

CHEMICAL HERITAGE FOUNDATION

ROBERT N. NAUGHTEN

Transcript of an Interview
Conducted by

David C. Brock

at

Saratoga, California

on

24 January 2007

(With Subsequent Corrections and Additions)

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This oral history is part of a series supported by grants from the Gordon and Betty Moore Foundation. This series is an important resource for the history of semiconductor electronics, documenting the life and career of Gordon E. Moore, including his experiences and those of others in Shockley Semiconductor, Fairchild Semiconductor, Intel, as well as contexts beyond the semiconductor industry.

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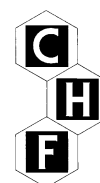
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ABSTRACT

Robert N. Naughten grew up in rural California during the Great Depression. He attended Sequoia High School and met Gordon Moore partially through football and swimming. Moore and Naughten commuted from home to San Jose State University for two years before moving to University of California, Berkeley. The two became roommates and were part of the co-op program. Upon graduating from the pre-med program Naughten was called to participate in the Naval Reserve's effort in the Korean War. After returning from two tours in Korea, Naughten migrated to the East Coast to attend medical school at Hahnemann University in Philadelphia. Returning to California for an internship at Highland General Hospital, Naughten and his family endured several years of economic hardship before he opened a private practice in Los Gatos, California. Naughten and Moore only reconnected at a recent Berkeley alumni event. Naughten concluded the interview with reflections on the philanthropic contributions of Gordon and Betty Moore and traits that make Gordon Moore an ideal CEO.

INTERVIEWER

David C. Brock is a senior research fellow with the Center for Contemporary History and Policy of the Chemical Heritage Foundation. As an historian of science and technology, he specializes in oral history, the history of instrumentation, and the history of semiconductor science, technology, and industry. Brock has studied the philosophy, sociology, and history of science at Brown University, the University of Edinburgh, and Princeton University (respectively and chronologically). His most recent publication is *Understanding Moore's Law: Four Decades of Innovation* (Philadelphia: Chemical Heritage Press), 2006, which he edited and to which he contributed.

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INTERVIEWER: David C. Brock
LOCATION: Saratoga, California
DATE: 24 January 2007

BROCK: This is an interview with Robert Naughten, by David Brock, taking place in Saratoga, California, on 24 January 2007. Dr. Naughten, I thought I would begin by just asking you when and where you were born?

NAUGHTEN: I was born 13 October 1928 in Stockton, California.

BROCK: Had your family been in California for some time?

NAUGHTEN: Some time, yes. As far as we can go back on my mother's side—an Italian family—they came here in the 1790s.

BROCK: To Northern California?

NAUGHTEN: Northern California, right. From Chiavari in Italy.

BROCK: Was your mother's family involved with agriculture?

NAUGHTEN: Yes, agriculture, at that time, near Sonora [California].

BROCK: Could you tell me a little bit more about that?

NAUGHTEN: Well, the two brothers arrived there in 1790 approximately, and they were felt to be two separate families. One lived in the southern part of Sonora. The other was in the northern part. Unfortunately their families intermarried, because those were the only people that were there. The last generation was Uncle Louie and Aunt Dolly, which were my great great aunts and uncles. They had two girls, no boys, and they did not want to adopt anybody. There

are some distant relatives still up there. We heard from some lady who worked in a bank. She said, "Oh no. No. They come in all the time, Volpone." That's the family name. It's V-O-L-P-O-N, either with an I or E. That's where the confusion occurred. I remember going to their cherry orchard, and my dad and I would pick one cherry and eat two, and I ended up with an upset stomach. [laughter]

BROCK: What about your father's side?

NAUGHTEN: My father's side was Irish, and they came to California through two interesting areas. One was Ellis Island, and our name is there at Ellis Island. Then they went across the Sioux Indian country to Butte, Montana. They were in mining, and then my father came to California. A common Catholic marriage in California at that time was Irish and Italian.

BROCK: What brought your father to Northern California?

NAUGHTEN: He ended up with a very small mine, up in the Sierras, and that helped us through the Depression. Then he went into more civil engineering with construction work. He was the chief on building the linear accelerator at Stanford [University]. And the United Technology Missile Center down here, below San Jose. So, he did a lot of big construction.

BROCK: Did he have an engineering education?

NAUGHTEN: Yes. He had some. He was at the Montana State School of Mines, and then he went to Berkeley [University of California, Berkeley] for a short time.

BROCK: And was it a metals mine then?

NAUGHTEN: Yes, it was a gold mine.

BROCK: For how much of your childhood was the mine an active concern?

NAUGHTEN: The whole time we lived in the area. We went through the fourth grade there. The school was in Melones, California. I recently saw my teacher, who had educated us through the first four grades. She settled down here when the school closed. There were fifteen children in eight grades. [laughter] That was it.

BROCK: A one-room schoolhouse?

NAUGHTEN: Oh, very much one room.

BROCK: Was it a quite rural area then?

