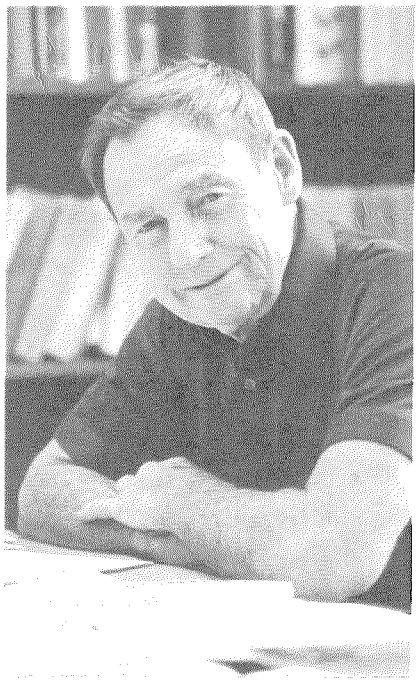


Robert P. Sharp — How It Was

Robert P. Sharp has the distinction of being the first holder of a named professorship in geology at Caltech and — even more unusual — of having that chair named for himself. He is now Robert P. Sharp Professor of Geology, Emeritus, and he was interviewed for the Oral History program of the Caltech Archives by Graham Berry, former director of the Institute's News Bureau. We present here a shortened version of the original transcript of that interview.

Robert Sharp: I'm a second-generation native Californian. My father was born in Santa Rosa and my mother in Saticoy. My father ran a lumber company in Oxnard when I was a little boy, and later he ran one of the citrus ranches that belonged to my grandfather. Neither of my parents got beyond the freshman year of high school, so I didn't come from a family that was intellectually oriented.

My grandfather loved kids, and he and my father and my uncles were always going off somewhere on fishing and hunting trips. I think largely through my grandfather's influence I got to go on a lot of these. I went to work at age ten, though I had nothing but a paper route to begin with. Later I worked in a jewelry store and then in a service station, which was a very good thing for me. I was a shy, withdrawn kid, and while working in the service station, you had to deal with people from all walks of life, from the town drunk to Buron Fitz, who was running for lieutenant governor of California — and to Gary Cooper, who used to come through on Sunday with Lupe Velez in his big yellow Duesenberg.

Between the time I graduated from Oxnard high school in 1929 and when I came to Caltech in the fall of 1930, I worked in a service station 60 hours a week and went to school part time. I'd hardly ever heard of Caltech when I was a youngster, but in my high school class there was one of these boy-wonder scientists. Caltech dominated his thoughts and talk. Eventually, three of us from Oxnard came to Caltech as freshmen in the fall of 1930. To the best of my knowledge, the only person from our high school to come to Caltech prior to that was none other than Vito Vanoni [now professor of hydraulics, emeritus].

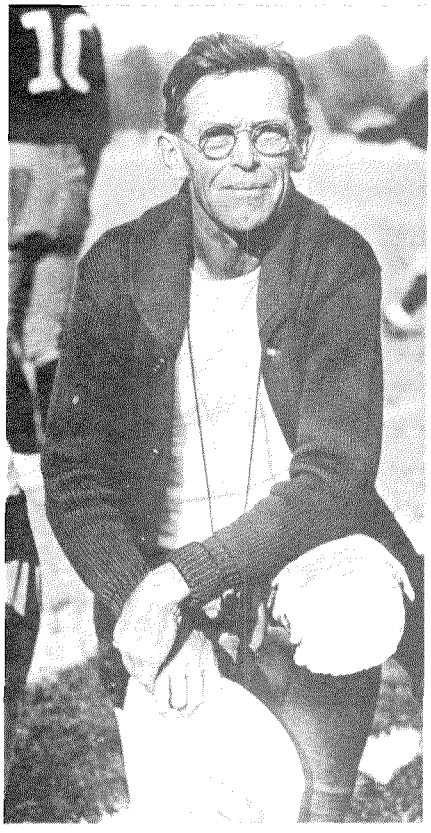
I guess the roughest three months I can remember as a young person was the first quarter at Caltech that fall. It was rough for a lot of reasons. First, I didn't come from a really good high school. Then I went out for freshman football, and I was so sore and stiff for the first month I could hardly walk. And the student houses were not yet opened, so I had to live in the town.

