And then we hired several others from the University of Nevada including Alan, my oldest son; and Ron Reiland, who is in Yakima; Grant Engstrom, who isn't with us anymore; Don Showalter, who is still here; and Dan Chatfield, who is in Milwaukee. So, we have a lot of Reno graduates. People from a rural area were easier to convince to come to work than people out of the major universities.

Because you were doing projects in the rural areas? Or why?

Well, they wanted to live in rural areas; they didn't want to live in a metropolitan area. So many of the students at the University of California, and so on, had big-city-ititis; and there were some terrific opportunities back in the '50s in the cities. But we were able to convince enough of them to come to work for us.

What were some of the difficulties in starting your own firm in the '40s and '50s?

Well, money is always a difficulty—to finance a business from a bootstrap operation. Another problem was, of course, peak loads—mountains and valleys. Another trap I got into, in about 1954, I think it was, that about 40 percent of the work we did was in subdivision development and about 40 percent for the lumber industry. Then in 1954, due to a change in federal financing, the housing market went like this [down]. And, of course, the lumber market went the same way; so there went 80 percent of our business practically overnight. That's when I concluded that I would never have over 25 percent of the business in any one particular field. We survived it, but we were pretty broke there for quite a while.

Did you have to let a lot of the employees go at that time? How did you convince them to stay?

Well, you couldn't convince them to stay if there wasn't work. But we were able, at that period, to get a good deal more work from the Pacific Gas and Electric Company. We located, oh, probably 15 hundred miles, maybe more, of major transmission lines for the PG&E, the Bureau of Reclamation, and Bonneville Power Administration; and this went on up into the '60s. It was a case of just scour the country for work, road work, bridge work, transmission line work, water works, and sewer works, anything we could find to keep our people busy.

Many employees were loyal to you and the firm, I imagine?

Yes, I think I always have had that. I think I was loyal to them, too.

You were heavy towards surveying work.

Yes, see all the transits? [Looking at photos on the wall] Yes. That's where most of your projects were in surveying. That's what a big part of it was at that time. That would have been 1953; I'm sure of that because Harlan came in 1952.

Had you gotten your pilot's license by the '50s?

Yes, I got my pilot's license in 1949 or 1950, I don't remember. About 1949.

How did it come about you sought a pilot's license?

Well, I'd figured up I'd been driving 900 hours 1 year and about 40,000 miles; and I decided you just couldn't afford to waste the time that all that driving took in a rural area like this. And so I got a pilot's license and bought an airplane and started doing my own flying. We didn't have any airline service at the time; so if I wanted to go to Sacramento, I'd get in the plane and go to Sacramento. If I wanted to go to San Francisco, Tahoe, or anyplace else, I just went in the airplane.

I bought a Cessna 120, and it was just a two-seater. Then I sold it and bought a Stinson, which was a four-seater plane in which I could haul three other people. I used to fly survey crews all over the country with the various airplanes that we had. We had that; and then we got a 170 and then a 180 and then a twin engine Apache, which was a predecessor of the Aztecs that

you came down in, lower powered. At one time, we had five airplanes that were used and several of the engineers were pilots. There they are right there [pointing to a photo of several pilots].

Yes. Was it your learning to fly that got you into photogrammetry?

No. I told you about this Whiskeytown project out here and two dam sites that I wanted to study. There were no maps of them. I had a friend in Sacramento who was a photogrammetrist, so I talked to him about flying these; and we ended up flying five dam sites and making topographic maps of them. Do you know what a plane table is?

No.

It is a table mounted on a tripod that you actually map in the field, and that's the way that mapping was done prior to that. Plane table mapping. You had what is known as an alidade; and you had a rodman going around, chasing the contours all around.

Another thing, we designed a sewer system out here in the northern part of town; and the surveys for that sewer system, to make a map, cost us more than our total fee. I thought, there has got to be a better way to do it than this. So I got pretty well acquainted with Charlie Greenwood in Sacramento on photogrammetric mapping. And we bought a Kelsh plotter; that's the original plotter we had. And two of our surveyors learned to operate it, and that's how we got started.

I was looking for somebody to get trained in the photogrammetry and ended up hiring Don Mayer. Maybe you have met Don; he is right across the hall from me here. He heads up the survey and mapping for the whole firm now. Don was a Canadian and was a photogrammetrist with Jack Ammons down in Texas. I don't remember how I heard about him; but I called him up on the phone and, after talking to him for 2 or 3 hours on the phone, I hired him. He came as our photogrammetrist, and we have one of the top photogrammetry installations in the West here. I'll just walk you through it because we are very proud of it. It was in the middle '50s; I've forgotten exactly when.

Were you a forerunner in this use of photogrammetric mapping?

There were others. Fairchild Industries had been in it for many years, even back in the '30s. At the time that we went into it, there was nobody else [in California] north of Sacramento. There was one firm in Sacramento; there was one in San Francisco; and there were others in Southern California.



Clair's Air Force

There was one in Eugene, Oregon—Chickering; and there were some in Portland. But it was kind of pioneer days.

[We didn't have] the sophisticated equipment that you will see in there now that is tied into the computer; there is no relationship between the early days with the two projectors. And another thing, this friend of mine in Sacramento had a big mapping project for the Army Map Service; and he didn't have the staff to handle it. During that period when I told you that we were just practically out of work, he asked if I could furnish him three or four good men. And so, I think, four of our engineers, Chuck Hornbeck was one of them, went to Sacramento and worked for Charlie through this project. I watched what was going on, and Charlie really influenced me to get into the photogrammetry myself.

He wasn't trying to cut off one of his clients, but he felt there was the need for it. Survey and mapping is very useful in the design of transmission lines, the design of dams, the reservoirs, any structure that needs a map; and photogrammetry is the most efficient and the most accurate way of making maps.

You know, civil engineering by California definition, means fixed works. In other words, design of an airplane is not a fixed work [hence, not civil engineering] by California definition even though civil engineers work on the design of the structure of an airplane. But the ground is a part of a fixed work structure, and that is why we need geotechnical engineers to tell us how much load the soil carry; and you can also need a map of the area to know what you have to work with.

So surveying and mapping is a very important part of the civil engineering profession, and it is one of the things that the professors in the system have forgotten because many of the schools have dropped surveying entirely. I think it is wrong. The fact is that I served on a national committee of ASCE at one time and I violently disagreed with the direction that the universities were taking—concentrating too much on the scientific part of the field as against the bridge between the science and the structure. A lot of people won't agree with me, but I think it is very true.

Would you consider your initial use of this photogrammetry technique a turning point in your firm's history?

I wouldn't say a turning point. It was a step. I think one of the things that were asked in this thing is certain benchmarks of our development, and I think I've pretty well covered them in this [paper that he wrote about Clair Hill and Associates history]. We did a tremendous amount of work on transmission lines and roads and so forth for the Pacific Gas and Electric Company, and that led to other projects of powerhouse and water development systems.

I mentioned Glenn-Colusa Irrigation District, which is a major irrigation district in California who we are still working with. I think it is more of a step-by-step. The major projects that you think of, of course, well the City of

Redding. We did that sewer master plan and then worked on the design of the features of that. Then on the Glenn-Colusa Irrigation District, we did a lot of work. In CH2M HILL, we have a tremendous staff of agricultural engineers today. We have all this big work up in eastern Washington in the Yakima area. The work in Nebraska and Glenn-Colusa Irrigation District is what led into that.

The PG&E work that we did on transmission lines led into a hydroelectric project up here on the McCloud and Pit River, and that led into a basin development on the American River for Sacramento Municipal Utility District. That led into the development of the Middle Fork of the American River for Placer County Water Agency, and we brought CH2M into that project. We were not the prime contractors. McCreary and Koresky were; and I suggested to McCreary that he contact CH2M to design the powerhouses, which they ultimately did. And the next big step, of course, well, Beale Air Force Base was one which I mentioned—the big housing project.

And then the South Tahoe project was one that really gave us national prominence as a result of the design of the advanced waste treatment facilities and that project led into the project for the Denver Water Board. The Glenn-Colusa project led into the Central Nebraska Irrigation District master plan. So one thing leads to the other. What you need, of course, is good dedicated people; and that's what I think we have. We started our water resources group here in 1956, I think it was, headed by Joe Patten who still heads it up. We have a good staff of agricultural engineers. So when we merged in 1970, our big strengths were one, the surveying and mapping and two, the water resources group; and then we had a good structural group. We did not have the capability in the sanitary treatment plant design, and that's why we kept using CH2M. But I think, in many respects, we had similar goals but different capabilities that merged together very well.

What were your goals particularly in those early years, and how did they change as time went on?

I'd say our goal was, basically, to do a good job for our engineering clients. In my view, it's essential that quality work be done. Our goal has changed from time to time, due to many things, as far as direction goes. It was easy to see work that needed to be done, but it was also a problem as to how to finance it. We did a great deal of work under the assessment district proceedings for years.

That's where the improvement say a sewer system is built; and the property owners form an assessment district, then borrow money through bonds, and the property owners pay them off, in California usually over 15 years. Often, helping a client put together a financing plan was a very important part of



Joe Patten

the whole job because if a project couldn't be financed, obviously, we weren't going to design it.

You put this together in the early years and you did most everything then?

Yes, we had to. Now, they've got financial advisors. We always had to use a specialized assessment district attorney. There is one in San Mateo whom we used because they had to put the bond sales together, but we had to furnish them the financial data so they could put the bond sales together.

Did you ever lose faith or hope that your firm wouldn't make it?

Well, I wouldn't say I ever lost faith; but I won't say I wasn't pretty badly broke at times. I had to raise money, borrow money from the banks to make a go of it. There have been difficult times, don't misunderstand me at all. As I told you, my wife grew up in the school system. And, as a school teacher, she had a set amount of money coming in every month; and she couldn't understand this business of getting nothing this month and maybe some next month. There was a time, this was before the war, when we couldn't pay our bills. And the telephone company called her up and told her that if we didn't pay our arrears phone bill up, they were going to have to take out the telephone. And that was a horrible shock to her; one of the times that shocked her more than anything else. But, financing a business is not easy; and it isn't easy today. Unfortunately, a lot of people are going broke today; in fact, the bankruptcies today are way up.

All the responsibility was on your shoulders? You had no other partners to share the burden with.

No, that was my problem. That wasn't theirs. Their problem was to get the job done and to do a good job.

Later, did you consider having other people as partners with you?

To say I didn't consider it isn't true; but in the 1960s, I formed a corporation and then worked out a scheme to where the employees could buy stock in the company. The six original stockholders were Harlan Moyer; Jim Lonneberg; Jack Jensen; Alan, my son; and Joe Patten. And the intent was to sell them 50 percent of the stock over a period of years. I also took in some more partners who had smaller amounts of stock—Bill O'Leary who is in San Francisco and about a half a dozen others. Yes, to answer your question, it was a goal for many years. In fact, I'd kind of forgotten it. But my original intention was to have four partners who had 12.5 percent interest, and I would retain 50 percent. But the problem with that was that it had to come out of profits, and there was just no way I could finance that and finance the growth. And so I just couldn't put it together. And it wasn't until in the '60s that I could see my way clear to put it together where they could pay their stock off through a bonus system, which is where we were when we merged.

We had the six general partners—six partners that, I guess, had 40 percent of the stock—and then the others that just had a smaller amount each. But those all became Key Employees of the company when we merged with

CH2M. So, I didn't have any philosophy about staying on my own—I just couldn't put it [the corporation idea] together; and I never wanted a partnership. The CH2M partnership worked out very well, but most of the partnerships that I knew did not turn out that well. And, so, it wasn't until I was able to incorporate in the '60s that I was in a position to take in other stockholders. And it took 3 years to get a letter from the Internal Revenue Service that would not wipe me out tax-wise if I incorporated. I think it was 3 years after I got the corporation formed before I could really put it into operation. In fact, I did appoint a committee and gave them all the facts and said, "I haven't been able to figure this out. You figure out a plan where you can all acquire stock." It was done that way.

Why were clients attracted to Clair Hill and Associates over some other consulting engineering firm?

Well, I think our clients are our best salesmen. We used our clients. I'd say, "I'd like to have some people contact you. Is it okay?" And I never had one of them turn me down. Basically, we always made every attempt to do a good job for our clients. I don't say we didn't have problems, but we've lost very few clients over the years; and when we have, it's been largely due to some personality problems and not due to work. Sometimes it's been due to other things. One thing, you get a bad contractor on a job, and it can hurt everybody's reputation because there is just no way you can be sure of having everything as good as you would like it.

What were some of the highlights through the years before the merger?

Well, I guess one of the big breakthroughs came when we got the job for the Pacific Gas and Electric Company in the early '50s to locate the 230-volt transmission line from here to the coast. Then, after that, when we did all the surveys, road design, and some bridge design for the PG&E up here on the Pit and McCloud project. That was an interesting project in that we were working in an area where there were absolutely no roads so it—let me just glance through this a minute here [looking through his photo album]—so it was all a case of work from pack horses. There [is a photo], we had a pack string going into a survey camp. There were 6 months that we had these survey crews up in that country working strictly from pack string.