NAUGHTEN: Very rural. There was a mine that wasn't really producing much, and that was the only industry that they had. Dad and my grandfather Dougherty, who was my mother's father, used to go over and I used to go over with them. My grandfather had one of those pumper things on the railroad track, and they would go over, mine it, take the ore, and when they actually finished crushing it, they would put it on a concentrator table with mercury, which would dissolve the gold. Then they would take the gold—why we didn't come down with mercury poisoning I don't know—but they would fry it in a frying pan to drive off the mercury, and then take that gold into Sonora. That was our income.

BROCK: Did you have siblings who were working?

NAUGHTEN: I was the oldest of five. I have three sisters and a brother.

BROCK: Were your grandfather and your father the two people principally working?

NAUGHTEN: Yes, the two principal people.

BROCK: You lived there through the fourth grade?

NAUGHTEN: Yes, fourth grade.

BROCK: So, that's around age ten?

NAUGHTEN: Right. And then we moved to San Andreas for a year, where there was a huge school. There were three hundred kids in eight grades. [laughter] Nothing like what I was used to. Then we moved down on to the Peninsula just before World War II, and we lived in

Woodside for two years. After that we moved to San Carlos, and that was when I went to Sequoia [Sequoia High School].

BROCK: Okay. So, you were in Woodside for middle school or junior high school?

NAUGHTEN: They didn't have middle schools then. I was there for sixth and seventh grade. It was a tiny school then. I don't remember the numbers, but it was a very tiny school. It was a one-room school.

BROCK: Did the Depression make much of an impact on you and your family?

NAUGHTEN: Well, you see when you're living at that level you don't have anything to compare it with, so you don't know whether it's good or bad. That's just what you had. We did have NRA [National Recovery Administration] stickers on our window, and we had a radio. There were several companies trying to become what eventually became PG&E [Pacific Gas and Electric Company], and they were terrible people. They would blow up transformers. They would cut down trees. So, we didn't have a lot of electricity very often. One broadcast I heard was Orson Welles' "War of the Worlds," and we were all not sure. If you'd heard the beginning it said that this was not true, but that's one of the few broadcasts. But, we didn't get much then. We'd heard some of the Fireside Chats. We lived in a wooden structure that was called a bunkhouse. There was a store across the street. We bought very little, grew most of our own stuff—vegetables and fruits.

BROCK: What were the emphases in your household growing up, let's say, before the time you moved to the Peninsula? Religion?

NAUGHTEN: Well, there was no church in the town. In the whole time that we were there—we went there when I was about eighteen months old—there were no movies. One came to town. I think it was a Will Rogers movie, as I remember, and nobody could afford to go. So it just didn't work. But, that was the only time in all of those years. One of our biggest activities was, of course, going to school. We would walk to school. There were no dance halls or saloons, none of the usual kinds of things. There were a limited number of people living there.

BROCK: Was there a library of any sort?

NAUGHTEN: No, and that was something that created an interesting mess for me in the eighth grade.

BROCK: What was that mess?

NAUGHTEN: Well, this is when the Stanford-Binet test came out, and that's based on literature. We really didn't have literature in school. We learned basic reading, writing, arithmetic. That was it. When the test first appeared in the late 1930s, down here Sequoia High used it to decide what you were going to do in school. There were three of us who took it at that time and completely failed it. And so, they had a rating. They had ratings: 2-2 was the lowest. I was a 2-2 going into high school. I mentioned to the counselor that I wanted to be a doctor. Of course, she knew that I was going to be flunking out in the first semester. So, in the first year, I didn't get any pre-college courses with one exception, and that was English. The English teacher had the three of us and said, "I don't believe it. There's something wrong here. I know these kids."

She had me tested along with the other two fellows on a non-literature basis, and of course, this showed that we had enormous IQs. She took the results to the librarian, who was our counselor, but she didn't care. The English teacher knew it was wrong. Her husband was the math teacher, and he put us in advanced math classes as freshmen in high school and then took the results down to the counselor again. It was crazy. So, when we came to getting recommended for college, the school wouldn't. My dad knew the chancellor up at UC and he went up there to get advice. Then he went back down to the principal of the school and said, "What's a 2-2?" I had every honor the school gave, and the three of us who were "retarded" graduated one, two, three in the class [laughter] of seven hundred. He looked and he said, "Oh, we get those occasionally, and the problem is that they don't make it beyond the first semester because they just can't do anything." My dad said, "You're talking about my son."

When we got accepted to UC we had to live in Richmond [California], and that's when Gordon and I—he wasn't one of the three—realized that if we lived in Richmond we'd be commuting the whole day to and from classes, so we went to San Jose State instead.

BROCK: So you did your first two years at San Jose State?

NAUGHTEN: Gordon and I went together. In fact, he had a flatbed truck, I think it was a Model A, and we would take off every morning, go down to San Jose and come back, so it was great.

BROCK: Go back in time to your impressions when you moved down to the Peninsula and were living in Woodside, about what the area was like.

NAUGHTEN: At that time, Woodside was strictly a summer place for people who lived in San Francisco. We rented a house in the Woodside Glen and we walked from there to school all the time. It was a very rural area. The famous Tudor barn that is on Highway 280 was there when I was going there. We'd walk by it every morning going to school. And the school was on the road that went up to La Honda.