Graham Berry: Had you decided on your major?

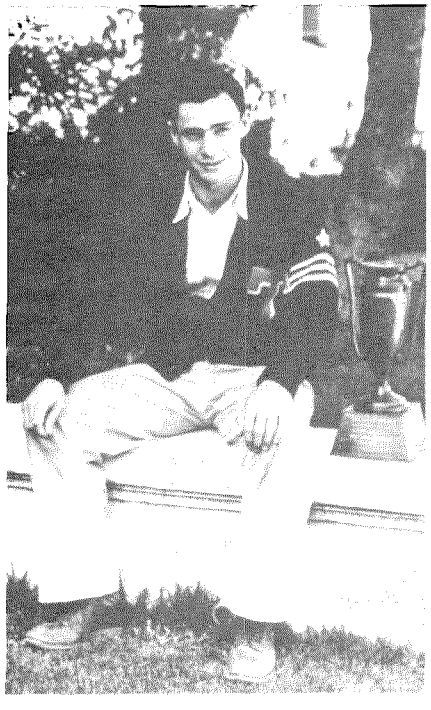
RS: No. I came down here thinking I was going to be a civil engineer. The first year you didn't have a chance to think about such things, and truthfully you were too busy to give a damn. We had to make a decision at the end of the freshman year as to whether we wanted to go into engineering or science. At that time I shifted from engineering to science, focusing on chemistry, but I think Ernest Swift [now professor of analytical chemistry, emeritus], who was a soft-spoken tyrant, a perfectionist, convinced me I wasn't going to be much of a chemist.

In the first term of my sophomore year I had to take a course in geology. I had hardly ever heard the word geology before that time, but this course hit me just right. Bingo! John Buwalda gave the lectures, and he was very good. It was a revelation to me. All of the things I had seen as a little kid, had made a note of, and didn't understand suddenly began to fall in place. I had done a lot of fishing up in the Mono Basin. I can remember walking over ridge after ridge after ridge to get to Walker Creek. Buwalda was lecturing about mountain glaciation one day, and it suddenly hit me, "My gosh, those ridges are lateral moraines!" So came the third quarter of my sophomore year, and I had to make a choice. I elected to give geology a try. Discovering it was one of the great good fortunes of my life.

One of the great opportunities offered by Caltech, if you had the will, was participation in varsity sports. I went out for football as a freshman and



Above, William L. "Fox" Stanton, physical director at Caltech for more than 20 years. Below, Robert Sharp in 1934. He had just been awarded the Wheaton Trophy for "ability, leadership, and scholarship," and was vice president of ASCIT and chairman of the Board of Control, which then, as now, administered the Honor System.



as an upperclassman did both football and track.

GB: Were you a quarterback?

RS: I came to Caltech having played a little quarterback in high school, but I told the freshman football coach, who was Layton Stanton, the son of Fox Stanton [physical director at Caltech at that time], that I was a halfback. He took me at my word, and I worked out at halfback, ending up on the second team of the freshman squad. We had enough freshmen out for football to have a couple of teams in those days. Later, I was a quarterback, and this put me on the first team. We probably had about 30 freshmen out for football.

As long as we're talking about football, let me talk about Fox Stanton, who was the ideal coach for Caltech. He was a fiery little guy, who had been trained originally as a clergyman, a preacher. Some of the finest sermons I ever heard in my life were in the Rose Bowl locker room. Stanton recognized that he didn't have a lot of talent to work with in terms of physical ability, so he had to rely on a bunch of kids who were relatively intelligent. He had worked up a beautiful, very complex offense. People who were scouting would come down to him during the game and say, "My gosh, Fox, I can't tell what's going on out here." And Fox would reply, "Well, I can't either, but sit down alongside of me, and if I see anything I recognize, I'll tell you what it is."