You don't do it that way anymore, do you?

Oh, not too much because we've got helicopters now. We had one hired packer, and then I'd go in Saturday and Sunday and move the camps with my pack horses. In fact, I'd usually go into camp on Thursday in time to meet the crew when they came in Thursday night and see if everything was going all right; and then I'd leave after dinner and go back out. Oh, boy, was it dark on those trails! I'd, oh, get home maybe midnight, two o'clock in the morning, depending on how far it was. But I was in and out of that camp I thoroughly enjoyed that. Here we first moved into this office right here (looking at picture). Here's Harlan when he graduated from Nevada, and this was one of those surveying camps that I referred to. That's Jim Lonneberg;

this is Wayne Riggins; he still works here. There's Carl Schafer who's in Corvallis.

So the Pacific Gas and Electric Company job you consider a highlight then?

Yes, it was because that project led to the South Fork of the American River project for the Sacramento Municipal Utility District. And that project led to the Middle Fork of the American River, and those were major jobs. (In the photo) That's Dick Tandy, and he's in Denver; and there's Les Shoupe. These two are still here. Some of these jobs we did, I thoroughly enjoyed; but those projects were a major item in much of the work we've done in later years. Here was this Beale Air Force Base community here [in the photo]. And so that was part of that Redding sewer system I referred to that we got Ralph Roderick's help. They designed the pumping plant that's right over there (looking at pictures). And so it's really, I don't know; it's awful hard to put your finger on something. This fellow [in the photo] here was our chief geologist, Hal Harned; and we set up a separate corporation. I badly needed a geologist; and, in my opinion, he's one of the best. He died of a heart attack here a few years ago. We formed another firm—Hill & Harned—and so that was around the soils. But, in answer to your question on the pack string, very seldom do you have to pack in anymore. We've used helicopters a lot over the years, and they're very useful.

You mentioned you formed another firm called Hill and Harned. Why did you form this firm?

For a long time, I had been looking for an engineering geologist to hire; and they were very scarce at that time. Hal Harned, who was at that time chief engineering geologist for the Bureau of Public Roads in Washington, D.C., was a long-time friend of mine; in my view, the most competent engineering geologist that I had ever been acquainted with. I wanted him to come to work for me. I heard from a friend of mine that after 5 years in Washington, his wife wanted to come back to California where her whole family was. So I called Hal and talked to him about coming with us, and it seemed that since he was going to be handling the geotechnical work entirely that it would be a partnership-type of organization. It's like CH2M; I really believe that professional people, if they're interested, want to be part of the action, so to speak.

Hal and I decided we would form a separate corporation, which would be divided 50-50. Hal would handle the geotechnical work and the laboratory, and I would the business end of it. That's what we did; and we set it up as a separate corporation, which later took in Jack Twitchell who was a soil scientist and who was working for me at the time running the laboratory that we had. That was the long and short of it. Well, when Clair Hill and Associates merged with CH2M, the Hill and Harned was not included in that. It wasn't until sometime later that Holly Cornell came down and negotiated the acquisition of Hill and Harned so it became a part of CH2M HILL.

So Harned and Twitchell were still part of that firm at the time of the merger?

Yes.

Did they work out of the Clair Hill and Associates office or someplace else?

Well, the laboratory where they worked out of is about four or five blocks from the office, and it's where the chemical lab and soil and concrete still is. It's in a separate building. That was the office that they worked out of although there was a lot of interconnection.

When was this that you formed Hill and Harned?

Oh, I don't remember, Jennifer. It would have been in the early '60s.

And you didn't try to expand beyond the three of you?

Oh, no. They had a group of technicians working and another engineering geologist. I guess there were 10 or 12 people there altogether. They had three drilling rigs. We did the foundation drilling for bridges, building, and what have you. They had the laboratory, which employed two or three technicians; but the owners were Hal Harned, Jack Twitchell and me. Then later, I disposed of my stock to my son, Alan Hill. When they sold to CH2M, they're the ones that really sold it.

Were there other firms you formed of this nature?

Well, we formed another one over in Weaverville in Trinity County, which is about 50 miles west of here, which was largely a surveying firm. It was formed in partnership with a fellow by the name of Harley Lowden. The reason it was done was because Trinity County is quite provincial—many places are. Harley Lowden was a fourth generation of one of the early surveyors in Trinity County who did a lot of the public land surveys. They were long-time Trinity County residents. There were several reasons we formed it. One was we were doing a lot of Forest Service work, and much of that work was having to be done by small business; so that was set up. Harley would do what he could and sub the rest of it to Clair Hill and Associates. We operated that firm for quite a little while. Then Harley got very sick and ultimately died of cancer. He was a fairly young man, about 50, I guess. So the best thing to do was sell the firm, which we did.

Was the firm about the same time as Hill and Harned?

No, it was sometime later. It was during the '60s also, but I don't remember just when; but it was later. Come to think of it, what we did is we bought out an engineer who was over there, whom I helped out from time to time. He was really a mining geologist. He wanted to go back with the Dodge Company back down at Tucson and wanted to know if we would buy him out, which we did.

And you formed Hill and Lowden from his company?

Yeh, we formed a corporation and then acquired Fred's company.

You met Lowden through that engineer?

No, he was working for me. He worked for me a long time. He worked for me clear back when I was City Engineer here, and then he left the city and came with us. He worked for another firm for several years; and when they liquidated, then he came back with me.

Was it his or your idea to form this company?

No, mine. I approached him as to if he would like to do it since he had roots in Trinity County and both he and his wife fit into that environment very well. So we went ahead and did it.

Were there other firms besides these two?

Those were the two main ones.

Why didn't you start other corporations?

Well, doing that is not without problems; and I was really concentrating my efforts in the parent firm. Shortly after that, we merged with CH2M; and then it was a different operation altogether.

At the time you were forming these two corporations, what were your goals?

I thought I explained they were formed for specific reasons. The one to get a strong geotechnical group, and the other to take advantage of a market that was available. And also, we had over the year done a lot of work for the Forest Service. And with this small business set aside, we were going to lose a good deal of that business. That was a way to retain it.

Earlier you mentioned some of the highlights, what about some of the disappointments then?

I don't talk about them.

Oh, come on. (Laughter)

Perhaps one disappointment was your experience with data processing in the '60s? I understand it wasn't very successful?

No, it wasn't. There were a lot of problems. There were two main problems. Do you know what hardware is? Okay. One is that you would no sooner get a system running, and get the hardware, until you'd outgrow it. And you would have to change the hardware, which meant you had to reprogram it. Each time you'd change hardware, you'd have to reprogram.

The other problem was competent help. And the other problem was that I was very busy on other things, and I really didn't spend enough time seeing what was going on. And the worst problem is when you once get somebody on your system, how do you abandon it? For instance, we were doing all the welfare checks for the county. If I'd just closed the data processing down and those people hadn't gotten their checks, boy, we couldn't have lived here.

We kept that thing going for over 2 years after I tried to get off the system. And finally the county got their own equipment in, and I was able to sell it—give it away; but I gave them the liabilities, too. No. I tried to computerize a

little too fast, and it cost a lot of money. We were ahead of time on it, but the equipment was changing so rapidly at the time. You'd just get one computer operating, and it would be obsolete. And that was a real difficult problem, and they didn't have a common program language. It was machine programmed; so for each piece of equipment, you'd have to reprogram everything. Besides that, there was a lot of cutthroat competition from the banks who had all this big, sophisticated equipment, and really did [data processing], like payrolls for clients to get their banking business.

I don't know any of those people who were in data processing at that time that are in it today. I don't say there aren't any, but I don't know any of them. Today, a computer that might cost \$30,000 will do more than a \$300,000 computer back in those days. The computerization of industry has really gone a long way. Of course, a lot of it goes to the space program. A lot of these things were developed for the space program, and now you can have a little chip that big that's got more memory than this computer that we used to have that filled that room up there. I tried to computerize a little too fast, and it cost a lot of money. All I can say is we needed a computer; but we should have limited ourselves to a computer that we needed for the business and not tried to help support it by outside clients because that took a bigger computer than we needed for our own business. And we got into it too early, too. I think it just points out something: you should never get into anything you don't understand pretty thoroughly, and I didn't understand the computer business that thoroughly.

You had the right idea but maybe just not the right timing.

The timing was wrong, and competent help there for a period was a real problem, too. The industry was growing too fast.

People weren't trained?

No, they weren't; and this reprogramming was what really put it under. That was a disaster. Now, they've got these universal programs.

I'm chairman of a technology committee for our locally-owned bank and, gee, what the computers today will do, compared to what the computers would do then, and the difference in the personnel requirements is just incomprehensible. And in addition to that, these canned programs have been developed. There are three or four firms in the country—there's one up in Portland, there's one in Florida, there's one down in Texas—who have banking programs; and what you have to do is find out which of those prepared programs is better for your particular bank and buy the program for, maybe, \$30,000 instead of spending a year and \$300,000 developing it. And it's still a rapidly changing industry.

Oh, I know. Last time we were together you mentioned that after the war, you had talked about going to Alaska and starting your own firm there. Why did you want to go up there and why didn't you do so?

I spent 2.5 years up there during the war. Physically, I was never as well as I was there. I had a bad time with hay fever and breathing problems in this climate, and it just vanished when I went to Alaska. I guess it must have been [because] the lack of pollens in the air, but I had no problem in the 2.5 years that I was there. The other thing is I felt that it was the area of the greatest opportunity that was left in the United States.

California was really a state of great opportunity, but it was becoming a metropolitan state; and I like the rural areas much better. I was interested in mining. I felt there were real opportunities in engineering up there, and I just plain liked the country. However, it was November 1945 when I got out of the service; and November is no time to go north. There was another thing: my mother was still alive, and she lived here. And she was getting along in years, and my brother lives on the East Coast; so I felt a little bad about leaving. And my wife's mother was still alive. But the other thing was Alaska's economy has always been almost a sine wave; it's just high and low. And mining, which I was interested in as I told you before, never did recover in Alaska or any of the west because of the greatly increased cost and the fixed price of gold at \$35. So it was apparent that you couldn't get involved in a mining activity up there because costs had gone up so much and the price of gold hadn't gone up. It's only been since the 1970s when the price of gold was turned loose that gold mining has started again.

There was another thing that had the [same] effect. The military was such a dominant economic factor in Alaska that the pulling out of the military had a real impact on the economy. And the third thing was they had a very serious longshoreman strike that just crippled the country. So, those were three factors that I [had] watched during the winter.

And the other thing was that I opened an office here as soon as I got back to work through the winter. And I found, about along in January, that I had more work than I could get help to do; and by spring, I could see that there was a good opportunity here to go back into the engineering business. So that's what I did. And I started trying to find people, which were very difficult because there were no graduates during the war. And there were very few in the latter part of the Depression, so finding help was extremely difficult. But I did open an office, and I started really finding [what] work I could; and I was able to develop as much business as I could staff. It meant many long hours. I used to leave here and be gone a few days. I'd make a circuit all through the northern part of the state looking for work and making contacts because naturally I had lost all my contacts in 5 years in the Army. But it didn't take long to get acquainted again, and I guess I gave up the idea of going back to Alaska. But I did look forward to the time when I might do work up there, which we did again in 1958. We got a job for Standard Oil up there. And then again in 1964 after the earthquake, we got a major job rehabilitating about 40 miles of the Alaska railroads. And we worked up there ever since, and I later opened an office in Juneau and Anchorage; and that's about the size of it.

I imagine it was difficult for such an independent, self-motivated person as you are to be in the service?

There's no question about that. I couldn't see any reason to do something the wrong way just because that's what army regulations said, and that caused me quite a bit of trouble at times.

Your liking to be your own boss made it difficult?

Yeh. And, you know, the Army is ruled by brass and not necessarily by brains. It has to be that way because orders have to be followed. And if you have a superior who's not too competent, you still had to follow orders; and that's the nature of it. Some of the brightest people I met during the war were noncoms. They had been very successful as civilians, and they were drafted into the Army and were very good people; and the very competent noncoms were really the wheel horses that made the Army go. A lot of the officers were very competent, but they are a cross-section of the people; and there are competent people and there are incompetent people. But that's the way it goes. And even though West Pointers are a very select group, they were pretty much a minority in the Army because it expanded so tremendously.

So you were glad to get out of the service.

Oh, yes. I wasn't cut out to be a career Army person. I had a total of 17 years in reserves and active duty, but I wasn't interested in any more of it.

That's a long time. After the war, did you consider relocating in some location other than Alaska that would give you more advantages than Redding—for instance, a large city like San Francisco or Seattle?