BROCK: You mentioned that by the time that you got to high school you already knew that you were interested in becoming a doctor? Could you talk a little bit about how you knew that?

NAUGHTEN: Actually, I knew that when I was ten years old. When we moved to San Andreas, my dad was working in an assayer's office, which was a common thing then for mining. One day he took an empty cardboard box and just threw it up on top of a filing cabinet and got a fracture dislocation of his neck. His head just fell back. There was a Dr. John Brown. I remember him. A young doctor just arrived in town, and this was usually a fatal type of injury. Dr. Brown was just marvelous. He took care of my dad. Dad recovered completely. No paralysis. I thought, "That's a kind of a neat way to live." I wanted to become a doctor and I wanted to go to UC Berkeley. Of course there was only one UC then.

BROCK: How did your mind fix on UC Berkeley?

NAUGHTEN: Well, we had lived in Oakland for a very short time, right after I was born, and then we lived in Stockton, then Oakland, then moved up the Sierras to get through the Depression. So, I knew about Berkeley—I didn't even think about Stanford.

BROCK: As you were going through school did you find that study came easy to you? You were performing well academically?

NAUGHTEN: Yeah, when I say "the three of us," we finally got into reasonable classes and we essentially graduated with straight As for all of high school. It wasn't hard for us. We got assigned—it was hilarious—we got assigned to an addition/subtraction math course, and they had a book from the Navy. This was the book we were going to be using for several years—and the instructor also was saying, "Something's wrong here." And so, not understanding that, we finished the book that weekend. [laughter] Just finished it and turned it in. They didn't know what the hell to do with us, and that's how we ended up in geometry and algebra early. Academics were never a problem for us.

BROCK: So you graduated at the top of your class?

NAUGHTEN: Right.

BROCK: Were you and Gordon Moore in the same class then, the same year in school?

NAUGHTEN: Yes, we were in the same year. Now he lived in Redwood City and his friends—well, I think he may have come over from Pescadero—but when he was living in Redwood City, he wasn't close to us. Most of our friends were from San Carlos, which is the next small town up. We would meet through different activities but we were not in the same classes together. He played football. I was called a “manager” of the football team, and that was really a water boy. [laughter] When I graduated from Sequoia I was 5'1” and weighed 110 pounds. I was on the swim team. I was a tiny guy.

BROCK: Didn't Gordon Moore do diving? Did you know one another in that connection?

NAUGHTEN: He was diving when I was doing the backstroke. Yeah.

BROCK: How did you first meet Gordon Moore?

NAUGHTEN: Probably with swimming, that would be part of it. When we started high school it was the beginning of World War II, in 1942. And so, in 1946 all of these guys came back on the GI Bill and started going to college, and the priority of all of the colleges and universities was to get those guys through school. Housing was impossible. Gordon and I came together on that. He was going to go to Berkeley too, but we found out that we had to live in Richmond, and there was going to be a long commute both ways. We decided we didn't want to do that. So, we went to San Jose.

BROCK: Did Berkeley have some housing in Richmond?

NAUGHTEN: Oh yes, they had student housing there.

BROCK: Okay. In your high school experience together then, you had these common sporting activities. Were the both of you in the same sort of social group or clique?

NAUGHTEN: No. I thought about that after I first talked with you. We were from two different towns and so from two different groups. There were about four of us from San Carlos who all went to San Jose State. But, only Gordon and I commuted in this truck [laughter] and it was just fun. We continued doing that at Berkeley.

BROCK: To commute in his truck?

NAUGHTEN: No, he then got, I think it was a Model B Ford. I was so short I could get up behind the driver. This was when Betty entered the picture, and she, I think had an aunt in Berkeley, so Betty was periodically riding with us. It was hilarious once because we got into an accident on Bay Shore driving back. The car ahead of us stopped suddenly and we didn't stop. The guy was drinking a chocolate milkshake while he was sitting on this freeway, and all of a sudden it looked like there was blood all over the windshield inside. [laughter] We said, "Oh god, we've killed somebody." Gordon's father was the chief deputy sheriff of the county, and here we are being hauled off, the two of us, with this young lady. I mean, my god, this is horrible. They looked at us like we had this white slavery thing going. [laughter] Not really. We were in the police station for quite some time before anybody confirmed the fact that, "Yes, that's right. His dad is the chief deputy sheriff." But, I'll never forget that windshield inside. Boom. Oh god, it was hilarious. [laughter]

BROCK: So, tell me a little bit about what Sequoia High School was like during those years. How big was it?

NAUGHTEN: Well, we had about 750 in our class. It was the primary high school for that whole area. There was a single high school, so everybody from that whole area came there. Rather diverse backgrounds.

One of the things that did occur was the Japanese students were taken out of our classes and put into this internment camp. At graduation, during the war, people were wearing their uniforms to graduate and they would just disappear into the conflict. One of the big hospitals out here was Dibble Hospital, which was up in the Stanford area, and it was a big operation.