GB: Stanton acted more like a preacher than a coach?

RS: Well, no question, he built character. He could be a very caustic old guy, a very stern disciplinarian, given to those little phrases that just cut you right to the quick. He'd give us a new play, and then he'd turn around to me and say, "Sharp, don't you ever run this play; you're too slow." One time during practice I got ready to unload a little shovel pass when I suddenly realized I had the wrong player in my sight. The ball just rolled out from my hand. Stanton came storming out on the field and said, "What are you doing, feeding the chickens?" So ever after I was "Feed the Chickens" Sharp.

In those days, every Monday at eleven o'clock the entire student body had to assemble in Culbertson Hall, which was where South Mudd is now. Attendance was required, and I think we got one unit of credit for being there. You signed a little slip — we had the honor system then, just as we have now — indicating how many assemblies you had missed during the term. Your grade depended on how many you had missed, up to the point where you could flunk. Then you had to do something special to make it up. The point is that once a week the entire student body got together, and there was communication on student body things. I think it was a unifying influence, which unfortunately is lacking now.

GB: Were you a Caltech graduate student at all?

RS: I did spend one year at Caltech as a graduate student. The year wasn't a complete loss, but it would have been better if I had left sooner.

GB: Why would you say that?

RS: The change of intellectual environments is stimulating. My world was centered in Caltech, southern California, the West Coast. When I got away, I realized I was a very provincial person.

I went about as far away as I could get, to Harvard, which I found very stimulating, good in geology, and a complete change. Caltech gave me an educational discipline that made study at Harvard relatively easy, so I had ample time to capitalize on the rich intellectual menu available there. Socially, Harvard was a blank. It was possible to feel you were a non-person to the third power.

GB: Did you specialize in any particular field of geology?

RS: I had not before I got to Harvard, but within my first year I had to decide on a PhD thesis. I wanted to do a field geology problem, and I was inclined toward one in structural geology. I had gone to the map room and discovered a brand new topographic map in northeastern Nevada. I could just look at it and tell that it was nice country. So that's what I finally did. It was basically a structurally oriented problem, but I also mapped the glaciation of the range and a lot of geomorphological features.

I spent the summer of 1937 in northeastern Nevada in the Ruby-East Humboldt Range, doing my second year of field work on my PhD thesis. Late in the summer I got a letter from Ian Campbell [at that time, associate professor of petrology at Caltech] asking if I might be available to go on a Caltech-Carnegie Grand Canyon boat expedition that he was organizing. We would go down the Colorado River from Lee's Ferry to

Pierce's Ferry in the fall, completing a study of the old Archean rocks in the inner gorges of the canyon. He and John Maxson [an instructor in the Caltech geology division] had been conducting this study for a number of years under support from the Carnegie Institution.