No. I have no interest in living in a metropolitan area. When we were first married, I was working in San Francisco; and we lived in Berkeley and neither of us are cut out for city life. I was glad to get out of there, so I had no desire to go back to a city. As I got older, I could have worked in some cities; and if the requirement had been to do that, I might have done it. But I could see no reason to [do so at that time], and I felt there were really many opportunities in the rural areas. Engineering work in this area used to be done by people out of San Francisco. Well, there's no reason that it had to be done by people in San Francisco or Sacramento. I just wouldn't want to live in a major city.

You met a real need in rural areas?

Yes.

Were there any individuals who influenced you in your decision to start your own engineering firm again after the war?

No, I don't think so. I can't think of anybody.

I'm sure there were many firms that started and failed during the Depression and after. What qualities did you possess that made you think you could succeed after the war?

(laughter) Ah, you know, I had 5 years in the Army to look at other people and see what they'd done, and analyze what I wanted to do; and I could see no reason that I couldn't succeed. I learned in 2.5 years before the war of a way by which I would not approach it again.

What do you mean?

Well, of course, it was the end of the Depression; and we had no money. I was very fortunate that I had a job when I got out of school, although I had to go back in the logging camps for a few months before I got a job in engineering. So it was really a boot strap operation; and I had to work in the field in the daytime and work in the office at night, doing all the small jobs I could find that I could do by myself or with one or two surveyors. The result was I never heard of the bigger jobs until it was too late, nor did I have the financial capability of handling them. And so I felt that if I were going to do it again, I would hire, number one, a secretary/bookkeeping person to handle the office routine; number two, hire sufficient help to do the work so that I could make contacts, secure the work, and see that it got done properly. In other words, you had to have an adequate staff to do sizeable jobs, and that was my goal.

I did pick up some people as they graduated from school and gradually was able to build a staff. But a one-man operation couldn't succeed. There are some in the state I've been very active in the California Council of Civil Engineers and Land Surveyors, and I remember one of the committees we had—it was headed up by a very bright fellow from Los Angeles; and they analyzed all the member firms that sent in their financial data. The names weren't included; the names were in a code so that it wasn't breaching confidence to competitors.

But I remember, when he made his report, he made the comment that, from the analysis of the information that had been sent in, it was apparent that quite a few of the council members were broke and didn't know it; and that it was very apparent that the small firms would get smaller and go out of business, and the bigger firms would get larger and that, with few exceptions, the small firms would not survive. And that's essentially been true. In other words, it's just not possible for a one or two-man firm; they can make a living, but they can't really be successful.

What did you mean when you said that you were in the military for 5 years where you worked with others and saw what they had done and consequently you thought that you could succeed?

Oh. I met people from all over the United States from all walks of life. I knew some of them had been outstanding successes in civilian life. And in working with them, I could assess their capability, and I think I had a fair estimate of my capability. And that's, I guess, about the size of it. There are very few

competent leaders and managers. There aren't enough to go around. That's no secret to anybody. So I know that in my Army career, I did a good job; and it was a good management experience. In civilian life, I never had any responsibility for three or four hundred people; and I learned a lot about the management of people, and I saw a lot of ways others did it. I saw a lot of people who were exceptionally good and some that were exceptionally bad. So, in other words, I could appraise people's capabilities and relate it to their success.

So you felt you had good management skills?

I felt I had the capability to do it, and I know I had a better technical training than very many of them at that time. The year I finished at Stanford, I think there were only six in our graduate class who graduated and got our engineer's degrees. And I think, at that time, the college graduates were only about 2 percent of the male population. At Stanford, I did have a good university record, and not necessarily just an academic record.

Earlier you mentioned one fellow you asked to be a partner with you, were there others you considered?

I did talk to others but most of them—it was after they could see that I was doing pretty well—wanted to buy in on a nothing-down basis; and I wasn't really interested in that. And besides that, I had been in partnerships; and I'm pretty leery of them. Partnerships work fine as long as everything goes well; but when it isn't going so well, then problems can develop pretty rapidly.

There was one fellow who was very anxious to go into business with me, but his wife was the dominant person in the family; and I wasn't about to have a partner whose wife was telling him what he was to do and what he wasn't to do. It was quite a blow when I wouldn't take him in as a partner. Besides, he made some remarks about things at the time that were different than my philosophy; and I thought, "Well, I've gone this far, I might as well stay with it." So, aside from those two cases, I never seriously considered taking in partners. However, as time went on, we got pretty large. And it became evident that it was essential that some of our key people be given the opportunity to own a share of the firm, and so we did work out a program where six of them could come in as partial owners of a corporation.

Was it difficult for you to share the stock?

Well, it was very difficult because none of them were in a position to pay for it. So I still had the full financial responsibility for the company, and the personal guarantee of all bank loans and so on. So it was a difficult thing to work out. But I felt that, well, nobody has a lease on life and you'd better prepare for a contingency.

That's why you did it?

Basically. Two reasons. One is that group of people had really helped me get where we were, and I really wanted them to participate in the ownership.

And the other was anybody can miss a curve, and you just better prepare for contingencies.

How did you go about acquiring business in that first year when you had had so little experience and really had no reputation?

Well, I did get involved in community affairs. In fact, I think I was president of the local chamber of commerce in 1949; and I was active in it previously. And I was active in water resources; about 1949, I had been very active in water resources and helped our senator [Edwin Regan] out substantially. He was a new senator, and there have been continually fights over the Sacramento River between the lower river people and the upper river people.

When the new senator went in, the lower river people knew that he had no knowledge of the hydrology of the Sacramento River and thought, "Oh, this is our chance." And so I got together with him and reviewed the disputed bulletin in detail and prepared the notes for his arguments. And that particular bill went out of the Water Committee of the Senate with a six to nothing or six to one, I guess, aye votes. On the floor of the Senate when it came to vote, it got six aye votes and all the rest no votes. I sat with our Senator right there at his desk on the floor feeding him answers to the various questions.

Another one was the preparation of a report in opposition to the Bureau of Reclamation's project for the Trinity River. This county wanted the development of Clear Creek; and it was not included in the Bureau's program, so I worked up a report for them and really promoted getting it changed. Well, as a result of all of this activity and some influential friends like Senator Ed Regan and others, I was appointed on the California Water Resources Board. That was a board of seven people from all over the state who had the responsibility for developing the California Water Plan, and I ended up a few years later as chairman of that Board.

How had the engineering profession changed from what it was before the war to what you found when you returned after the war?

Years ago, very few smaller cities had an engineering staff that amounted to much; and the same was true of counties. And so consulting engineers designed the water works, designed the bridges, and designed the sewer systems, and so on for the cities. Well, as time went on and as a result of the public works programs of the '30s, most of the public agencies built in-house staffs and proceeded to do the work themselves. And the State of California actually did work for cities and counties, and so there was a great change there.

After the war, with the tremendous expansion in the economy, there was a real need for engineering firms to take these peak-load jobs from cities, counties, corporations; and so there was a big opportunity. We have done a tremendous amount of work for the Pacific Gas and Electric Company. They have a big engineering staff, but we have done specialty jobs and peak-load jobs. We've done several million dollars' worth of work for them over the

years [in the way] of surveying, treatment plant design, bridge design, road design, power line locations. The Pacific Telephone used to have a large engineering staff. And they greatly reduced their staff and would contract these major jobs out so when the job was through they didn't have a big bunch of people with a what-do-we-do-with-them-now [problem]. So there was a change both in industry and a change in the public works.

Then there were a lot of these clean water programs that were developed, and that's just one example of [these new opportunities]. There was a real need for the design of waste treatment facilities and water treatment plants. CH2M really got their start that way. Fred Merryfield was very active in the State of Oregon in a similar position to what I was [in California]. And one of his goals was to get the Willamette River cleaned up—raw sewage was dumped into the rivers. And so he really had a big backlog of work there when Holly and Jim and Burke came out of the service, so they got started to meet a need. And the same is true of ours. We went a different direction in that we did a lot of irrigation work and water resources work. We developed a photogrammetric staff, and we had a large survey group locating transmission lines and telephone lines for the utilities.

Another big change in engineering is that they have become much more technical. I'll just illustrate it. The transit that I started in business with—it is home I guess—was given to me by the man who was my boss when I first went to work for the state. He had been a freelance engineer; and, in 1909, he was city engineer of Lima, Ohio. And he had to have his own transit and his own level. He bought this used transit in 1909. He gave it to me in 1938. Well, he loaned it to me; and his wife gave it to me after he died in the late '40s. I used that transit clear up until, well, about 1960.

I'll bet you that not many of the surveyors we employ today can use that instrument nor could I use the instruments they use. They're electronic measurement; they're optical instruments, instead of the type they were. And the surveying, I think, rather typifies the drastic technical changes in the field, which apply in the waste treatment and all the way through. We do much of our surveying today right in here on these plotters as against doing it with a strong-arm method out in the field. It was the only way you could keep costs within reason. Where we used to pay a party chief \$6.00 a day, you pay them now probably \$12.00 an hour—I don't know what the present rate is. But, by technical improvements, you could keep things in balance. And so where we at one time had 22 survey crews working out of this office, I don't think there are that many working out of the whole company today.

Times have changed.

Yeh, they've changed. And the whole business has become so thoroughly computerized. I think most of the engineers today don't know what a slide rule is except from history [pulls a slide rule from his desk drawer], but to ask them to use one...

They wouldn't know how.

They wouldn't know how. And the information off the plotter in there is plugged right into the computer and prints out. You have these little calculators. You don't have to look up trigonometric functions anymore. When I first started out, I had a book of eight place log tables. That book was in the library here and somebody asked me what in the world that was for. Well, that's the way I computed traverses.

And then that old flat-deck Monroe calculator that is up there in Bob Harding's office—I bought that for \$25.00 in about 1938 to compute traverses with. Well, now, you just plug in your information in these; and it computes the sine and cosine—and it's no bigger than that. There's one in there on Harry's desk. So you don't even have to look up trigonometric functions anymore. So it's just a different world technically. And then this space program has developed so much in miniaturizing things. You've seen these little calculators that are the size of a business card. They are fantastic little things. And on something no bigger than that piece of jade there [a small piece on his watch], you can have a tremendous amount of technical information.

Why, you say, "What's different?" Everything is different except one thing. And that's judgment. And if anybody lacks judgment, they'll never be able to use all these fancy things because they won't recognize if something is right or wrong. And that's one of the big problems with the computerization: you lose the feel for what the answer should be. If the computer says it should be this, well, a lot of people have a great faith in that. I like to sit back and look and see, well, "Does that look reasonable?" A friend of mine, who is a very prominent structural engineer in San Francisco with a very fine reputation, his office designed a building and left out half the reinforcing steel because that's what the computer told them. It's easy to do if a person doesn't have the background of doing the work just step-by-step.

Is judgment what you were talking about previously when you mentioned this friend of yours saying that he was part of a vanishing breed?

He said he was part of a vanishing breed because the municipal corporations and the counties and the companies were all developing their own in-house engineering staff so they didn't have any use for the consultant anymore, so they thought.

Oh, I see. So you're also part of that vanishing breed that he spoke of?

At that time, yes. But times have changed. After the war, I was city engineer here on a part-time basis because they couldn't find a city engineer. And so they came to me and asked me if I would take it on a retainer basis, which I did. It was a pain in the neck, but that's beside the point. I was county water resources engineer on a retainer basis. Later, we developed a department and hired a director of the department of water resources.

What were some of the keys to your success?

(chuckle) Well, it's easy to say hard work but I'd say in a lot of ways, that's a hard question. I think the key to success of any business of this type is to get a job, do a good job, and meet your time schedules—your committed time schedules—and do the work within your estimate. You get a few successful jobs, and you have people who will refer work to you, and you have references you can give. That's one of the real sad things today in this era of lawsuits.

It used to be that if you had a problem on a job, and if you made a mistake, you'd just discuss it with the owner and make a settlement to make it right. You can't do that anymore because anytime a contractor loses money on a job, he's going to sue somebody; and the engineer is one of them that is going to get sued. It has really hurt the profession. But I think that [the key to success is] to do a good and honest job, and be sure that you have competent people to do the work. In my view, any good supervisor should take the responsibility for anything that goes wrong and give credit to others for the successes. I think that's the way it should be and, if somebody makes a mistake, what you'd better do is help them straighten it out and take the responsibility for the error. But if somebody makes too many errors, you've got to come to the parting of the ways because you can't do it [any other] way. I think the key to any personal service business success is competent, loyal people, and that loyalty has to go both ways.

That's what was stressed in your organization?

Yes.

At what point did you think the firm was finally on a sufficiently solid financial footing to continue and survive?

It's just a gradual thing. There are ups and downs in the economy-yo-yos. In fact, there was a time when about a third of our work was for housing developments and about a third of it for the lumber industry. And what I learned in 1954 was, when the housing industry goes down, the lumber industry goes down at the same time; and you're out of business. So I made a vow at that time that I'd never let over 25 percent of our work be in any one specific field that way, and I just about kept that up until I merged. That's one of the things that I think, in CH2M HILL, there is too much of our work in the water and waste treatment field; and it's a dangerous place to be in. The management knows it, but it takes a matter of time to change it.