I was very active in student activities. I was the class vice president and then I became president, when the president left. I ran the student council and I participated in sports. I'm not a big sports person, but it was a good time. We had good teachers, very good teachers, when we got the classes that we wanted. Once they found out we were serious about going to college we couldn't take shop, because they'd ruin our hands. It was a very, very culturally diverse group of people from all over the whole area.

BROCK: Socially, did groups form according to where people lived?

NAUGHTEN: Yes, they did. That's why the four of us from San Carlos pretty well stayed by ourselves for the whole time.

BROCK: I see. Well, could you talk about the impact of the Second World War on the school, on the community, on your family?

NAUGHTEN: Well, a lot of things occurred. Many of the people killed at Pearl Harbor came from the Bay Area. There was a lot of animosity and a lot of bad feelings about the Japanese. Oh boy, I'll tell you. When they decided to intern them, people talk now about how illegal that was. I know when we were students we were so angry at these people that I'm afraid that there may have been a mess if they had stayed. That's not nice to say, but this was what was going on. Of course we would lose friends, brothers, who were a year or so older. Dick Grossick's brother was killed in Guadalcanal. That brought everything home to us. But, there were just so many people who were killed at Pearl Harbor, three thousand and something. We all had victory gardens. Later, I was in Korea twice. I was a Navy corpsman with the Marines, and with that come a lot of different thoughts about that war. But in any case, during the Second World War, supplies were very short. I had my first job, besides a paper route, working in Torito's Market in San Carlos. I got paid sixty cents an hour and I figured out that was a penny a minute, and, boy, I was really living. [laughter]

BROCK: That was during high school?

NAUGHTEN: That was during high school. The manager of the market lived near us and he would wrap up butter in plain paper and give it to us, because it was rationed. Gasoline was rationed. You had a sticker that said how much you could get. Meat was really in short supply.

We would grow a lot of stuff in our victory garden. One of the most miserable crops that we grew was zucchini squash. We grew several heads of zucchini squash. God, I got sick of zucchini squash. [laughter] We were out in the backyard when the news reports were coming in from Pearl Harbor. I know my dad was very angry.

BROCK: By the end of your high school experience you were still on track to go to medical school?

NAUGHTEN: Right.

BROCK: Did you and Gordon Moore see one another socially? Did you discuss this idea of going to San Jose State instead of Berkeley?

NAUGHTEN: I think we just figured out this is what we had to do. And, I don't remember the details of those discussions or how they came about. I was very close to this group from San Carlos. Two brothers and the other fellows, and these people were in my wedding when I got married. With Gordon, I think it was a necessity kind of thing. We found out that we weren't going to go live in Richmond, even though we'd been accepted at Cal—so this worked out because he had this truck. We tried living down in San Jose one time. I know I lived there for a quarter or something and it was just more than I could afford. So, we came back to the truck again.

BROCK: In those two years, while commuting together to San Jose State, did Gordon Moore ever talk about wanting to become a chemist? Did you guys ever talk about chemistry?

NAUGHTEN: No, he didn't, we didn't talk much about—he took primarily math, physics, and chemistry. A big thing at San Jose State at that time was that they had a wonderful math department and they dove into that very well. We were trying to get—they all call it basic ed now—out of the way. I thought I had it out of the way and I finished my associate's degree, and then at the end of my senior year in Berkeley they reminded me that I needed another social program. Also, I decided to take math and the mistake I made was not dating the graduate student lady in order to take the class. I didn't understand the requirements of it. So, I didn't do well in that class. [laughter] Mostly, San Jose was just getting through the requirements. It was a very busy campus then, as they all were. All the veterans came back. A lot of guys just weren't qualified to go, and they started and then they didn't make it. Books were very expensive. We'd never bought books before. One of the big things at that time was slide rules and they were terribly expensive. Gordon and I took a lot of parallel courses. I did take a lot of chemistry courses. He loved explosions. He put together some stuff in one of the chemistry labs and he'd coat it on things. It was so unstable it'd go pop, pop, pop, pop, pop, pop, pop. [laughter] The instructor was a little upset about that.

BROCK: Did you guys sometimes commute down on the train? Was there rail service?

NAUGHTEN: I don't remember doing that, normally. I remember taking the train occasionally. I remember one thing about the train. Harry Truman was president and he came through San Jose and I was closer than you are now to him. He was standing at the back of the car. I was right in front of the crowd and I looked up at him and I thought, "Oh wow." He looked like a president. He really did. I'll never forget that. That was really something. The only president I've ever seen.

BROCK: Were you and Gordon Moore just commuting pals or did you have a friendship that developed at that time?

NAUGHTEN: We developed a friendship and then at the end of the two years, when we decided we were going up to Cal, we decided we were going to live together. That was a big step too, for us both, because we hadn't even thought about it at that point.

BROCK: How would you describe Gordon Moore, during high school, and during those San Jose State years? Was he quiet?

NAUGHTEN: Several things. He has said himself that he really didn't work very hard in high school, but he was a very studious guy in college. He was doing very well in the classes he took. When we got to Berkeley he took again the same three classes, basically math, physics, and chemistry. He was a good student with that. He was a quiet kind of guy. We were at State or Cal, I'm not sure, but he belonged to the Rocket Society.