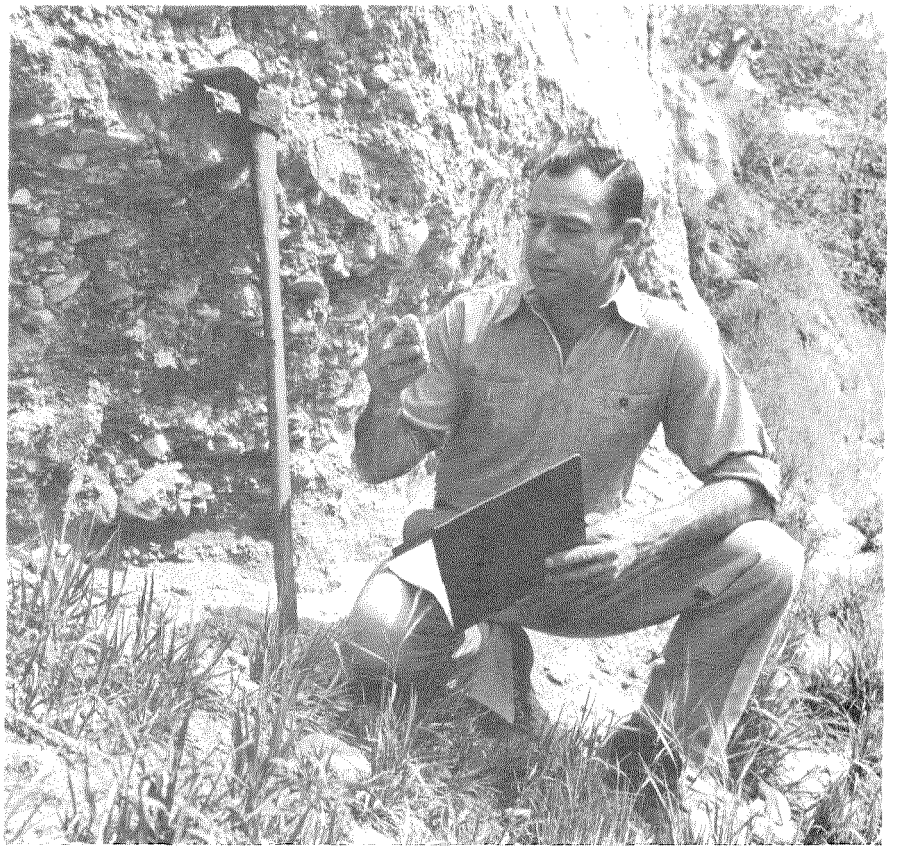
It was the opportunity of a lifetime, so I wrote to Harvard and asked, first, if they would grant me a leave of absence for the first semester and, second, if I could have my Woodworth Fellowship for the second semester. Harvard not only said yes, but they made my fellowship a traveling fellowship for the first semester. It amounted to something like $400, but I thought that was just terrific.

On the Grand Canyon trip there were seven of us all told, three boatmen and four geologists. I was the kid of the outfit, the gun bearer so to speak. That was the greatest trip I ever had. We got out of the canyon just a little before Christmas, and I spent Christmas at home and then took off back to Harvard where I had to write my thesis and defend it within the short period between January and May. I did it.

GB: You met your wife at Harvard?

RS: She was a graduate student at Radcliffe in 1937-38, and I knew about her through Dick and Frances Jahns. Dick Jahns was a Caltech graduate who was on the Caltech geology faculty. They told me, "When you get back to Harvard, you must look up this wonderful girl, Jean Todd, and get acquainted with her." After I got back from the Grand Canyon trip, I got somebody to point Jean out to me, and I invited her to supper. We were married in the late summer of 1938. By then I had a job at the University of Illinois, and we settled into a little apartment in Champaign. I worked at Illinois for five years — 1938 to 1943 — and I never worked harder in my life.

What finally got me out was World War II. I went into the Army Air Force in 1943 and spent three years in the Arctic-Desert-Tropic Information Center, part of the time in Alaska and out in the Aleutians. In 1946, I took a job at the University of Minnesota as an associate professor. In my second year there I received offers from Caltech and Stanford, and the University of Illinois asked me to come back and head up their geology department. I finally chose Caltech even though I had some serious reservations about coming back to my own alma mater.



Teaching and administrative duties as chairman of the division didn't keep Sharp from getting out into the field, as shown by this 1956 photograph.

GB: How was it to be back?

RS: I arrived at Caltech early in the fall of 1947. John Buwalda, who had been for over 20 years the chairman of the geology division, had just stepped down, and Chester Stock occupied the head spot. Stock was just the opposite of Buwalda, who ran a tight ship. Chester operated with a very light touch. He died, however, within three years. Then Ian Campbell became acting chairman for a couple of years, and finally I succeeded Campbell in 1952.