So there are movements towards expanding into other fields?

Yes, working more into the industrial field. You may have read an article in Engineering News-Record about 3 or 4 years ago when Harlan Moyer and, I think, Holly Cornell were interviewed by Engineering News-Record, and it was pretty much stated in there that the direction was to change in that direction. To answer your question, there were ups and downs financially. I got into the computer field a little prematurely and that cost a lot of money. So, to say there weren't ups and downs wouldn't be right. There were.

You mentioned last time that you met Harlan Moyer at an ASCE meeting?

In Sacramento, yeh.

And asked him to work for you. What impressed you about him? Why did you invite him to join your organization?

Well, I interviewed him, I guess, and felt that I had a lot of respect for the University of Nevada Engineering School and Professor Blodgett who headed up the Civil Engineering Department. I talked to him about several of their graduates, and Harlan was from Modoc County up here and was interested. In fact, he had a job offer from Pacific Gas and Electric Company in San Francisco, but he didn't really want to move to the city. And so, in the interview, and in talking to Prof. Blodgett, I felt he would be a real good addition to the firm; and we finally got together.

WORKING TOGETHER: CLAIR A. HILL AND ASSOCIATES AND CH2M

Why did you call Fred Merryfield to help work on the treatment plant in Redding? Had you heard about the Corvallis firm or was it just based on your acquaintance with Merryfield? I know that you knew him briefly at OSC.

No. We were doing some work over in Brookings, Oregon; and CH2M was doing work there, and Archie Rice was handling it. And Archie and Ed Worth, who worked for me there, had been friends at Oregon State when they both went to Oregon State. Ed told me about work that CH2M were doing, and I knew something about the work they had done. We did not have a strong capability in sewage treatment at the time, and there was a problem down here in the sewage treatment plant; and also the city needed a master plan of the sewers.

I talked to the city manager—well, really, having been city engineer, I had pointed up to him the need for a master plan. So I really promoted the job with him. But one of his requirements was that I get some help in waste treatment because the plant had been designed just a few years before and was not properly designed. As far as the sewers and the pumping plants and so on were concerned, I felt confident. But I made no bones about the fact that I was not an expert in waste treatment, so we were awarded the job with the understanding that I would associate with somebody who had a reputation in waste treatment. Well, obviously, I wasn't going to go to San Francisco and get some of my California competitors to work with me on it. I had gone to school with several of those people—Kennedys and various other people. So, I thought, "The best thing for me to do is to get somebody out of the area;" and I called Fred and talked to him.

You didn't see them as competitors in the same sense as the San Francisco firms?

No, because San Francisco has always done a great deal of work in this area. And I just felt it would be better—and really it's not that much farther. It's about 300 miles to Corvallis and it's 230 miles to San Francisco, and yet the Siskiyou Mountains kind of separate the two. So the long and short of it was that they sent Ralph Roderick; and that's how, again, I got acquainted with them.

You mentioned that you had heard that Fred Merryfield had helped clean up the Willamette River. Can you talk more about what you had heard? Talk about his contributions.

I didn't work with him directly at all. I just knew that he had been very active in—I've forgotten what they call the board in Oregon, but it is similar to our Water Resources Board here in this state. He was really a leader in getting that done. I don't know any details about it except that Fred was active in it.

Did you get to know him better as years passed?

Oh, yes, much better. I enjoyed Fred very much. I didn't know his first wife, but I very much enjoyed Anne. I think she is a great person; in fact, I've seen her from time to time since Fred died. Fred was a very interesting person, and I hope you have gotten from people who know more about his background because it is very interesting. Too bad you couldn't have interviewed Fred. You would have had to have spent a week. (laughter)

He's quite a talker.

I think I know why you say that. But tell me why.

Well, he's quite a talker; and he loved to talk.

That's what I understand.

Yeh, he was quite a talker. But his background was interesting enough that he had a lot to talk about, too.

I got in a big argument with him one time. I was on an advisory board for the Engineering Department at Chico State, and Fred headed up the [accreditation] team. I'm not sure he wasn't the whole team; I haven't ever gotten that quite straight. He inspected them for accreditation, and he turned them down; and I didn't agree with him. I had quite a discussion over it, but there was nothing I could do about it; you didn't change Fred's mind. He was a fine person; but, anyway, I felt that he was unreasonable in turning them down. Actually, being turned down had some benefits because they got busy and corrected the problems that Fred pointed out to them.

The Engineering Department Profs knew those problems existed, but they couldn't get the support of the president. And I was later on the President's Advisory Board, and I really gave him a hard time. I had been on this Engineering Advisory Board and then was asked to serve on the President's Advisory Board, and the subject of accreditation came up. The President was not an engineer. He didn't understand the engineering [registration requirements], and I had to tell him he was doing a real disservice to the engineering students by not taking the necessary steps to get accredited. I said until they corrected it, I couldn't recommend Chico State Engineering Department to high school students. And he blew a fuse; and I said, "Well, now, just a minute. I've been on the Registration Board for Civil Engineers in the state. The state law says that you need 6 years' engineering experience to be eligible to take the registration examination. Four years of that can be credit for graduation from an accredited engineering school." I said, "Graduates of Chico State get no credit. So they must have 6 years of experience after graduation before they are eligible to take the engineering examination." And I said, "I don't think that's right. I think the Engineering Department is doing a good job. And their deficiencies should be corrected, and they should have your support instead of opposition." And he didn't like it very well. I thought he was unreasonable. But the engineering Profs were real happy with my statements because they hadn't been able to get to first base with him. But they did correct their deficiencies, and we have a lot of graduates of Chico State here now. They do a good job.

Can you talk about what you felt the contributions of Fred Merryfield have been?

I think you have to get that from the fellows who worked for him from day to day because I was not that close to Fred. I think his main contribution to the firm was building their staff. He was the staff manager. But you should get directly from people like Ralph Roderick, Holly, and Jim. Those fellows who really worked with him right at the time.

When you were considering another firm for that Redding project, were there firms other than CH2M in the offing?

Yeh, there were others. But they were all in the San Francisco area.

None from Portland or Seattle?

I didn't know any of the Portland or Seattle firms. I had very little acquaintanceship up in that area. But I knew Kennedy Engineers. I went to school with Dick Kennedy. I knew Harry Jenks who was a prominent sanitary engineer and Brown and Caldwell. I knew the other sanitary engineers. I didn't (want to) feather their nest.

I looked at your pamphlet called At Your Service.

(chuckle) Oh, yes.

It looked like you were very successful in 1954 with all the projects listed in it. I think that was about 1954, wasn't it?

Is that when it was? I don't remember. That little green one?

Yes. I have a copy here. So you were doing very well by 1954?

Yeh, ummm, hummm.

Were the first two projects that you did with CH2M the plant in Redding and then the Beale Air Force Base project?

I think Beale was the next one, yes. I don't remember whether there was any in between there or not, but I think that was the next one; and that was a major project.

What was your impression of CH2M's work, then?

Oh, that was excellent.

You mentioned that Ralph Roderick was the individual that came down and represented CH2M. You talked about him a little before. Can we talk about Ralph Roderick now and his contributions, his attributes, his achievements?

Well, Ralph was a real sanitary engineer; he liked to design treatment plants and sewer systems. What he liked was the technical activities, and he liked project design work. He was quite innovative and, I think, a fine engineer and a fine man. I think that the company made a mistake when they put him into a management position, or a staff position, instead of letting him go on heading up the waste treatment department or sewer department or whatever

they call it. Because that's what he liked to do. And I don't know, but I think the reason that he took early retirement is that he didn't like that corporate. Well, he was manager of the Corvallis office there at one time. And later he became manager of Corporate Development, I think the title was; and I don't think he liked it. So, he was a great man, in my view, to work with. I thought he was fine, very capable.

Technically, you mean?

Technically, and just a good person to work with. He was just strictly business, and I found him real easy to work with and very competent in his field. I liked working with him, a fine person.

He had a tremendous amount to do with the success of the Lake Tahoe project, I understand.

I don't think he had so much to do with that. Now, I'm not sure. Although, he's the first one yes, wait a minute, now. He came when we got the first major job. There were two big pumping plants involved, and they designed those for us; and Ralph had the responsibility. As we went on with the project, I'm not sure how much he was really involved in it; Sid Lasswell was really heading up a good deal of that work.

Can you make a statement of what you think his greatest achievement was?

I think he really built that waste treatment capability there with the younger people like Sid Lasswell and the others coming along. But, you'll really have to get more details on that from the people that worked with him on a closer basis than I did.

Why did you continue working with CH2M?

Because they were very satisfactory to work with, and they had strengths that we didn't. And we did a tremendous amount of work with them without a formal contract. Just a letter agreement as to who was to do what and it worked out fine.

They had goals and philosophies similar to yours?

Very much the same, yes. They believed in high quality work and doing a good job, and they always filled a need that we had; and that was about the size of it.

Earlier in this interview, you said that you saw some difficulties in having a partner in your own firm. Did you see any problems, or wonder how they did it, up there in Corvallis?

Yeh, it was beyond my comprehension that a partnership like that could work; but I could see that it did work.

Why do you think it worked? What were your observations?

Well, that's a good question. One of the things about it was, as near as I could tell, that they kind of drafted Jim Howland as the manager; and none of the rest of them wanted the job. I guess the reason it worked is, that in

spite of differences in all individuals, if they have a common goal and want to accomplish it, they can successfully work together. I think it was amazing. There were actually seven. Earl Reynolds was one of the early partners, too.

He came a little bit later.

1952, wasn't it? Yeh, but it was the four of them, and then the six of them, and then Earl; and then it was some time later that they got the other group in. But I have to admit, I kind of marveled at the way the partnership worked. But it did.

You couldn't find anybody that had similar goals to yourself whom you could invite to join you as a partner?

No, they started out together.

That's the difference?

Yeh, that's the difference. It's hard to bring partners in later. If you start out together, that's one thing. And they knew each other before the war. They weren't strangers. They were, I think, all students of Fred's. And then, I think, Jim went to Harvard and got a masters in soils, I think. And Holly went to what? Yale?

He went to Yale.

And Burke I believe also went to Harvard?

MIT.

Yeh, MIT. I find that kind of interesting because, based on my registration board experience, I feel we have better schools on the West Coast than what I've seen of the East Coast schools, including Yale and Harvard. But, at that time, I know that was the thing to do. A lot of the foresters went to Yale for graduate work. I certainly never had any interest in going to an eastern school; but I think that as far as engineering was concerned, Stanford and Cal Tech are really superior to those eastern schools.

You still believe that is true today?

Yeh.

Do you have anything else to say about their partnership?

No, I don't think so. I just think it was kind of a marvel. There were really six of them; and they did things differently than I did, which is perfectly natural. But I think it was kind of an amazing partnership.

What specifically are you talking about? What do you mean by "differently?"

Well, as I understand it, each of the four of them—Holly, Archie, Jim Howland—kind of split the state into areas. Each took a responsibility for those areas. And Burke didn't quite fit into that picture because his field was electric power, so he really covered the whole thing. But, due to the fact that there were four of them and then six, they could operate that way, whereas my job was promotional activity for the whole area as well as seeing that we

got the work done. And then they got Jim in there as the managing partner, and he was no longer really involved in the public relations and all the other things that go with it.

I spent an awful lot of time on public relations like this California Water Commission. For years, I spent a minimum of 2 days a month, and sometimes it would be a whole week at a time, like if I'd be in Washington for a week. But, offsetting, I learned a lot about water development in the country, which stood us in good stead and also met an awful lot of people. One time, I actually got quite a lot of work for the City of Santa Cruz on an airplane between Washington and San Francisco. The city manager was on it, and I'd gotten acquainted with him; and we got to talking about the design of a couple of bridges. And we designed a water tank for him and a couple of bridges, three bridges, I guess.

Was it coincidental that he was on the plane with you or was that planned?

No. It was just that we'd all been back there at the appropriations hearings for flood control projects in the state; there were around 25 of us from the state back there. He was back there representing the City of Santa Cruz, and I was chairman of the California Water Commission; so I headed up the group. At the time, it used to take about 8 hours to come across in a DC7; I think it was 7-3/4 hours eastbound and 8-1/4 hours westbound or something like that. So, anyway, we were discussing the flood control project, and then the design of these bridges came up. And I said, "I'd like to come down and talk to you about them." Which I did, and we got the jobs.

You must have had a tremendous amount of energy to be the sole proprietor of this organization—to do the PR work and the technical work and everything involved with it. How did you juggle your personal life with your job here and your civic activities?

