

James Hawkins Oral History

PETER BRUEGGEMAN: It's May 29, 2012. I'm Peter Brueggeman with the Scripps Institution of Oceanography Archives, and I'm here to do an oral history with James Hawkins.

JIM HAWKINS: I'm James Hawkins, and I prefer to be known as Jim.

PETER BRUEGGEMAN: How did you pursue your career? You have a PhD from the University of Washington, and I would guess there are some major formative influences before that. I have talked to other scientists, and they speak about childhood interests and personal interests feeding into their career. How did you get into your work?

JIM HAWKINS: I might say it has been a torturous path, and I will blame it all on the maternal great-grandfather who was a stone cutter in the granites of Wesley, Rhode Island. I'm sure that has nothing to do with what my path has been, though.

I started out the conventional way, going to a four-year high school. From there I went to the University of Connecticut and was going to major in civil engineering. I won the math prize in high school. When I got to college, I discovered that there were people who had a lot more math than I, and I could not keep up with them. And so I had a roommate who was one semester ahead of me making the same discovery, and he was taking geology, and it was really interesting. So I thought well, I will give it a try. So I switched my major then from engineering to geology at the University of Connecticut and got a bachelors degree there in 1954. Is that right? Yes. I got my high school diploma in 1950, so my college diploma was in 1954, which would be recognized as a bad year because local draft boards owned your body.

PETER BRUEGGEMAN: The Korean War?

JIM HAWKINS: It was known as the Korean War. And I quickly learned that by essentially majoring in ROTC, I could get a four-year college education and get a brass bar when I graduated. And I did. I was on the rifle team, and I was on the drill team, and all of the stuff in ROTC. I managed to do a creditable job in geology as well. And so with a combination of a geology degree and the fact that I had a brass bar as a second lieutenant, I had the option of going to Fort Belvoir, which at that time in Virginia was the engineering center.

So I went down there, and knew I was going to build bridges for the Army and all of that. Well it was pointed out to me that our job, I would be a combat infantry platoon leader, and my job would be to clear the way for the infantry, which did not sound like a very good job.

By chance one day when I was driving around the post for some other reason, I saw a sign that said "Engineer Arctic Task Force." That piqued my curiosity. I walked in, and here was this seven-striper, as we used to call them, a top sergeant in the Army. He was sitting there and I talked with him a bit and told him of my interest in construction in the Army, and that I was also always interested in glaciers in the polar regions and all of that kind of stuff.

And we talked for a while, and as I like to put it, a voice like Charlton Heston came out of the other room, and the guy said, "Leveck (spp?), send that man in to see me," Leveck being the sergeant that I had been talking with. And here was a bird colonel sitting there, and he was the commander of an engineering unit that was going to Greenland to do -- it didn't matter what it was to me, it sounded exciting.

And so at that time they said there were only three ways to get out of the Engineer's Central Regiment, which I was in, which was a housekeeping job: you died, you served your time, or you went AWOL. It turned up that there was another way to do it, and that was to have a guy with connections at the Pentagon get me transferred into this Arctic Task Force. So that was one of my second bits of good luck. I got into this task force, and went to Greenland.

We didn't know what we were doing at the time, but now I know. We were learning how to build a nuclear powered under-the-ice-cap missile base with Russia right over the horizon. So we were learning how to build things under the Greenland ice cap. I spent some time out there right on the crust, about 8,000 feet elevation. That was really exciting stuff. We had electronic navigation stuff, electronic being two cables on each side of the trail you are supposed to follow as you went through big crevasse fields. We navigated our way through so we could bring tractor trains of stuff out to build the space.

So I served my time in there, and got out alive.

PETER BRUEGGEMAN: You had your geology degree while you were there, and you probably enjoyed it on a whole other level being there in Greenland, right?

JIM HAWKINS: I was, because one of the jobs I was doing -- they were trying to build and understand how to build things on the ice cap, but also on the ground around it that froze and thawed on an annual basis. So I was actually mapping the plane table in transit, theodolite line, ... regular transit, mapping polygon fields which were literally big polygonal mass of ground where the stones had all been pushed out from the center of the ice, froze and thawed each year.

PETER BRUEGGEMAN: Was that like in the Antarctic dry valleys?