One day he and I set off this rocket and the thing went completely out of sight. We don't know how high it went. We were at his house and in came his father. His father was livid. Something about screwing around with the rockets or something. It came down and went through a two-story house. Went through the top story, through the bottom story, and exploded in the living room. [laughter] Nobody got hurt, but he knew that there were only two people who could have done that. [laughter] He had this rocket engine that he had designed on his desk at Berkeley. That was the first Rocket Society, back in the 1940s.

BROCK: Did you get to know his family during this time? It sounds like you were over at his house. Did you meet his parents?

NAUGHTEN: Yes. I knew his parents. His mother was a very quiet lady, a very nice lady. His father was too, but he also was obviously a lawful kind of guy being chief deputy sheriff. In fact he lent me a .45 to go to Korea on my second trip over. He also was a quiet kind of a guy non-bombastic, not a politician-type guy. He was very nice.

BROCK: Was he somewhat imposing? I've gotten the impression that he was an imposing figure.

NAUGHTEN: Well, he was a big person and in his uniform, yeah. But, I knew him in a different context so he didn't seem imposing to me. There are some hilarious stories. He and

his deputies would go up to Woodside during deer season to be sure that guys were not going to shoot up the whole area, and somebody stopped him and asked him where the deer were and he said, “Oh, there’s a lot up there but you’ll have trouble getting over the fence,” and let it go. Shortly after that here comes this guy with this big male deer draped over the hood and said, “Thanks a lot, but boy did I have trouble getting over the fence.” What he had to do was to go up to the headwaters for Crystal Springs Reservoir. It’s all reserved—you can’t go in there. He climbed over that fence, shot this deer, which was right next to the fence, and brought it back. Well, Gordon’s father couldn’t arrest the guy because he told him where to go!

BROCK: Did you get to know Gordon Moore’s brothers?

NAUGHTEN: There are two. I took care of his youngest brother’s children when I was down here in practice. Then they got divorced and they disappeared. His other brother, who lived in Pescadero area, was in farming. He was a very pleasant guy, and I met him maybe once or twice but that’s about all.

BROCK: Did you get to know Betty Moore at all at San Jose State?

NAUGHTEN: No. That’s one thing I thought about when considering all these things. I know she came into the picture when we were going to Berkeley because she would drive up with us. I don’t know how they met. But, my god, Betty and Gordon have known each other longer than my wife and I, and we’ve been married fifty-three years.

BROCK: When you met Betty Moore during those Berkeley years, what was your impression of her?

NAUGHTEN: Well, she was a nice gal. She was a tiny gal. My own wife’s only 4’11”, so, both are short. Gordon was courting her and doing all of this academic work, superb academic work. I was always amazed by that. I think, but I’m not totally sure, that she went to the Senior Ball with him. We had not dated much at all before, and Betty was new in the whole scheme. We were not big daters in high school.

BROCK: You mentioned that your father had gone to speak with the chancellor of Cal. How did the two of them know one another?

NAUGHTEN: They were classmates. My dad didn’t finish four years of college, but he had gone to Montana State School of Mines. He had also gone to Gonzaga [University] with Bing

Crosby. They told Crosby he had a lousy voice, “You might as well quit what you’re doing,” you know. [laughter] Then my father got to Berkeley. I don’t know how long he was there, but the man who became chancellor was one of his classmates.

BROCK: I see. So then it would have been, let’s see, around 1948 that you guys started?

NAUGHTEN: When we went to Berkeley. Yeah.

BROCK: Okay. And you were there until around 1950? Were you quite occupied with the pre-med program then?

NAUGHTEN: Yes. With the pre-med program, you could take a degree in chemistry or zoology. All I had to do was take one course either way in my senior year. And pre-med was really competitive then—there were many guys who really wanted to go to med school, and this was their last shot.

BROCK: In what way was it competitive? Just very hard coursework?

NAUGHTEN: Well, the number of people applying for the number of places available, and, with the GI students, this was their last chance to get into medical school.

BROCK: I see. Was it at this time that Gordon Moore talked about wanting to become a chemist?

NAUGHTEN: I don’t remember him using the term chemist. I just don’t. That doesn’t mean he didn’t. But, his whole direction was that way. As we got into our senior year we were talking about where he was going to go, and decided he was going to go down to Caltech.

BROCK: Did the two of you live together for both those years?

NAUGHTEN: Both years. Yeah. We lived on the north campus right above the Newman Club—right on the edge about one block from the campus. All of my classes were in the LSB, the Life Science Building, way down in front of the campus. It looked like the Pentagon. Gordon’s classes were up on the other end. So, we were going all the time to those areas. We had the craziest landlady in the world. She wanted to make it clear that we were not to use

Lifebuoy soap, because she didn't like the color it left in the showers. [laughter] It was just too much. I still remember. She ran the place. It was really old, and the mattresses were like padded foxholes. [laughter]

BROCK: And this was the co-op?

NAUGHTEN: No. No. But the co-op was how we got through.

[END OF AUDIO, FILE 1]

BROCK: Okay.