Well, it was difficult at times. I used to come to the office at 5:00 in the morning, and then go home for breakfast about 7:00 A.M. so that I'd see the kids because I might not get home that night until late. I traveled for years 75,000 to 100,000 miles; but I always tried to make it a point when I was in town to eat at home. And then I tried to make it a point to spend Sundays with them. Then we built this cabin over in Trinity County, and Joan [Mrs. Hill] would take the kids over there for about 6 weeks in the summer; and then I'd fly back and forth whenever I could. I'd try to go over on Wednesday night or Thursday night. And then, oh, probably, if I could go Friday night, but usually it would be Saturday about noon, I'd go; and then I'd come in early Monday morning. Get in here by about 6:00 or 7:00 A.M. So she had a real responsibility. And she was very much involved in that we used to have lots of people for dinner. In fact of the matter, at one time, one weekend, we had 110 for dinner and then 2 weeks later had about 98.

Really?

She decided we ought to have all the people at the office; and she said, "How many are there?" And I said, "Well, with wives, it would be close to 200." And

she gulped and said, "Well, I guess we'll have to split it in half." So that's what we did. And we set up tables in the back yard, and I had to rewire the switch at the house so we could run six of these big GE cookers. She cooked a rice and chicken meal that she makes out in the garage; had all these six cookers there, and I had to put in a heavier service in there so it would take it. But we used to have lots of oh, out-of-town people.

How often did she invite the employees over to your house?

Well, for years, she'd always invite the girls. We didn't have a lot of them. Usually she'd have them for lunch before the annual Christmas party so they could kind of get acquainted. To answer the question, there was nothing regular. If the California Water Commission was here, we might have 25 or 30 for a barbecue in the back yard; and for dinner in the winter, the limit was about 12 because that's about the size of our dining room. But we used to have quite a lot of company of that type. Well, after we merged, for instance, we had a regional managers meeting here; and we had them all up for dinner—and she does a real good job.

She was a real asset.

Oh, yeh. There is no question about that. And she was it was a problem, me being gone so much, especially when the kids were teenagers because teenage kids are a darn nuisance. But everything worked out real good. We don't have too much company other than family anymore. I'm not the manager anymore, and it isn't my place to.

What was your policy about allowing children of employees to work for your firm?

Well, yes, we did a lot of surveying work in those days; and we hired quite a lot of summertime help. Whenever it was possible, I hired employees' offspring. I felt surveying was a good job for young people. I knew they learned how to work. I felt it was an advantage to the employee. Some that worked for us was Bob Harding's son, Rob. Dick Tandy's son, Mike—two kids still work for us.

These men worked more than just seasonally?

Well, most of that was just seasonal work because they were going to school. But some of them did work part-time in the wintertime.

What about full-time work? Did you encourage or discourage employee children from being permanent employees?

Yes, as I said the two Worth boys still work for us.

You had no objection then?

No, I was in a different position than CH2M were with about 12 partners. It could lead to problems. My only restriction was they weren't to work for their fathers. Both my kids worked for the firm all the way through school.

As seasonal employees?

Yes, although Alan worked here about 20 hours a week in the wintertime when he was going to junior college, so he worked essentially year round.

Did you consider hiring him as a permanent employee?

Did.

Oh, I thought this was after you merged in 1970?

No, Alan worked from the time he was 14; and I think he graduated from the university about a little over 20 years ago. Then he worked for the firm clear up until he resigned from here 3 or 4 years ago.

Then he worked for his father in the sense that you were the president of the company?

Well, that's true; but he didn't work directly under me because he was working under whatever the department chief he was working with, largely in the survey department.

Why did he quit 3 or 4 years ago?

Well, that's a long story; and I don't think that adds to this.

The first CH2M employee that you met, other than Fred Merryfield, was Archie Rice?

I didn't meet Archie. No. Ed Worth met him over there, and he visited with Archie. So I didn't meet him. I guess the first one I met was Ralph.

Did you get to know Archie Rice later?

Not until after we merged really. I didn't really have anything to do with Archie. Of course, he left the company for quite a while there and ran MicroFLOC; and so I really didn't have that much to do with Archie.

You don't feel you are in a position to say anything about his contributions or achievements?

Well, now, I'm saying before we merged, I had nothing to do with him. There was no occasion. Before we merged, CH2M worked with us at Beale and at Tahoe. Then I really got them involved in that American River project where they designed the electrical facilities, and that was in Burke Hayes' group; and the one that handled it, I guess, was Bill Watters if I remember right. But as far as Archie is concerned, except on the Board, I've never worked directly with him.

You know that he developed the matrix system and MicroFLOC?

Yeh. Well, the matrix system was put in about the time that I merged with them.

You have similar interests with him. He fishes and hunts too?

Uh, huh.

What projects before the merger were most memorable to you?

Oh, I guess those three I mentioned. Beale, Middle Fork of the American River, and Tahoe. And Tahoe, we worked together for several years.

Are there any projects, not necessarily with CH2M, that stand out particularly in your mind?

Oh. (pause) Well, that Beale project really stands out because, at that time, that was the biggest job we'd ever had; and a city of 1,700 houses and all the support facilities was really a major job.

Did you personally get that project?

Harlan and I got it. Harlan heard about it in Sacramento. We were down in Sacramento, and so we immediately went up to Beale. That's a long story, but we really promoted that together; and I was very involved in that project all the way through even though it was Harlan's project. He managed it.

There are some other very interesting jobs that stand out in my mind. I've always liked bridge work. I haven't personally designed a bridge for 30 years, I guess. But we did get prizes on two bridges that Phil Mather designed, both over on the Coast. And Jack Jensen designed one of the real interesting bridges that we got quite a bit of recognition on. There is a picture of it around here someplace. It was a very interesting job over on the Smith River. I guess another early project we had was the original Shasta College, all the layout for it, all the civil work. The architect, of course, did the buildings. But that was a very interesting job and, for our size at the time, was a job of major size. Since then, they've built a new Junior College and that [the original building] is now Shasta High School.

I guess another one that I particularly enjoyed was Stumpy Meadows Dam and Reservoir, which was a larger dam than any that CH2M had designed at the time that we merged; and there was a mountain canal and tunnel. It was a very interesting project.

Of course, we did a lot of the work for the Pacific Gas and Electric Company. In that old brochure, you'll see a picture of a pack string. That was up on their project. And then that was followed up—we did all the surveying and mapping work for Sacramento Municipal Utility District Middle Fork of the American River project; and then, later, we did the same work for the Placer County Water Agency. We did all the roads and most of the bridges, all of the survey work, for that project for Placer County Water Agency. It was a hydroelectric project of, I think, five dams and many miles of tunnels; and we were on that project for about 3 years, actually. Those are the major ones that I think of.

What do you mean by interesting? Do you mean challenging?

Yes, umm, hummm.

What do you like about building bridges?

Well, to me, a bridge is a very interesting engineering structure. You're not involved with all the junk that you are in buildings—plumbing systems,

electric systems, lights, sprinkler systems. On a construction of an office like this, you might have 15 subcontractors; on a bridge, you might have 2. And it's a much cleaner job, and I find bridges very interesting. Of course, I started out in the State Bridge Department, and that might have something to it.

What projects or events were moments of pride for you?

Oh, I guess, most of them.

(laughter) Okay.

I'll tell you one of the things that I was really proud of was when the Bureau accepted my concept of a dam at Whiskeytown to store 250,000 acre-feet of water on Clear Creek, and control the floods on Clear Creek. I was very proud of accomplishing that, and it's actually written up in the Congressional Record. It's up in the library. But I felt that was a major accomplishment for the county here because, by doing that, we have four big water systems on the west side of town and a huge one of the east side of town, which would not have been possible had they not been tied into that legislation for the Trinity project. I felt pretty good about that. I worked hard on that. And that's one of the things it wasn't direct work for us, but it was a real accomplishment for the area. I don't know, I guess the pictures have been taken down.

So one of your most prideful moments was when they accepted that project?

Yes.

By the 1950s, you had come to know CH2M. Had you met the other principal partners by that time? I mean Holly Cornell and Jim Howland?

No, I didn't meet Holly until sometime later. I don't remember just when I met him.

Who did you come to know the best of the partners?



Jim Howland

Probably Jim Howland. In fact, I was trying to think why I went up. I went up on the train. I remember that train used to get into Albany at 6:00 in the morning; and Jim Howland, I remember, met me there. I don't remember why I went up there or when it was, but I'd say I knew Jim probably better than most of them until later years. And then I worked on an electrical case with Burke Hayes. It wasn't until after we merged that I really got well acquainted with some of the partners. I got real well acquainted with, oh, Sid Lasswell and Wayne Phillips, who is no longer with the company, and those that were working on Beale and working on Tahoe.

Can we talk about Jim Howland a little bit? Did you know him because he was the manager or because of the projects?

Yeh, that's right, because he was the manager.

Can you say something about his achievements, contributions?

Well (pause).

Maybe you want to say something about why you don't want to talk about contributions. You mentioned something before the interview.

No. There's nothing in that regard. It's just that we're all different, and we don't see things the same; but I think that our philosophies were pretty much the same.

As far as Jim is concerned, my dealings with him were very satisfactory. Jim, I'm sure some of them have told you, is a very frugal individual. As Holly commented one time, there were times when it was probably a darn good thing that he was. Jim is a very high type of individual and doesn't believe that rank has its privileges. I don't quarrel with that except for the fact that, as people get higher in an organization, if it works in the way that in my view it should, everything should be taken from them that they don't need to do personally.

Jim is adamantly opposed to secretaries, and I couldn't operate without a secretary. I found out real early that a good secretary could save you more than anything else you could do. In fact of the matter is, after I lost my long-time secretary after I was no longer manager, I found it took me about a day and a half a week to do things that either she did for me or I didn't even know were being done. It just about drove me up the wall. Jim's approach is that a secretary is overhead. I could not have done all the traveling that I did and still keep things running without a good secretary that I could call most every morning. Most meetings started at 9:00 a.m., and I'd usually go to the room at 8:00 a.m.; and she had a list of the people that wanted to talk to me. Maybe that isn't good management, but I didn't have a "number two" as such; and she took care of many of the letters that were ready for me to sign when I got back. So Jim's and my philosophy in that regard are very different. Jim is absolutely honest. A good family type person, very religious person, and just a good citizen. I think that's about it.

Why do you think he had this philosophy of leveling?

I don't know. I've often wondered. I don't know. Did you read that little bulletin he wrote about Chairman Jim?

He has written a couple of them.

To me, it doesn't fit a company like this. He refers to perks. I really don't think that goes with our capitalistic system. The reason the capitalistic system works, in spite of the government, is people's drive to better themselves. And when they better themselves, you're entitled to fruits of your labor, I guess you would say. And I don't understand it because Jim did work out this stock distribution program, which is, I think, a good program, an excellent program; but I don't think it's quite consistent with some of the things he wrote in that book. It doesn't seem to quite fit together to me. Now, maybe you see it some other way; but that's the way it seemed to me.

I never thought about that.

But Jim certainly was a major contributor to the firm by being its manager. Jim meticulously keeps his files personally. Files drive me up the wall. I have to do it now, and the result is that I'm always looking for something.

(laughter)

I find, well, when I had secretaries—Bernie mainly—I never made any attempt to get anything out of the file or put it back because I'd probably put it back in the wrong place.

Oh, you mean she kept the meticulous files?

She kept the meticulous files. And even now, I have to call her up once in a while and ask here where something is. She still keeps my personal books. Of course, I hire her now instead of the company.

So your management styles are very different.

Very different, very different, yeh. For instance, I'd dictate maybe a long and rather detailed letter, or maybe just the outline of what I wanted and let her finish it up. But she worked for me for so long that she was capable of doing it. She was very capable.

I've only had about three secretaries. The girl here now, Shelley, has got kind of an impossible job. She's, what do they call her? Survey Assistant, I guess. So she's got Don, Harry Wilburn, Egon Harrasser, Dave Kelstrom and, I guess, me. So, with that many people to look after, it's pretty hard. But she does a good job.

Is it the philosophy of CH2M and Jim Howland to have one secretary meet the needs of a number of different people?

No, his philosophy was no secretaries; and this is a compromise.

Oh, I see.

Now, I'm not saying everybody should have a secretary. Nobody can afford that, nor do they need them. You go into a lot of offices in Washington, and they've got two secretaries; and neither one of them doing anything. But anybody in a management position should learn how to use a secretary and then use them. Very few of the people in the company really know how to use a secretary. I think if you talk to Carol Wilkinson, I guess she's in Denver now, she's just got too many bosses. I always felt sorry for her. I don't think you can do a good job for any of them if you are trying to do everything for everybody. Perhaps this has changed.

So people in management positions should have their own secretaries?

I don't say individual [secretaries] but at least enough secretarial help that you can personally learn to work together.

How did Jim Howland type his letters and some of his work?

Oh, he had them typed; but he wrote them out longhand. Now, I think he did have a Dictaphone; but a lot of the people in the company write their letters longhand. That's crazy.

It's much easier to dictate them?

You have to learn how though. I had a sergeant in the Army who was a very bright fellow, and he took shorthand at a court-reporter speed; and I used to write out the stuff. He'd come to me and he said, "Well, if you just call me and dictate it, you won't have to write all that out. I'll take it down in shorthand." I didn't even know when I went there that he knew shorthand. I figured he couldn't read my writing is why he wanted to do that.