JIM HAWKINS: Like in the dry valleys in Antarctica. So, we were doing that, and then we would cross-section the things. I had a wonderful guy who worked with me who truly could not read or write, but you could give him explosives, and he could do anything you wanted done with them. His name was Sergeant Wiley Hand. Interesting combination of names. The man truly could not read or write, because I would write to pay him, and he would say, "Oh, I do not have my glasses, Sir, will you show me where I need to sign?" He would scrawl something there.

Wiley Hand helped me map the polygon fields and understand how they were made, and he would blow them up for me when I needed that done. I came to realize that having a college education was not the only important thing in life. Good common sense and knowing how to do things with your hands was equally important. I have always remembered that.

So I got out of the Army, and this was just before the International Geophysical Year was going to start. I'd heard about this. Being totally naïve about politics, I just walked into their office in Washington when I was back there, and I said, "I am getting out of the Army here next month, and I would like to get in with you people with the International Geophysical Year." And they said, "Oh, who sent you here?" And I said, "Well, no, I just heard about you." They should've just drop-kicked me down the hall.

I talked with them a little bit, and they said, "Well, we've got a job down in Antarctica on the Knox Coast." I said, "Well, I just spent the better part of two years in Greenland; what else have you got?" They should've said, "The door," but they didn't. They said, "Well, we've got a job up in Alaska." I

said, "Well, that sounds kind of interesting," so I thought I would sign up for that.

It turned out that another guy got picked for that, and I got a chance to go to the University of Washington to work for the meteorology department, oddly enough, on an equation study project for the Geophysical Year. It is going to be on Mount Olympus in Washington. We went in, and at the time we had to hike all the way in, it was a 28 mile trip in to the base of the glacier, and then you had to climb up the glacier to get up to where we were going to have our place. We went up there, and they came by and dropped a bundle out to us that had tents in it and that kind of stuff. We set up tents.

PETER BRUEGGEMAN: You were an employee then, not a grad student?

JIM HAWKINS: I was a civilian employee. I had a bachelors degree, and this was a long way from graduate school.

We had to hike in to this glacier station. We carried in tents, and it was pretty miserable because it is cold and wet there. The Air Force from McChord Airbase down by Tacoma was going to drop supplies in to us, and our job was to make a target for them to hit. We made a big circle in the snow with some lamp black, that was their target. We were at roughly 7,000 feet elevation, and they were flying at about 13,000 feet. They dropped stuff -- some of it actually hit the bull's-eye. Incredible job those guys did.

One load of stuff did not hit it, and the wind caught it, and the last we saw of it was heading off into an ice fall. That was a load of four fifty gallon drums of fuel, and it turned out that it was not as critical as it might've been. We got all the rest of the stuff, essentially. Some of the lumber we wanted got broken up, but the guy who was running the project had carefully designed the building we were going to be in so that as long as we got multiples of 4x8 panels that were a proper number, we could have a modular building. It fit what we had available, so we built the cabin. We built that fast, because it was just foul weather up there. Rainy and wet, soaking wet all the time. We got that all set up, and the Air Force dropped the stuff in.

That turned into a lot of fun, because we had all this stuff we had to move. I took two plastic Army mountain troops sleds, they were about ten feet long and two feet wide. We made a

catamaran out of two of them with 2x4s on the top. Then in the daytime when it was soft, we dug underneath a load of stuff we wanted to move and built our little raft there, and let it sit all night. And then in the morning when the snow had frozen up, we could haul it on to slide on the snow. We moved tons of stuff that way, just literally hauling it by hand.

Then, because I had experience with explosives in the Army, my job was to build a platform to put the dropped generator on that -- a big diesel generator -- and that was a combination generator shack and latrine. I had a thirty pound shape charge that I set up, and blew a hole in the rock there and turned it all into rubble. We were able to dig out a platform for that. Then I made a railroad out of 2x4s with rock holding them together. You can imagine taking two 2x4s and two slats and nail them together to make a square, to make a track to roll the fuel drums on. So we rolled all of these tons of fuel that we had to our campsite, and got it to where the generator was.