NAUGHTEN: Well, the co-op was probably the way that most of the students—a large, large number—got through college with board and room. Some lived in the places. We didn't. You won't believe this, but our bill was twenty-six dollars a month for food. There was no room for us in Cloyne Court, which was near us, but we ate there all the time. Of course we were real neophytes when we arrived, so we got assigned the central kitchen and that's where we were doing pot washing. After that I ended up hashing, serving the tables. Then senior year, I got a better job. It was painting. I was painting the inside of the women's dorms. [laughter] But we got good food.

Gordon Moore eventually gave a very large contribution to the co-op, the whole organization. I think it was something like almost one hundred thousand dollars. That sort of defines him. The thing I can't emphasize enough about him. Yes he has a lot of money but he gives it by the tons away to people for very good things. It's a most amazing thing. You don't see people doing that anymore. I'm aware of many of his contributions. But, the co-ops really took good care of us back then.

BROCK: Were your rooms part of the co-op, or they were in that private house?

NAUGHTEN: No, our rooms were separate. There were about three rooms in this dilapidated house just above the co-op. It was not part of the co-op.

BROCK: So did you two share a room?

NAUGHTEN: We shared a room. We had two beds in the room and we had a separate bathroom/shower, what have you.

BROCK: You both must have been quite busy with your studies, but, did you have any common hobbies or activities?

NAUGHTEN: We didn't have common ones but we did participate in a lot of the things. Cal went to the Rose Bowl the two years we were there, and I won't forget the first time. Gordon and I went down on a train and these two lovely coeds came up and wanted to know if we would like to play bridge. Well, we could play pinochle but we didn't know how to play bridge. [laughter] I said, "Oh god. Of all the skills that we needed." [laughter] Then we went to eat in a Chinese restaurant and he had ordered a steak, and it was so tough it was unreal. He tried to cut it, and it was airborne. Just went *pfft*, [laughter] across over the room.

I had another classmate who was also pre-med and we went out on the old red trolleys to Pasadena, and we went to the Rose Bowl then. It was quite a time. In fact, we took my dad to the big game with his snow-white hair, with his cap on, to sit in the rooting section, and the rooters were just wonderful. They thought he was great. It was special. We didn't participate in the riots [laughter] that went on at that time. The city got all upset because when they went with a float by the reviewing stand they just pumped water on all the dignitaries. Then there was an ice cream truck that was going up Bancroft and it was spilling gasoline out of a full tank all the way down to the bottom. People didn't know that and they built a bonfire, and it went *shoop* onto the truck, and the guy was passing out all of the ice cream just to get rid of it. Then the next thing the fire department arrived and they had a red engine. Well, you can't have a red engine at Berkeley. So, they painted it blue and gold. [laughter] So, that one riot was, I think, in 1948, but it was just too much.

BROCK: Are there any other stories from those Berkeley years of Gordon Moore or of the two of you that come to mind?

NAUGHTEN: Well, we would usually drive home on the weekends. We didn't spend time on campus on the weekends. That's how we avoided the first riot that the city really came down on Cal. And at the same time, of course, Betty was very active in this era and she would drive back with us periodically. She was raised over here near Campbell. Yeah. We would go to the basketball games and that kind of thing. We were mostly tied up with what we were doing in class.

BROCK: Now you were coming home on the weekends and you would stay with your family?

NAUGHTEN: Right.

BROCK: And similarly for Gordon?

NAUGHTEN: Yes. Then on Sunday we would play pinochle with my dad and then drive back to Berkeley.

BROCK: And so, in some ways, your lives were still centered over here rather than . . .

NAUGHTEN: Yes. I think about that periodically, wondering how much I missed or did not miss. Most pre-med people were just busy. The schedule, the requirements now for applying to med school are so different. I had a guy in my class who was a philosophy major from Stanford. We took everything in the world.

BROCK: You're in your senior year at Berkley and Gordon Moore is deciding to go to Caltech. How were you deciding on where to go to med school?

NAUGHTEN: Well, what I did was I applied to mostly the West Coast schools—Stanford, and Cal, what have you. In fact, I taught the son of the dean of admissions at Cal how to swim in Belmont one summer, and I thought, “Well, that’ll be helpful.” But, the overwhelming number of veterans applying meant, “No.”

Gordon was really kind. He had been accepted at Caltech and he was waiting for my acceptance to med school before we had a party about it. That didn't occur. Then, in 1948, nobody believed that Harry Truman would pass a draft law, and he did, and that's when I joined the Naval Reserve. Every week I would go to Reserve meetings at Treasure Island. While I was waiting, we graduated on 15 June and on 25 June the Korean War started and I was a Reserve hospital corpsman.

BROCK: So you were called up right away?

NAUGHTEN: Right away. I went down to Stanford. My commanding officer thought I should try to get a microbiology degree from Stanford and I got down there for a couple months before our whole division went.

BROCK: Then you were in Korea for how long?

NAUGHTEN: I was in Korea for a very short time. I was at the Naval Hospital in Oakland for a while, then I got assigned to the Fleet Marine Force, the First Marine Division, and I went through Camp Pendleton. We went over for a short time, and then I got assigned to the Navy OCS in Newport, Rhode Island. I went back there for four months.