I hadn't been here but about two days in 1947 when John Buwalda walked into my office and said, "I have been teaching the elementary physical geology course in this department for over 20 years, and I'm tired of it. Here are my notes; you do it." So I immediately inherited a big elementary physical geology course, which at that time was required of all students at Caltech. I taught that course for about 25 years, and I was glad to do it because I think that's probably the most important course taught in the whole division.

In 1952 I was made division chairman, more or less over my own dead body, and I stayed in that spot for about 15 years. The first thing I did when I was appointed was to call up George Beadle of biology and Robert Bacher of physics and ask them to have lunch with me so I could ask them how to be a chairman. So we had lunch together at the Athenaeum, and I kept putting questions to them, and they'd look at each other and say, "Well, how do *you* do it?" Then they'd discuss it and often say, "Gee, *I* don't do it that way." At the end of the luncheon I think it was Beadle who said, "You know, we ought to get all of the division chairmen together and talk about some of these things." That was the beginning of what used to be called the Division Chairmen's Meeting, which has now become the Institute Administrative Council, the IAC.

GB: You didn't do much teaching while you were a division chairman, did you?

RS: Oh, yes, I did! I did both teaching and research. I feel very strongly about that. It's very important that administration figures keep contact with the front-line activities of the Institute. My research suffered, but I continued to do some, and I think that's highly

desirable. The Institute encourages you to do this, and it's a sound policy.

We were building our division all through those years, and I can remember in 1955 when we had an opportunity to hire two young assistant professors. We looked all over for people and finally had a line on three that we'd like to hire, but we could only place two of them. Those three people were Leon Silver, Clarence Allen, and Jerry Wasserburg [now all senior professors in the division]. We had already gotten Frank Press [who has since been a professor at MIT, science adviser to President Carter, and is now president of the National Academy of Sciences] and Harrison Brown [who left Caltech in 1977 to become director of the Resource Systems Institute, East-West Center, in Honolulu], and they were both highly entrepreneurial and good operators. Thanks largely to their imagination — and using some money I had managed to raise independently — we ended up hiring all three of those young men in one year. They have all subsequently been elected to the National Academy of Sciences.

I want to talk a little bit about the geology division in historical perspective. John Buwalda built a very sound operation based on discipline, toughness, and a devotion to field work. He established a classical geology base into which he then integrated seismological work, and eventually Caltech wound up with a whole seismological laboratory in its pocket.

This made us different, and I think established a fortunate frame of mind. Our seismological laboratory is world famous. When Stock died in 1950, we had an extended introspection within the division, and we elected to go into geochemistry. At that time, this was quite an innovation, but our geochemical operation has proved to be a huge success.

As geochemistry developed, a curious thing happened, and I hope that it will happen again. We had on our staff here perhaps three people who would have been called geochemists anywhere. Slowly, other staff members became involved in the geochemistry program, and although we never called them geochemists, other people would have because of the nature of the work they were doing. I'm a classical geologist — a geomorphologist — but eventually I did a lot of work with Sam Epstein [professor of geochemistry]. We wrote a good many papers on isotopic techniques in the study of snow, ice, and glaciers. At that time, this was pioneering work.

Once our geochemistry operation was matured, we began looking around for what to do next. Press, who was still with us at the time, wanted us to go into ocean-floor geophysics, which is a great field. The trouble with it is that you have to have ships. Owning a ship is like marrying a harem: You've got problems.

We debated this for a long time and finally said, "No, let's not go that way. Let's go into space science because the bus, in a sense, is right at our back door. Through the Jet Propulsion Laboratory we have an opportunity to participate." Now, either decision would have been good, but we had a greater chance for uniqueness by allying with the space program, and it worked out well.