(laughter)

But anyway I started outlining what I wanted to say and then dictating it to him. It takes some experience to learn how to properly use a secretary; and the more responsibility you can put on most anybody, the happier they are. The fact is my secretary quit after I gave up the management because she didn't have enough to do. She became Harlan's secretary; and Harlan was never used to using a secretary, so she quit. And she'd quit a previous job for the same reason; she didn't have enough to do. But she worked for me 9 years I guess it was, and then she's worked for me ever since doing my personal stuff.

What's her name, Bernie?

Bernadette Nelson. She was a top secretary and a top person.

You said that you worked with Burke Hayes on one project in particular, and that's when you really got to know him?

Yeh. I worked with him. There was a big lawsuit over a parallel power system, and the Pacific Gas and Electric Company wanted me to take the contract, or to work with their attorneys on it. They knew that I didn't have the electrical capability that was needed but asked me to get somebody to work with me. So I got Burke Hayes, and he did all the work. The only reason I had the contract was because I had an ongoing with the PG&E for other work, and they didn't want it to appear in an out-of-state firm.

And so I just got Burke to work with me, and I got acquainted with him on that and then various other things. I think very highly of Burke. I've always enjoyed him. Have you seen him lately? How is he?



Burke Hayes

Well, I saw him the first of this year, maybe March. He's doing well. He has traveled all over the world. He's going to Africa next. Why do you ask?

Turn that off for a minute. [Tape recorder was turned off and on again) A brilliant guy. He's sometimes kind of hard to sit down and get a job done, I found.

You mean because he's off doing other things?

I think Burke is one that tends to work on something that's of interest to him and let other things slide. In my view, a very highly intelligent individual and very knowledgeable in the electrical field, and I think he is very well thought of in the electrical field as an engineer. But I haven't done a lot of work with Burke other than those one or two projects.

He developed the Flomatcher.

Yeh.

Can you think of anything else about his achievements or anything you want to say about Burke Hayes?

No, I don't think there's anything else particularly to say. He's one of the people that I've always enjoyed very much. He's very personable as well as very knowledgeable.

How much contact did you have with Holly Cornell?



Holly Cornell

Very little until after the merger, and then after he became President. Well, he was on the Board of Directors when I was. Holly is, in my view, a very clear thinker and a very competent engineer. I think it's a real loss to the firm.

Because he's retiring.

Yeh, ummm, hummm.

Why do you say that?

Well, I just think that it's too bad to lose all of the knowledge that somebody like Holly has. I found him a great person to work with. I guess we all have to retire. I don't know whether he has found enough to do. He didn't seem to have a lot of outside interests other than golf. I just wonder how it is working out. Somebody told me he still came down to the office every day, and I don't know what he does.

I think he advises on projects. I think that's what he said.

Well, I hope so because he's got a lot of knowledge.

What do you mean knowledge? In what sense?

Just plain horse sense and background of things. You know, it's awful easy to reinvent the wheel if you don't remember how the last wheel was done. Also, you've got to remember the mistakes you made so you don't make them again. I think that's important. But Holly certainly is entitled to retire and do whatever he wants. I hope he finds enough to keep interested. I know he bought a place down in Arizona, but I'm sure he's not down there in the summer time. It's hot down there now, but it's a nice place to go in the winter.

Are you saying that he shouldn't have retired perhaps?

No, I didn't say that. I just say it's too bad. The preparations were made for his retirement. Didn't he sell his home in Corvallis?

Gosh, he didn't say anything about that.

I think he sold it, and I think they bought a condominium, or an apartment or something; but I'm not sure. They had quite an interesting and a very nice home there.

You saw Holly Cornell's horse sense and levelheadedness as one of his contributions?

I think that's true, and there's something else. He's apparently very good at client contacts. I think he and Burke both are very good at that. And that's the name of the game.

Were you implying that one of the reasons you felt Holly Cornell shouldn't retire was because of this mandatory retirement age? Do you want to comment on retirement from the firm?

I don't really know what Holly's desires were, and I just think it's too bad to lose that knowledge that people like Holly have. As long as they've got all their bearings, why not make use of them? Now, I think Burke was ready to retire, as near as I can figure it out, because I think he's just been having a ball since he retired.

Do you want to say anything else about Cornell?

No, I don't think so.

MERGER WITH CH2M

When was the idea of a merger with CH2M first discussed?

I think it was 1967 that Jim Howland came down and asked if I would be interested in the possibility of a merger.

It was his idea then?

Yes. I think it was his idea. I don't know. He's the one that approached me anyway. And the timing wasn't quite right for either of us. I think they had just started this planning group. I forgot whether they were just starting the Portland office or whether they were starting a planning department or what. But the time didn't seem to be quite appropriate. And then I had a computer company that was part of the company, and I wanted to spin it off into a separate corporation; and I was involved in that. So it was a couple of years later before we sat down and really put the package together.

And I think we actually merged in 1970 (looking through his papers for the date).

The end of 1970 and it started January 1st of 1971.

Yes. I thought I had it here, but I've got some other stuff at home.

Why did you see that as a positive move for your organization?

Well, the same thing I mentioned earlier. I felt that we had strengths in structural engineering and water resources and mapping, surveying that complemented their strengths in sanitary and water treatment, and that the whole would be much stronger than we were individually; and we had worked for years on this big treatment project at Tahoe.

We also had a very strong irrigation group and did a lot of irrigation work, in fact, a lot of it in Oregon. And it seemed to me that as far as our people were concerned that it gave them opportunities that they wouldn't have just with our firm. I think it boiled down to, we either had to merge or become head-to-head competitors because sooner or later they had to move into California. And it was a way for them to move into California. And, after all the years we worked with them, I really didn't feel like head-to-head competition with them; and the fact that if we were [competitors], we couldn't work together anymore.

In this case, you saw no problems in accepting partners and sharing the management of the firm?



Howland and Hill Swap Stock

Yes, I did see problems; but you can overcome problems if you have the desire to do so. And besides that, the time was marching on. And, in 1970, I was 61. And there is no telling. You don't know what your future is, and it seemed to me that all the good people that we had would be better off with an on-going company. None of them had had background in the financing, and I had been doing 80 percent of the promotional work; and that had to change anyway. Others had to pick it up. And it just looked like it would be better for both sides, so it was finally put together. As far as problems, the paperwork just about ran me up the wall. I wasn't used to that much paper. The fact is, I didn't pay too much attention to a lot of it, much to the frustration of some people. But it was frustrating to me to mess with it, too.

What paperwork are you talking about?

I don't know. It seemed to me there was more paper flowing through the mill than I'd ever seen before. And questionnaires. And a lot of it I guess was necessary, and a lot of it was unnecessary. Sure, there are bound to be problems; but I think it went comparatively smoothly. Much better than any other firm that I know, and I know a lot of them that merged.

But you felt the benefits outweighed the disadvantages?

Yes.

Were you ready to slow down?

No. That was quite a stumbling block, in fact. I had all the papers and I was reading them all. And I don't usually lay awake at night thinking about things, but I did this particular night. And finally the next morning, I came in; and I called Mike Fisher. I said, "This whole thing has been bugging me, and I haven't known why. And it finally dawned on me that, in your Key Employee Agreement, you have to retire at 65; and I'm in no mood to contemplate retiring 4 years down the line." And he said, "Well, if that's what it is, we'll change it." But, he said, "Our corporate rules are 65." And he said, "Well, what do you want to do?" And I said, "Well, I want, at my option, to stay on as a full-time employee at least until 70. And after that, we can decide what I should do." So the agreement was set up that I stay on full time and then work as a consultant for as long as it's mutually satisfactory. So I retired as a full-time employee 3 years ago, I guess it was.

I think retiring by chronological age is for the birds. But I can see the need of it, too, because you can't afford to have people in a personal service organization that are coasting. You just can't afford that, and an awful lot of people do like to do a lot of coasting. Well, I never have cared about that particularly. But the last few years, we've done a lot more traveling, which we both enjoy.

You and your wife, you mean?

Yeh. We've always done a good deal. The fact is, I never left for 2 weeks. The first time I ever left for 2 weeks was 1970. That was the year after we merged. Before that, I'd usually take a week at a time. And in 1970, we went

to the Orient with an AOPA group. But I didn't want to quit and play golf or anything. I wanted to keep on working.

Now are you ready to slow down?

Well. I've been so busy at various other things, including politics, that I kind of wonder sometimes when I had time to work!

(laughter)

We've done quite a little traveling. And there are just a lot of things I've put off doing both at home and at my little ranch out here, and the place that we have on Trinity County. I don't have any trouble. The fact is, this morning I was working on changing around some of our sprinkler systems and our swimming pool so it's a little more efficient. I put the whole yard on a clock system so we're not tied to the yard to irrigate it, and that's important here in the summer.

So, anyway, I guess the answer to your question is, since I'm really out of the main stream here and don't punch a time clock anymore and don't have a lot of things to do, I still do a certain amount of work. I went off as a director of the State Chamber the first of the year, and that used to take a couple of days a year. I'm still on one of the statewide committees; and I'm on a couple of political action committees, which are things that I've done for years anyway. But I've stayed with those. So, to answer your question, I guess the nature of a corporate operation is when you get out of the main stream; you're just kind of on call.

What did the employees of Clair A. Hill and Associates feel about this merger?

Well, I put it up to them. With the exception of two or three, they felt, in balance, it was the best thing to do. We've lost quite a few of good employees because of the merger because of this matrix system that you referred to. Some of the people have felt that they and their capability weren't being fully utilized, so some of them just up and left. It's too bad because they were good people. But they felt, well, in some cases, that they were more competent than the discipline head they had to report to; and they didn't want any part of it. This discipline system has a lot going for it, but a lot going against it, too. I think it's a good answer, as good an answer as you can get. But it does give every person two bosses, and that's always a problem.

The problem you see is the two bosses?

Yeh. Two bosses; and, oftentimes, the best man isn't the head of the discipline. And everybody is different, and some people just get frustrated by it.

One person described the merger as breaking up a small family.

Yeh. I think that's... was that here?

Someone that worked for you before the merger.

Yeh. That's been a problem is that there's been the feeling that, well, I was always really interested in all our people; and they were a very loyal group. And they felt, by the merger, that we didn't have the tightly knit group that we used to have; and it was true. It's too bad, but I guess that's one of the penalties of growth.

You think there was no way to avoid that?

Yes, I think there was. But I think what's probably been said to you is that there was a feeling of some of our people that a lot of people in Corvallis insisted that theirs was the right way to do it and wouldn't listen to anybody else. And there's a lot of truth in it. And so it was, some of them said, "Well, to hell with that. I'm not going to go along with it." So they left, and it was too bad.

Are there other problems that were caused by the merger? You've mentioned some.

I think those are the main ones. Personnel problems.

One of the real problems, too, is people were forced to move; and a lot of them didn't want to move. Every company has that same problem. Bob Charley in Portland came from here. Dick Morgan came from here. Ken Wengler in Florida. Two or three others that I can't think of right now. In Boise, the head of the survey group. The head of the water resources group, Mike Mickelson, came from here. And in Denver, Mike Stansbury, head of WR group and the head of the survey group there. In other words, it's been a real drain to train the people here and then transfer them someplace else. I think it was a bigger problem with us than it was in the other offices because we didn't have as large a group. I guess somebody else just went to Denver. A whole group of them just went up to Yakima. That's the way it is. But it does cause problems.

One person mentioned to me that one problem was that CH2M left your organization as an entity, and therefore that your organization didn't penetrate CH2M and CH2M didn't penetrate yours as it might have otherwise.

(pause) I don't know what they were referring to there because I don't think that was it became a regional office.

It wasn't assimilated into the organization fast enough at first. This is what this person was saying.

Was that here or somebody up there?

Up there.

Yeh. I think the answer to that is they wanted all the assimilation on our part and none on theirs. That was one of the problems. The feeling that the CH2M was the right way, and it was resented. On the other hand, well, I'll give you an answer, an example. We have a very fine printing machine that we bought before the merger because we'd worn out two or three of those others; and they just didn't do precision work. Well, they were working up

plans for that new print shop up in Corvallis, and they had space in there for this German printing press that we have here to move it to Corvallis. And you can imagine how that went over.

Was it moved?

No, it wasn't moved. But those kinds of things were really resented. And the fact is Duane Hickey came down here, and he figured that should be moved up there. Well, I admit they needed one; but I don't know what they figured we would do—send our printing up there. Well, I'd been through that, and that doesn't work. That's why we developed our own print shop. So, anyway, any number of those things did happen.

The same thing happened in the soils lab. There was a push to... In fact, they sent a manager down here; and we lost all the local work as a result of it because he had no feel for the local work. There were those problems, and you're going to have those kinds of problems. I think there was probably resistance to change here, but there was no intention or desire to change on that side. So it was resented; that's all.

Do you have any regrets about the merger?

Oh, no. I think it's been better for everybody. I think that it's too bad there wasn't a little better understanding, and a little more give and take on it, instead of all take.