BROCK: And then the second time?

NAUGHTEN: The second time was longer because of the amount of training that I had to undergo, but the time in Korean waters was very short because we went into the Wonsan invasion and that was a disaster. It cost me about five years in total. When I got out I reapplied to all the schools—back east, too.

By then I was married and my wife was pregnant with my son. The admission guys all blew their stacks. How could I be doing it? First of all, I was too old. I was twenty-six. I was married and my wife was pregnant. “You want to go to medical school?” Oh, they were really terrible. I was teaching at the medical school at Stanford. I was working on a Ph.D. and I took my master’s and then went back. I could teach in the med school but I couldn’t be accepted there because I was too old, married, had a son. I had a nose-to-nose conversation about it with the dean of admissions. Next day, Dr. Arthur Miller said, “You know, Bob, what you said to him was correct, but he’s the dean of admissions. So, what we’re going to do is we’re going to find you a school where they take old people.” [laughter] “Who are married.” I said, “That’ll be good.” They got me into Hahnemann in Philadelphia [Pennsylvania].

BROCK: Did you keep in touch at all with Gordon Moore during or after the war?

NAUGHTEN: During the war I saw Gordon and Betty down in Southern California. I never realized what wartime barracks were like in terms of lack of color and what have you. I remember when they picked me up we went to a grocery store and that was just a beautiful thing, you know, it was wonderful. We drove up to a town down there called Montrose, and that was the name of my ship, Montrose. That was the last time I saw him and Betty. I assume that they must have gotten married while I was overseas.

BROCK: Yeah. I think they got married right before they went down to Pasadena. That must have been right around the same time that you were being mobilized?

NAUGHTEN: Yes, the whole division. Of course, the whole division didn’t go. Half of the division decided if they stopped going to meetings they wouldn’t be called in. [laughter] And

so, the commanding officer said, “If you don’t go we’re going to turn your name into the draft board.” Well, they had a female yeoman, with an IQ of one, who typed up the two lists and sent the wrong one to the draft board. So, I’m overseas and my dad has three U.S. Marshals show up at our house in Redwood City to arrest me for draft dodging, [laughter] and I’m with the First Marine Division. I had to get a letter from E.O. Smith.

BROCK: So, after going to med school at Hahnemann did you come back immediately to the West Coast?

NAUGHTEN: Yeah, we did. I have a lot of allergies, even here, but my wife wanted to stay. There is a beautiful little town called Haddonfield [New Jersey] right across the river from Philadelphia. We had made a lot of good friends, but the allergies were just too much. I was almost asthmatic. We came back and I chose Highland [General Hospital] in Alameda County, for an internship. I had applied to about ten. I got accepted to all of them. What’s hilarious about med school is when you get accepted in one school then all of them want you.

We went to Highland, Alameda, which was one of our toughest times. I got ninety dollars a month and I had to buy my uniforms out of that, and we had two children then. And, it was thirty-six hours on and twelve hours off. Thirty-six on and twelve off. One of Ann’s favorite stories is dividing an egg for breakfast between the two kids. [laughter] It was a tough year. Then I went to Stanford to do cancer research and got a raise. We got a hundred and twenty-five dollars a month. We were there for three years.

BROCK: Did you go into private practice after that?

NAUGHTEN: Yes, I opened my private practice in Los Gatos in 1963.

BROCK: Did you have any contact with Gordon Moore subsequent to that?

NAUGHTEN: No. Because my understanding is he went from Caltech, to Silver Spring, Maryland, and he was working on a lot of highly classified things at that time. Then when he came back out he started with Shockley, and went on, he and—I don’t know when Andy [Andrew S.] Grove joined him—but they did eventually go off on their own. Silicon Valley—my wife and my daughter worked there. My daughter is an HR director. That’s a totally different world from medicine, a total different world. We were just in different worlds and the only contact I had was with his brother, when they came in to my office—his brother’s wife would bring the child in. That was the last contact. We lived in two different worlds. The next time I saw him was at a Berkeley alumni of the year award a few years ago.

BROCK: Did you get a chance to reconnect?

NAUGHTEN: We talked a little bit but not a lot. It was a big event. He was standing outside, because nobody knew who he was, and I saw him and went, “Gordy, come on in.” He was always known as Gordy Moore to me. He said, “God you’ve got fat.” [laughter] We went in and I sat at the table with his family. His two sons were there.

BROCK: Right. Well, I wanted to close with just a few more questions. One is to ask you to reflect on the changes that have taken place in this geographical area, in part caused by your former roommate, the whole Silicon Valley semiconductor phenomenon. How has the region changed since the two of you were in high school?

NAUGHTEN: Well, when we were first here, one of the big things, was to come down for Blossom Festival. The whole valley was nothing but beautiful blossoms of all kinds of fruit trees. I remember, in the middle 1960s, 1963 or 1964, we were still at Stanford and we wanted to find a place to live. We were going to buy a house, or maybe rent one. We would come down over here to Saratoga, on Sunnyvale Road, and the farmers were selling all of their farms for a million dollars. And, all of a sudden we had all these millionaires here and most of the homes, including this one, had fruit trees in the backyard. They’re hard to take care of. And so, suddenly all these blossom festivals just disappeared. There are still a few. There’s one in Sunnyvale, Olson’s Cherry Orchard, and I think there’s only four acres left.