We have been one of the top geology-geoscience operations in the country, but you have to work doubly hard to maintain that status. And you have to get good young people and develop a sense of mission, a focus. Barclay Kamb [chairman of the division from 1972 to 1983], I think with good judgment and astuteness, had identified the field of natural resources as the next area in which we could become an outstanding contributor. Over the next 10 to 20 years in this country, natural resources are going to be a major concern, and basic research having to do with the discovery and use of them is going to be required.

GB: Can you tell me about your research?

RS: As I progressed through my career, I came to have a greater and greater interest in what I call "today's geology" — things that are going on currently on the earth's surface in the way of geological processes, events, and their products. I particularly like to work with things you can measure. That's how come, in part, I got into research on glaciers. They're dynamic bodies, and you can measure how fast they move, what the velocity distribution is, what their growth and shrinkage is, and so on. To some degree, the work I did with wind is related to the same thing. We have the desert in our backyard, and since I had always been interested in deserts, the opportunity to work directly with arid-region features was welcome.

GB: How about your experience on the Harold Brown Presidential Search Committee?

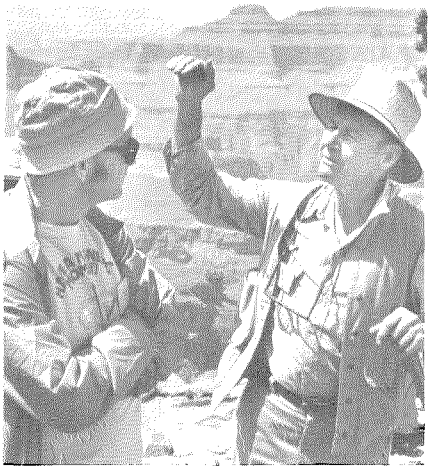
RS: This was a faculty committee appointed in 1967 at the wish of the trustees, who have the final word as to who the president of the Institute will be. Arnold Beckman, who was then chairman of the board of trustees, requested Jesse Greenstein, who was chairman of the faculty, to appoint a committee. Jesse came and talked to me about it, and we drew up a list of possible members, being sure we got campus-wide representation. I don't quite know how I ended up as chairman, but I did. We worked very closely with the trustees. As a matter of fact, they used us as their search and evaluation arm.

GB: Did you compile a series of biographies?

RS: Goodness, yes. We made large files on many candidates. They have all been destroyed now, except for one or two crucial files which rest in the archives in Millikan Library under a sealed setup. It is interesting to note that finding a new director for JPL in 1976 required more work over a longer time and was harder than finding a president for Caltech. I was chairman of the JPL committee too, and we used to deliver dossiers about the candidates to Harold Brown [Caltech's president from 1969 to 1977]. I remember the first one we ever delivered to Harold. He looked at it and said, "Boy, I'd like to see what you guys have on me." And I said, "Well, Harold, that's one thing you *can't* see."

One of the most unusual aspects of the whole presidential search procedure was bringing Harold to campus before he was annointed as an acceptable candidate. Brown was Secretary of the Air Force at that time. That was the era of student disruptions, and you couldn't have brought the Secretary of the Air Force onto the campus of most institutions then without having a confrontation. You could do it here, but even so it was a sensitive issue. We simply said to the trustees that Brown could not be a viable candidate unless he came and exposed himself to the community so we could see what kind of person he was. So Harold came out and spent the better part of three days meeting with small groups of the faculty and a fair-sized group of students in head-to-head sessions, going from one to another of them without a break. He's a very durable guy. When he left, I was completely worn out, but he never lost his cool once during the whole time.

Wherever he goes, Sharp gets a chance to "do" geology. Above, at Freshman Camp on Catalina Island; below, on an Alumni Association trip to the Grand Canyon.



GB: You haven't talked about your space research.

RS: The planetary exploration operation has been important for our whole division. We only got 12 or 14 pictures of Mars from Mariner 4, and they came in very slowly. Furthermore, they didn't look like anything to begin with because JPL had not yet developed its processing and enhancement techniques to any degree.