Meanwhile, we built the building. As I say, it was a modular building. We lost some of the load, but we made it fit. We got it all snug and ready for the winter. We were up there, five of us, for the whole summer and into the fall. And then through the winter we shifted off one team at a time, because there was not much you could do up there with the weather so foul. Two of us would be in there for a month at a time, and the other two would come in, and we would switch back and forth.

It was one of those things that everything you did -- your life is on the line in a place like that. You learn a lot. Obviously, we all learned well; we all got back.

PETER BRUEGGEMAN: Well, you had been accumulating skills in high-altitude work and snow and ice.

JIM HAWKINS: Well, it wasn't all that high, it was about 7,000 feet. Yes, the snow and ice stuff. So I became an experienced mountaineer. In fact, I remember that we were up there -- we flipped the coin as to who got Thanksgiving home or who got Christmas, and who got Christmas also got New Year's. I was up there for Christmas and New Year's, which really didn't make much difference. So then on New Year's Day, I thought hey, no one has ever climbed Mount Olympus in the winter. We could be the first people to climb it this year. I took my partner, who did not even want to be there -- he was just doing it for the money -- we got up to where we could start, and I said, "Roger, we can be the first people to climb it this year."

PETER BRUEGGEMAN: You mean with ice axes and crampons and winter mountaineering?

JIM HAWKINS: Yes, and he said, "No," and he untied the rope. I said, "Well, you better hope I get back, because otherwise you've got to get back to the cabin by yourself; I'm going up." And so I did. It was a very formidable peak, it was all sheathed in ice.

PETER BRUEGGEMAN: What year was this? No one had ever summited Mount Olympus before in winter?

JIM HAWKINS: It would have been 1958. No one had ever been there in the wintertime before, and so I knew no one had ever climbed it, no one had ever made a winter ascent. So I made the first one. It was not smart.

PETER BRUEGGEMAN: Are you recognized for it?

JIM HAWKINS: Yes, I think so. The Seattle Mountaineers -- I wrote something from them one time, and they have it in their archives. That was great sport. I got up on top of Mount Olympus, but then I realized I had to get down. I did, as you can see. That was great fun.

So that was the IGY project. I've always said that one of my fringe benefits of the IGY is that I met my first wife there. She was climbing it on Labor Day weekend, which was a long weekend, and we were watching all of the climbing parties go by through our surveying instrument, which turned everything upside down, but it didn't matter. We were recognizing climbing parties that looked like they had women in them, and we wanted to be sure to be around when they came by. But the weather would turn -- it was getting foul, and there was a lot of static electricity in the air. There was not lightning around, but you knew that you could hear it, it would buzz sometimes off the edge of the building. So I was out there truly cutting up fuel drums with a cold chisel and a sledgehammer, just cutting the ends out of them like you would cut a can out, and squashing them flat. This party came down the slope, and I've always said that her hair was like an aura around her because of the static electricity. So the least we could do was invite them into the cabin. We did, and that's how I met her.

Then three years later we were up there together at the cabin. We were married, she was my wife at that time.

PETER BRUEGGEMAN: Did you participate in any rescues or things when you are up there?

JIM HAWKINS: No, I don't think so. It was one of those things that most people, by the time they got that far, they would not have even tried it if they weren't experienced.

PETER BRUEGGEMAN: A higher level of confidence to even be doing it back then?

JIM HAWKINS: Yes, or even try it. You had to climb up through an ice fall and go across a crevasse glacier. We did send one guy down. There were a couple of yo-yos that came up there, and they truly had clothes line tying the two of them together about ten feet apart. One of them was carrying a real pickaxe, and the other guy just had a stick. They wanted to get to the top. We said, "The best thing you can do is go right back down right now while you're still alive," and they did go back down. They were really the only inexperienced bunch that came through.

PETER BRUEGGEMAN: I know a lot of it is about clothing and learning what works well and dressing and all of that. You had obviously immense experience by that time.

JIM HAWKINS: Yeah, but back then -- this is before Gore-Tex. It was before polyfoam boots. No, we wore cotton and wool clothing, and you got soaking wet sometimes. There was a trade-off. You wore a rain jacket that was impermeable and got soaked, or you wore a poncho where it would flop in the breeze, and that was a menace. It was hard to be up there, but people did it all the time. I climbed Mount Rainier and all of the big peaks were climbed that way.