One of the things that was really resented was switching us over to an accounting system that, in our view, wasn't as good as ours. Now, they've got a new system that, I guess, cost a million dollars. But we had a good operating system, but they refused to accept it. So, sure there were problems. There are problems in anything.

Seeing Secretary Watt [James Watt, Secretary of the Interior] up here on the wall. I don't know how close you follow national politics, but I think he's doing a lot of things that had to be done; but, boy, is he getting blasted for it. Ed Meese there, who is counsel to the President. The last time I talked to him—I knew him when he was in the state here, he was Reagan's chief of staff here—tremendous problems. But that doesn't mean that you can't work around them and keep making progress. I think we've made a lot of progress. I think we have probably the finest company in the United States, and in the world, probably.

I think we have to keep new management teams, but they do lose the personal feel that we had here. One of the differences is, I think for good reason, the wives of CH2M had essentially no contact with the company. My wife was very much a part of the company. She knew all the people, and it really bugs her now because she walks into the office and knows so few of them. So it was different. There's no question about that. And a lot of the older people notice it.

How are you taking measures to pass on your philosophy and your way of operating to the new management? Is that being passed on in some way?

A lot of the older people, I think, have grown up with it; and so, to some extent, it does pass on. There is an interesting thing about people; I've seen it happen not only in this organization. When a person moves out of a job, the person who takes it over feels that it's his responsibility, and whether he is insecure and doesn't want to ask advice or whether his ego gets the best of him, I really don't know; but it accomplishes the same thing: they will seldom ask the person who had left that job any questions. And it's not only with me. That's the way people seem to be. Maybe it's a little insecurity that shows up kind of in reverse and maybe it's the feeling that, well, it's my job to do; and I've got to do it my way. I really don't know, but I see things happen once in a while that I thought, "What in the world are you doing that for? We tried that, and it didn't work." But, I don't know. As long as you have people, you are going to do a certain amount of reinventing the wheel. Maybe it's a better wheel, I don't know.

So you think that CH2M HILL will prosper even though they might not take all the advice from the founders?

Oh, yeh. There are a lot of good people coming up. And, technically, the knowledge these young fellows have when they come out of school compared to what we had was like night and day. They are tremendously well trained. And I think more effort is going in to teaching management principles. In fact, when I was still manager, I had some of these Dale Carnegie courses set up. And I paid for them, and I practically made Toastmasters a command performance for the young engineers because very few of them could speak; and I think all of those things helped. And I think they are still doing it as far as I know; I haven't paid that much attention to it. So, yeh, just because the way I did it isn't necessarily the right way. You know, everything has got three sides. It's got the right side, the wrong side, and the correct side.

You're probably right.

So, it's like. . . . Well, anyway, everybody has to do things their own way if they are at all a dominant personality. And if you are not a fairly dominant personality, you shouldn't be in a management job anyway.

Well, it would seem that there had been a formula that accounted for the success of CH2M and Clair Hill and Associates; and I wonder if that formula is being passed down.

Oh, I think so, I think so. Yeh. And I think the management will work out. I think Harlan has done an excellent job as president of the company. He's very unfortunately had a real upset in his family life. But those things happen. It's too bad. I don't know just how soon he's moving to Denver. His office I think is still here. It was the other day anyway.

Whose idea was it to add the "HILL" to CH2M?

I don't know. There was a big controversy, "Well, what do we call this new beast?" Their official name was Cornell, Howland, Hayes, and Merryfield. And mine was Clair A. Hill and Associates and Mike Fisher called it CAHA, which I

didn't like. But there was a lot of debate about what to call it, and I don't know who made the decision.

You didn't have anything to do with it? I mean, you personally wanting to have HILL added on?

Well, I just said that, to work in California, we had to continue the name of Clair A. Hill and Associates; and we did for quite a while. And even today, I'll meet people; and they'll say, "I know who Clair Hill and Associates is, but who is CH2M HILL?" We're still not nearly as well known in California as CH2M HILL as we should be. We've made a lot of progress in the last 2 or 3 years; but before that, it was very important in California to maintain the CH2M HILL because I was the one that was involved in all of the statewide activities. What I thought we ought to be was Clair A. Hill and Associates, a subsidiary of CH2M. I think it would have been better than the way it was. You know, the State of California has 10 percent of the people in the United States and probably close to 20 percent of the industry of the United States. And the State of Oregon is 1 percent or a little less than 1 percent of the people in the United States and probably less than 1 percent of the industry. And in Los Angeles and San Francisco, Oregon is on a different planet; and that has never been understood by the old CH2Mers. Everybody has their ego; but, in my view, it would have been better to maintain the name that I'd been 25 years in advertising personally.

You couldn't convince them?

No. I lost. So, where the name CH2M HILL came from as a compromise; I don't know. But when they took that sign down off the front of the building, they said, "What do you want to do with it?" And I said, "Well, I can use the metal doing something." And one of the fellows said, "I'm going to put it up down in your office." And that's what he did. [It is hanging on the wall facing Clair Hill's desk] Clair A. Hill and Associates, Consulting Engineers. So there's all that's left of it. (laughter)

Well, your name is still part of the firm's name though.

I didn't look forward to the merger as such. I liked it the way it was. But I really felt, for the reasons that I've said earlier, it was the best thing to do. And I think it was.

I'm going to ask a question unrelated to your last statement. What did you think about hiring women as professionals in your firm?

Well, I'll tell you an experience. I was asked by a former classmate of mine, who was a professor at Stanford, to come down and talk to the graduate students in sanitary engineering, which I was very happy to do. I hadn't been on the campus for years. So, when I got through, the prof said, "Some of these people would like to talk to you. Would you talk to them on a one-on-one basis?" And I said, "Sure, I can stay all afternoon. I'd be happy to talk to any of them."

So there was one woman in that graduate class, and she came bouncing in; she had kind of a chip on her shoulder, a bright girl. She said, "Would you hire a woman engineer?" And I said, "Yes, I'd be happy to. But if you're referring to yourself, let's discuss it a little bit. I see you have a ring on your finger. What does your husband do?" Well, he's doing such and such. Next year, he is going to be a research assistant at Davis. I said, "Well, our office, you know, is in Redding. Who's going to commute?" I said, "We have a woman now working in the computer department whose husband is going to school in Chico, and they live in Corning. So she has an hour commute each way, and he has about an hour commute and that's pretty equitable. But," I said, "In your case, it's about 2-1/2 hours between Davis and Redding; so a daily commute isn't practical. Where are you going to live?" "Well, we haven't discussed that." And I said, "Now there is another thing. Our people, due to our location, do a lot of traveling on projects." And you have to recognize, this is close to 20 years ago, now. So things are a little different, but I think some of the problems are the same. "Our people do a lot of traveling, and a lot of places they are out in a camp some place. I'm not sure how understanding your husband would be of you going on a week's trip with somebody else." "Well, I hadn't thought of that." I said, "Well, I've seen your qualifications, and I think you're well qualified for the couple of jobs we have open. And if you see an answer to these problems I see, get in touch with me; and we'll discuss it."

Well, your age and your generation and mine are different. But I see these women on survey crews. Now, thank the Lord, I didn't have to put up with that because we have three people oftentimes staying and being gone a week at a time. And I know I had enough wife problems with fellows being out of town for a week and 2 weeks. And if they'd been out of town with some other gal for a week or 2 weeks, regardless of either one of them, I'd had more troubles; and its troubles that I just plain didn't need. I don't know how many of the girls around here live with some guy and aren't married and all. It's none of my business. But it's not an era that I grew up in.

As far as hiring women engineers, well, let me tell you. For about 15 years, Joan and I have given a scholarship to graduates of Shasta College going on to the university. Most of the money has come from the employees in the Christmas present to us, and it's usually about \$600 a year; and then we supplement it if we have to. In the last 4 years, I think three of the recipients have been women. So, I'm all for them and would be happy to hire them.

Times have changed, so we don't have some of the problems we had 20 years ago in some of the remote locations we used to work in. But if we hire a woman engineer here and she's married, there's not that much opportunity for a professional husband in the area. We have a lot of girls working here—well, Bette Primrose, maybe you've met Bette. She's a very aggressive person and she does a lot of traveling. Her husband is a truck driver—a local truck driver. And I take my hat off to Bette that she's kept her marriage together with all the traveling that she's done. But whether it's

right or wrong, women supervisors are resented, often more by women than by the men.

What?

Yeh. They are. And why, I don't know. But I've been kind of amused at times, watching. Don't get the impression from what I say that there hasn't been a vast change in the last 15 years or so; there has. But change is slow in coming. Career women in an area like we're in, there are problems. Do you ever read Harry Schultz? He's a very fine financial writer.

The name sounds familiar but I don't know.

A brilliant man. He lives in London. He travels continuously around the world. He was married to a woman—Dawn Schultz—who's also a brilliant woman. She lives in New York, and we went to a financial seminar last February. She was on the program, and Joan went to her program; and I went to another. And in commenting on Harry Schultz— they are very good friends—she said, "Harry was a fine person but impossible to live with." And I think that's true of a lot of very bright people, especially career people. I know it was hard enough on both sides when I'd be gone for a week at a time away from home, especially when the kids were growing up. I think it would take some real understanding for a wife to be gone.

You think it's different for a woman than for a man?

Terrifically different, and I don't say there aren't reasons. I think we made a heck of a mistake not hiring Roberta, who is one of these girls that we gave the scholarships. She graduated from Chico State, and she worked here summers and demonstrated her ability; and I think we should have hired her.

Why wasn't she hired?

Well, my understanding was they didn't have a spot for her. I think they should have made a spot for her.

Oh, this is recently then.

Yeh, this is a couple of years ago. My experience is if you see a good person, you hire them. And you'll soon be able to find a spot for them pretty fast, especially when they are pretty versatile. But as far as hiring women engineers, if I were doing it, I would be real happy to hire some of them. But I think that the whole situation would have to be looked at to be sure it would work for the company and for them personally.

In what ways?

I think women are underpaid. I paid as much as I could, but I couldn't get completely out of line with the State Highway Department who was paying their secretaries and all their other women employees less than they paid their rear chainmen. But, to me, paying a rear chainman more than you paid a girl running one of these complicated—I don't know what you even call

them anymore. We used to call them a typewriter, but I don't what you call them anymore. To me, she's worth a lot more than that rear chainman is when you can go out and hire another one on the street if you don't like him.

I think the supervisory women are underpaid. At the time we merged, if I remember right, I think my secretary was higher paid than the highest paid woman in the Corvallis office; and I don't consider she was overpaid. She was worth what I paid her.

Do you remember the first woman professional that you hired at Clair Hill and Associates?

I never hired a woman engineer. They weren't available.

Even up to 1970?

Well, see, very few were available; and very few of them [applied for work here]. I don't ever remember getting an application from a woman engineer up to 1970.

Looking back over the years, if you had the opportunity to do it all over again, what would you do differently?

(laughter) What would I do differently? You know. My wife, at times, asks, "If you had to do it over again, what would you do?" And it's something I never dwell on. It's done, and I'm not going to do it over again; why worry about it?

Your reflecting back may help someone in the future when they read this.

Well, I've really never reflected on it. I always figure that what's done today can't be changed tomorrow, and so why concern myself on it. In my view, we made some mistakes in negotiating our merger agreement, but they were the best we could do at the time. And so, that's the agreement we made, and that's what we live with.

Do you have a sense of satisfaction over what's occurred?

Yeh, yeh. The biggest thing that was wrong with it in my view was the way the program was worked out. Our employees for 5 years just got half the Key Employee Bonus. Mike Fisher worked that out. And he worked it out on a computer program that showed a lot of things that; but anyway, I would have never accepted that another time because, in my view, it made them second class citizens. And it caused a lot of resentment. It caused probably more resentment than any other one thing. And it still sticks today in the craw of some people because what it means is somebody in CH2M with this much stock at that time, and one in the same position here, are like this now. It's a stock bonus, you know; and it was not equitable. But that was the thing; the way it was. And when they talked about doing the same thing with Black Crow and Eidsness employees, I told them, "We made a mistake last time; let's not make another mistake."

Did they follow your advice then?

Well, what brought it up was the proposal to give stock with the same benefits as to our people who had gotten half benefits. And so at a meeting, I said, "We made the mistake once, let's not make it again. There's nothing we can do to correct our situation." And I said, "Frankly, I think I made a mistake." I think that was probably the biggest mistake we made, right there.

Has economics ever been the primary guidepost for your firm?

I would say no, but you have to qualify it that any firm that doesn't make a profit doesn't stay in business. So from that stand point, it was a primary goal. It should not be to the detriment of quality work. That was our primary goal was to do first class work, and I think it paid off. Even if we had a job that was losing money, we did not short the job. We finished the job just the same as if it were a very profitable job. So from that standpoint, you wouldn't say the primary goal was economics; but it is important if you are going to stay in business.