Mariner 6 and 7, still as flybys but with a much expanded program, came next and eventually Mariner 9 gave us a continuing orbit. With the flybys, in effect you just lean out the window and take a bunch of pictures as you go by. But when you start orbiting, that's a different ball game. By the time Mariner 9 was finished, I'd had about all I wanted. These space missions are very demanding; the pressure on experimenters is heavy.

GB: Let's discuss your field trips for the geology staff people.

RS: It's long been my feeling that the non-academic people at Caltech don't get the recognition they deserve. In our own division I always felt that the lab technicians and secretaries must have felt left out when they saw our faculty and students going on field trips. So we started a non-academic staff field trip.

Initially I ran very simple one-day trips, such as over the San Gabriel Mountains and back by way of Mint Canyon. The first two-day trip was up to the Owens Valley and back by way of Panamint Valley. We stayed overnight at and near Lone Pine. After we had eaten supper in town, we dropped all the people who were staying at the motel off, and then I climbed back on the bus with the people who were going to camp out in the hills. What was left on the bus besides me? Seven girls, and nobody else. So I had seven girls camping with me in the Alabama foothills that night. I had brought some firewood and some popcorn, and we really enjoyed a great evening. [Sharp has also conducted a number of field trips for alumni — on the island of Hawaii, for example, and through the Grand Canyon and Yellowstone Park.]

GB: You've written two geology field guides?

RS: Yes, there are two. The first difference between my field guides and those done by other people is that mine are written expressly for the layman. Second, I tried hard to make them focus on what you see while traveling. I tried to give a continuous running account of what you'll see between Victorville and Barstow, for instance. The last book, on the south coastal region, was a difficult chore. I found it very hard to do a guidebook for freeways, and it's also hard to use on freeways. But I felt if we were going to try to reach the lay public, we had to stick to freeways. People are not going to turn off and follow some back road just because you've written a geological guide about it.

GB: What about some of the awards you've gotten?

RS: Well, let's run down through some of them just to get them in perspective. For example, the business of the *Life* magazine award as one of the ten best teachers in the United States. That's a very capricious selection — to pick out only ten guys in the whole country and say these are the ten best teachers. You have to have certain basic qualifications, perhaps, but after that other things control the selection. *Life* wanted somebody from a small technical school because they already had people from Harvard and other big liberal arts places. Still, they wanted a prestigious school, and Caltech qualified.

One of the most meaningful honors, from my standpoint, was the naming of the endowed professorship for me here at Caltech. I had worked very hard on that project, which was taking people on a geologically oriented boat trip through the Grand Canyon for enormous sums of money to endow the professorship. I was more than a little embarrassed that it ended up bearing my name. The other honor, which is a highly specialized thing, is the Penrose Medal of the Geological Society of America. That's a very humbling sort of award because the former Penrose medalists have been the great names in geology in this country as well as abroad. You have to wonder if you belong on that list.

GB: What about the National Academy election?

RS: I'm going to give it to you straight. My humble opinion is that I was elected to the National Academy of Sciences, not because I did any unusual geological research, which is supposed to be the basis, but because Caltech's geology department was recognized as a real gung-ho operation. People gave me, probably incorrectly, more credit than I deserved for that fact.

I'd like to end this with a sort of summation, which is very personal in some ways. I think luck plays a very large role in what happens to us. I was lucky in simply being at the right places in many instances, at the right time. I was fortunate in having a grandfather who made it possible for me to get a really good education. I don't know anything that has made more difference to me than that. If I hadn't come to Caltech, if I had just quit at the end of high school, I could be like hundreds or thousands of other guys who are in some little town working in a store or a service station. Which is not to say that's bad, but my life has certainly been, to me, a lot more exciting and interesting and satisfying because I had wider opportunities afforded by a good education. □