PETER BRUEGGEMAN: You climbed them during your stay?

JIM HAWKINS: No, when I lived in Seattle. That comes later on after we got off the mountain. The Geophysical Year lasted for about a year and a half. We really learned a lot about how a temperate glacier worked. That was picked because it was the southernmost glacier in the U.S., and that was picked to be kind of an endpoint in the different kind of glacier systems.

We collected all kinds of data about incoming solar radiation and outgoing solar radiation, wind velocities, water accumulation.

PETER BRUEGGEMAN: The data went to somebody?

JIM HAWKINS: They all went to the National Science Foundation. They were running the project, and I think it is probably safe to say that all of that stuff now is lost, because all the data from the IGY was stored on magnetic tape with the idea that you could run them back and forth and reverse them and all of that. They did not do it, and so there are probably miles of tape with useless data now. The stuff we had in hard copy that survived.

We had the first measurement of energy exchange between the earth system -- in this case, a glacier -- and the atmosphere. We were measuring incoming radiation and outgoing radiation and so on. That glacier where we worked was sort of an end member of all of the different kinds of glaciers there were. The only southern place that had some snow and ice was on the Palisades in the Sierras. That was just a tiny little thing, and it wasn't really much you could do with it. Here we had a huge mountain of snow and ice.

We did that for the better part of two years. Then I came back two other summers to work up there just for the summer when I was in grad school at the University of Washington.

PETER BRUEGGEMAN: After you are done working for the IGY program, they released you?

JIM HAWKINS: Yes, that was the end of the program. I was a resident of Seattle at that time in Washington, so I went to the University of Washington for grad school. I got my degree in geology there. And that was working on hard rocks, there were no glaciers involved in that.

PETER BRUEGGEMAN: Hard rocks in Washington State?

JIM HAWKINS: Right, granite and metamorphic rocks and things of that composition. That was right along the international boundary in the northeast of Chelan, Washington. It was a very pretty area. There were three miles of road in my thesis area, and that was along one edge.

PETER BRUEGGEMAN: So it was not in a well-studied area.

JIM HAWKINS: No, nobody had done anything up there at all, other than the fact that they had surveyed the boundary between Canada and the US. At that time, they discovered a tungsten mine up there, and the tungsten mine was totally mined out by a

German operation just before World War I. The French and Brits got it back, and they used it to make munitions. My thesis area really was an unknown part of the state, there was no detail at all. So I did that.

By then I was married to this beautiful woman I met on the mountain, and she was my field assistant up there for three long summers. I got my PhD, and a former buddy and classmate of mine was up at the University of Alaska, and he was going on sabbatical leave. He said, "Do you want to come up here for a year to the University of Alaska?" I thought yes, why not? We didn't have another job anyway. That was a sure thing, and we went up there for a year. By then I had a son, as well as being married to my beautiful friend I met on the mountain.

We went up there and took everything we owned in a three-quarter ton truck and drove it up. We went up and spent the year in Fairbanks. That was a hard winter, because everything was so unbelievably expensive.

PETER BRUEGGEMAN: What year would this be?

JIM HAWKINS: This was around 1963. Because the pipeline was not in, the only thing you could drive on between our house and the North Pole was our driveway. There was nothing north of us and we had a really nice place out in the woods we could live in. It was a log house. We had a moose that spent the winter with us, a cow and her calf, and they roamed around in the backyard. My son got to know them. He'd be taking his nap and look up, and he'd say, "Oh, the moose is here again." The moose would look in the window at him. That was kind of fun.

I could have stayed up there, but we couldn't afford it. I was offered a one-year job to go back to the University of Washington as a sabbatical leave replacement, teach for one of my former professor's job. I did that, and taught there for one year. We had a guest speaker who came in from Caltech giving a talk. On the way to the airport with him, another good buddy of mine who had known this fellow said something about, "You got any good things down at Caltech? My buddy here Jim is looking for a job next year." He said, "Well, not at Caltech, but there is a job down at a place called Scripps, it's for one year, and I will check with my friend." He gave me Harmon Craig's name.

PETER BRUEGGEMAN: Who was the Caltech person?