And then Silicon Valley, my daughter has been climbing the ladder through all this. She’s vice president of Shutterfly now. Suddenly the income skyrocketed around here. The orchards disappeared. The pressure increased. The cost of housing is enormous. They just kept building more and more, and they’re still doing that. This whole beautiful valley was taken up by all the chip organizations. So, we’re seeing people like the HP CEO, the guy last year made nineteen million dollars. Exxon’s parachute for the CEO was for almost five hundred million dollars. I thought, “What is this? You know, this is crazy.”

But, then you consider what Gordy has done. One of his comments is hilarious. He had twenty billion dollars and he put it in four groups of five billion dollars each and somebody asked him once as he was sitting in one of the meetings and he said, “I’ve never had so much trouble giving money away.” [laughter]

BROCK: Do you have any reflections on what this person you knew as a very young man has been able to do from a technical point of view, from an industrial or business point of view, and now from a philanthropic point of view? Would you ever have expected it?

NAUGHTEN: He said that at his presentation. He said, “I was in the right place at the right time.” He attributes all of his position now to that, that he was there at the right time. He got into the big wave that was going on. But, as far as the technical part is concerned, I mean it takes my own daughter to show me what a chip looks like.

I don’t think he’s really changed that much. I think that the huge amount of money that these people make is secondary. I mentioned to you, I’ve said, “He’s what a CEO should be.” I would be surprised to see him holler at anybody at work, though I don’t know that, but I would be surprised. He comes from a very humble background and very quiet people. I think he’s probably a fairly private person as well. He used to live in Los Altos, and then they moved to Woodside. It’s then when he decided to share all of this enormous wealth with everybody, and he did. The building at Berkeley was one. The co-op. Some idiot in the cooperative newsletter that comes occasionally was criticizing, “What has Gordon Moore given to the co-op?” Dumb thing to ask because he had given a hundred thousand dollars, and they had not made any big deal about it. That’s just exactly what you’d expect. Did I tell you about the United Way?

BROCK: No.

NAUGHTEN: Okay. United Way went sour. They had pulled all kinds of stunts to make everybody give more, and what have you, and they almost went bankrupt. She [Betty] wrote a check for one million dollars to United Way and saved them. They never made a big deal about it. That’s the kind of people they are.

BROCK: Thinking about Gordon Moore’s successes, technologically and from a business point of view, you would think that he might be competitive or ambitious. Did you see any of those traits in him?

NAUGHTEN: No. We have a lot of competitive ambitious people that we see. You know, I took care of people from this whole area, but mostly this end of the Valley. They’re making enormous amounts of money. With Gordon it wasn’t a matter of blatant ambition.

BROCK: Two last questions. One is, you were talking about Gordon Moore’s character; humble, quiet, private sort of values. If you had to say what those values reflect or where they came from, how would you answer?

NAUGHTEN: I would say that they came from his family. I would say that these were good salt-of-the-earth kind of people. I don’t know whether his older brother is alive or not, at this point.

BROCK: He's deceased.

NAUGHTEN: Okay. I'm willing to bet that he was a successful person in agriculture and never made a big thing about it, and probably did fine. His mother and dad had raised them like that—low-key people.

BROCK: Last question is, if you think about the story of Gordon Moore's life, 90 percent of it has happened within let's say a thirty-mile radius around the Bay Area?

NAUGHTEN: That's right.

BROCK: So, his story's very much a Bay Area story. Do you think there's anything about the Bay Area that uniquely informs his story?

NAUGHTEN: Well, in other words, he realized a new device, a chip which had not been done before, and he realized how important that was. He came up with this Moore's Law about how many more each year kind of thing, and realized that, "This is what we have to do." It's kind of like discovering penicillin and realizing how much it could be used. He discovered this device and then he also decided that Shockley was not the person to continue doing this. He was essentially crazy. But, his intuition, his insight to what he had in his hand was something. At our med school reunion they had guys in the fifty year reunion who had these plates, microbiology plates, who also grew the mold but didn't see it killing the bugs, while Fleming said, "Hey!" That's what really Gordon did.

BROCK: To have that realization.

NAUGHTEN: Right. Then he ended up, as I said before, becoming what a CEO should be.

BROCK: Well, I think that exhausts all of the questions that I had. Is there anything that I should have asked you that I haven't?

NAUGHTEN: Not really. I think we've covered as much as my old mind's remembered going on. [laughter] He was a very, very studious guy in college, for sure. What he's doing now is just phenomenal. There's a group preserving chunks of land all over and he's a member of that group too. Every time I turn around I find something else that he's doing, and I think, "How

neat. How great that is, you know.” Because he’s unique. Now Gates is doing some of this, but, as Lloyd Bentsen told Dan Quayle, “You’re no JFK,” I’ll say “Gates is not Gordon Moore.”
[laughter]

[END OF AUDIO, FILE 2]

[END OF INTERVIEW]

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