I'm leading to another question. To what extent does the engineer's responsibility to the public come into play? Like in issues dealing with land use planning, or where the public interest is versus engineering feasibility. Sometimes they don't coincide.

Well, (pause) I guess I have to say that you have to be a good citizen. In fact, to me that is one of the most important things to be a good citizen. We have, and I'm sure most dedicated engineers have, turned down jobs that we felt were not good for the area, the country, or what have you.

Can you think of examples?

Yes, some of the subdivisions some of these people wanted to make we felt would be very detrimental to the people that purchased them... In that particular case, the county had to pick up the maintenance on them later. That's probably a field that has been kind of a black eye in the engineering profession in a lot of places. They subdivide areas that should never have been subdivided. I remember looking at one over on the coast. An engineer from Los Angeles asked me to joint venture with him. I told him, "no way." We'd map it for him if he was going to do it, but we didn't want any part of that subdivision because it's a very unstable geologic area. Most of that development work in that coastal region has caused a lot of problems, and I want no part of it.

So even though you were aware that some other engineering firm would probably subdivide and make a profit, you were willing to forego that project?

They did. I didn't want any part of it though.

Are you the exception or do you think that's . . .

I don't think so. I think there are a few in the field that are willing to do anything, but I don't think that we're the exception. I think the engineering field, by in large, has very high ethics; and I think you only have to look at

the number of people that contribute on public boards of many kinds—school boards, utility district boards, hospital boards—you name it. I think they're a very dedicated group of people.

So you think most engineers feel they have a responsibility to society?

I don't think there's any question about it. There's always a dispute because there's nothing that's black or white.

So you think your philosophy that we discussed previously about the engineer's responsibility to society has been passed down to CH2M HILL?

Oh, I don't think there is any question about .it.

How was that done? Was there a program about this issue or was it by example or what?

(pause) I don't know if it was ever taught. I think it's something people learn.

So you think there's some responsibility by the engineers to get politically involved?

Very much so.

Did you have something to do with forming this group?

No. It was formed by a very prominent man in California. I was asked to chair this district—there are 426 Congressional districts and there's a chairman in each one—a woman who was the Minority Leader in the Assembly until she decided to run for Lieutenant Governor, and she lost. Some people largely in California came up with the idea [of Citizens for America] and presented it to President Reagan and his staff. Many of his staff were Californians; they were very enthusiastic about the idea. It's just been put together in the last 6 or 8 months by a group of people, some Republicans, some Democrats. The purpose of it, as I say, is to inform the public of the facts on these problems.

You have always been politically active throughout your career, haven't you?

Yes.

Have you encouraged others in the firm to be active as well?

Yeh, many times when I've heard them complain about something the school district was doing, I've said, "Well, put your effort where your mouth is and run for the school board." And a good many of them have. The only thing they can't run for is jobs, which would be a conflict of interest.

I would like to change the subject. How has the increasing specialization in various areas of engineering affected the operation of the firm?

Well, it caused us to develop all the specialties in order to have a fully integrated firm. It was one of the reasons for our merger that we had strong surveying, mapping, water resources, structural—as well as a good name in California. CH2M had strengths that we didn't have—electrical, mechanical.

In fact, we worked together 15 years before we merged. I think we'll always have to joint venture, subcontract with others who have expertise that we don't have. There's no way, except for somebody like Bechtel, that you can have everything. We've even worked for Bechtel.

So it's not possible for a consulting engineering firm to have enough capability to meet all the demands then?

No. For instance, we often use financial consultants for financing of projects. There would be a lot of examples that others could give you better than I can. I have never hesitated. If it's a project that requires expertise that I wasn't comfortable with, I would get somebody who was.

So there are several areas where CH2M HILL has not tried to compete?

Well, I wouldn't go that far because I think we probably have about as broad a technical field as any company in the country; but there are still things where we need outside experts in certain fields. Well, I'll give you one. Geophysical exploration. We don't have the equipment or the capability, the last I knew, for this seismic work in the geotechnic exploration. And there are others. I can't quote them offhand. We now have quite a strong mining group, but for a long time we didn't.

You've developed areas along the way depending upon demand?

And depending on availability of people we needed. Experienced, well-trained people are hard to come by. If there's a particular field that you haven't worked in, you don't hire a recent graduate and put him in charge of the department. You need somebody who's had a good track record.

Why are good people hard to come by?

Well, (pause) if somebody has been with a firm for 10, 15 years, and if he's happy with the work, but he has the expertise we want, why does he want to leave there?

Why would he want to come to CH2M HILL? Is there something your firm has over other businesses?

Oh, I think we do in a lot of ways; yes. In the first place, we're an employee-owned firm. Many of the other firms are not. For instance, Bechtel organization; it's a very closely held company. Kaiser Engineers, International Engineers—the people there, even though they get a good salary and a bonus, they're not part of the company. And a lot of engineers like our employee ownership program. I think it's one of the best programs in the country. I know one major engineering firm that's been in business for a long time. Last I knew the firm was still owned by eight partners. I think it's changed now, but that's one of the reasons [why CH2M HILL is attractive to potential employees]. There's other reasons. We have some very good people who came from Harza Engineers. Harza's work is about 90 percent overseas. They [some Harza employees] got tired of living in Arabia, Iran, Indonesia, and South America. Their kids were getting to the age they

wanted to go to American schools, or they didn't want to be away from home all that much. We hired a good many people from them.

A major pull to CH2M HILL is the employee ownership program?

Yes, I think so.

Are there other reasons?

One that I just mentioned was the type of work. We're probably 90 percent domestic and 10 percent overseas. Other firms are as much as 80 to 90 percent overseas and 10 to 20 percent domestic. That gets tiresome. And it's difficult for families too.

Do you think that CH2M HILL should expand more rapidly into the foreign sphere?

Well, I personally don't; but I'm not in the position to even discuss that because I'm not that involved anymore. But I always felt that our big opportunity was in this country where we understand the language, understand the ethics, understand the government; and I was never interested in trying to figure out how to work in a foreign country. Everything is different throughout the world, and I don't say that we shouldn't be working overseas. I think it's very good for the company, very good for the people. But I would not like to see us become very highly dependent on overseas work.

Because of the cultural differences?

Just a lot of reasons. The different culture, the difficulty of having people do that overseas work. If you want more information on that, you'll have to talk to some of these fellows who have spent 10 or 15 years circling the globe. Some of them like it, but not too many of them do. They get tired of it. I had one fellow who left some years ago, and he spent the rest of his career in various parts of the world; but he had no kids. His wife was very active, and she went along. They were in Thailand; I don't know where all they were. I used to get letters from all over the country. He liked it, and he liked the pace; it's a slower pace than we set.

Can you think back and think of some of the more humorous moments in your time as a part of Clair Hill and Associates?

(pause} Not offhand, I don't think I can.

THE FUTURE

Where do you see CH2M HILL heading in the future? More mergers? Expansions? Going into different areas of work?

Well, I'm not one to speak to that because I'm not that closely involved with management anymore.

I feel of necessity we should get into more in the energy field and more in the industrial field. And I feel very strongly that more attention should be paid to Southern California. After all, there are 13 million people down there. And it's the financial center of the Pacific basin. And we ought to make that office much stronger than we have, probably by an acquisition. But I'm not in a position to; nobody's asking my advice on it. But I felt that if we'd spent nearly the effort in Southern California and the San Joaquin that we spent in some other places, we'd be way ahead.

I don't know how much overseas work we'll get into. My view has always been that there are greater opportunities in this country than there are chasing all over the world.

How can historical information about the firm's past be useful today?

(pause) I think it helps build an esprit-de-corps for one thing, and I think that the younger people can see what has been accomplished over the years. I think it helps give them goals. I think also it shows the stability, and that's important to younger people. I think that there's one thing that history if it gets in there, I doubt very much if it will, is that you shouldn't have to reinvent the wheel. The only way you can do that is to know the history.

What place do you see these oral histories fitting in?

Well, are you a history buff?

Yes, I like studying history.

Well, I think you've answered your own question. I think that the history of the country, the history of a company, is important to most of us. I think we learn a tremendous amount about it.

You know, I'll give you an example. In the middle '50s, I was chairman of the California Water Resources Board, which was working on the development of what became the California Water Plan. It was the biggest water development program ever accomplished by any state, any country, in fact. There were so many trials and tribulations on it—political problems, legal problems—the engineering problems seemed kind of simple compared to the others. But during that period, I happened to be in Washington, D.C. at a meeting, and so took a couple of days when I got through and went down to Williamsburg, and watched that film there that gave the trials and tribulations at the time that led to the Declaration of Independence. Frankly, when I came back, I felt if they could solve those problems, we could sure

solve ours. It's an entirely different field; but if people in that era could solve the horrendous problems in that regard, we could sure solve this one.

We did. We built the project. So I think even if history isn't in your field, I think it maybe helps us. In fact, I've been so impressed with the history of our country that we've taken both sons and all our grandkids to Williamsburg over the past 25 years and had them visit the Library of Congress, the Smithsonian Institute, and see the Congress in action. We've just got one [grandchild] to go; and whether we'll ever get to her, I don't know. She's still pretty young. Anyway, I think knowledge of the history of our country, our company, is very helpful.

They're lucky kids. What are your goals for the future?

What are my goals? My grandson, he is in the eighth grade, I guess; and he is a very bright kid. And they gave him one of these Apple computers for Christmas. And the other day, he said, "You know grandma, I put you in my computer; and you are going to live to be 93."

(laughter) Grandma or grandpa?

I think that was grandma. I don't remember which one. It didn't make any difference. But, anyway, since I retired, if that's what I've done, I've been spending an awful lot of time studying finances. I find it fascinating. Gold, silver, stocks, not bonds. Not stocks so much but really the hard metals, and we've gone to several of these investment conferences. I find them fascinating. I was on the board of directors of a bank here for quite a while, and I'm now chairman of the technology committee. Banking is changing like engineering. Pretty soon, you'll be banking with your phone.

I think as long as we're able, we'll do considerably more traveling. In fact, we're going to Scandinavia next week on a Stanford alumni Viking cruise. We are going to Denmark and Oslo, and Bergen and on up to the Arctic Circle and back to the Shetland Islands, Orkney to Edinburgh, and England. We were up in Canada a month ago. We took two of our grandsons and went up to Campbell River where I've wanted to go fishing for a long time. And we had three of the grandsons up in the Trinity Alps the week before last. So, those kids seem to keep us pretty busy.

How many grandchildren do you have?

We've got six. Alan has four and Malcolm has two. And we've had five of them in Washington, D.C. and Williamsburg and Boston.

Now, one of your sons is a doctor and one is an engineer.

One is a doctor and one is an engineer, yes.

And the one that's an engineer, Alan, he works for CH2M HILL?

He works part-time now. He resigned about 2 years ago and sold his company stock back to the company. They wanted him to go to Atlanta and Denver. He spent 2-1/2 years in Alaska. He said, "I'm going to stay in

California. I think that's where my opportunity is; and if the opportunity isn't there with the company, I'll leave." Which he did. But he still works on a consulting basis with the company. So, he's involved with a good many other things. He's a director of one of the local banks, and he's involved in some real estate and other activities.

What is the place of the engineer in our society?

Too bad Fred Merryfield isn't alive. You could ask him that.

Why? What do you think he would say?

I don't know. That's why I say, "Ask him." Well, telephones, space museum, utilities. There isn't anything that we use today that isn't an engineering project whether it's an automobile or a space shuttle, so the engineer is becoming scarcer and more important.

Scarce?

Yes. They are, have you checked the graduates?

Have they gone down?

I'm not sure if it's gone down, but it hasn't gone up in proportion to the population. I haven't looked at it lately. But last I knew, I think, percentage-wise, it had gone down. There for a while, you know, engineering like medicine and some of the other fields, the training is hard, and fewer and fewer seem to want to work that hard. Now, I think that's one thing the depression will do is change some of that because people won't get that silver spoon. I know it's hard to say, but there is no question that we have lived too high on the hog.

Do you have anything else you'd like to say about your time with the firm, and about Clair Hill and Associates and CH2M HILL?

Oh, I don't think particularly. I may have told you this before. When I came out of the Army, I happened to be over in Trinity County, which is a little county west of here; and they had a judge who was a very fine individual whom I knew. And he said, "What are you doing?" And I said, "Well, I'm back in the engineering offices I was before the war." And he said, "Do you like what you're doing?" I said, "Yes, I find it real challenging and enjoyable." And he said, "Well, that's good. Life's too short to get all your pleasure out of playing." And I thought it was a pretty good remark. I have very much enjoyed the engineering business. I enjoy seeing the things that I've had a major responsibility in: the bridges, the buildings, the master plans, the dams, the recreation facilities. We've done a lot of recreation work. And the fact that we've got two fine sons, two fine daughters-in-law, and six fine grandkids. I intend to continue to be active in politics. I think that the lack of interest and lack of knowledge of the general public is what's gotten us in to the mess we're in. I think that the people should participate in electing government officials and support them.

End