JIM HAWKINS: Jerry Wasserberg [Gerald Wasserburg]. He was up there giving the seminar, and so he kind of interviewed me on the way down, 'what you do, what do you want to do,' all this kind of stuff. I guess he convinced Harmon that I was good enough of a gamble to come down for one year. I came down to Scripps. I told him I can teach this, I can teach that. They said, "No, no, no, we don't want you to teach anything. We want you to do some research." I said, "Okay, I got a project I've been working on." They also let me teach the undergraduate geology course and the undergraduate mineralogy course, and I taught both of those. At Scripps, there was an oceanography group, there was the geological sciences group, I think they called themselves. And then there was an undergraduate program that was totally disconnected from Scripps, but it was taught by Scripps people, and that was run through the chemistry and physics department. So undergrads would get a degree in chemistry and earth science or physics and earth science. Then they would ship them off to grad school. It turned out that the pedigree was so good, if we gave them a good recommendation, they were in.

So that was going on, and Harmon -- in Harmon style, Harmon would appear at 5:00 o'clock in the afternoon and be going home the first thing in the morning. That was his clock.

PETER BRUEGGEMAN: Yes, he was a late-night guy.

JIM HAWKINS: Midnight guy. I got involved in teaching in the undergraduate program, and got involved in an incredible hassle with the bureaucracy, because the physics department had their requirements for a person to be called physics and anything, and the chemistry, it was the same. We had to have a minimal number of courses that we could cram in there. I think they had maybe five geology courses, and Harmon taught one of them. Ed Goldberg taught a chemistry class that they took.

PETER BRUEGGEMAN: Geochemistry?

JIM HAWKINS: No, Ed taught chemistry, real chemistry. I'll come back to him, but that guy was phenomenal. In fact, they all were. Harmon was too.

We had this joint program going, and it was really difficult for the students because we had to engineer courses at a time when they could take them. They could take them at funny times of the day. We had enough credibility so that we got students into really good schools: Yale and Caltech and USC and some other

places, University of Washington. They got into good schools, but they had a minimal geology background. It turned out that was to their benefit, because they knew all about chemistry and physics and they could launch off into a high-level thing, but it had to be geological. Harmon would appear on the scene and run the store. The first year I decided to order the classes with people. Ed Goldberg, a giant -- he would come in the door, and he would start writing an equation backwards across the board.

PETER BRUEGGEMAN: Backwards?

JIM HAWKINS: From right to left, he would be putting this equation on -- a big thermodynamic equation. He would get to the other end, and then he would start talking about it. It was showmanship, but it was impressive. It would be an equation that he had embedded in his brain, and he was reading as he wrote. If you don't think that made an impression on everybody... he was something else.

PETER BRUEGGEMAN: I wish I had video of that for the Scripps archives.

JIM HAWKINS: If you can just imagine, and it was not just like $A = B + C$, it was an equation, a thermodynamic equation. So he would do that. I became good friends with Ed, because he was at that time looking at clays and where they were distributed around the Earth. He had decided that a certain kind of clay was typical of the Arctic, because they have been in cores up by Alaska. I timidly said, "Well, you know, I know a little bit about the countryside up there. It's not because it's the Arctic. It's because of the kind of rocks it is coming from." He went like this -- [slaps table] -- and he said, "You're right." I thought oh, that made my day. I could tell Goldberg something that was useful. He was superb.

PETER BRUEGGEMAN: You were teaching, and you also followed your own research interest during that year. What were you working on?

JIM HAWKINS: At that time, I was still finishing up some stuff I had done in Alaska. In fact, I had two things. The stuff I had done in Alaska, and then I collected a large amount of rock from Mount Olympus in Washington, and I had discovered a mineral there that everyone said could not exist, could not be there. I had a guy from the USGS take me to task about that, and I said, "Look at this." I got out the x-ray diffraction pattern, and I

said, "This is the mineral prehnite. It's there." He said, "It's not supposed to be." I said, "Well, it didn't know that. It's there."

I promptly published a paper on that, which was totally different from anything I'd ever done in igneous petrology. It was a fringe benefit of being up on Mount Olympus. So that came out, and then I did another thing. A friend of mine from the University of Washington was monitoring Columbia River sand. They were looking for stuff coming out of the reactor up at Hanford, and wanted to have a background notion what the sand looked like. He came down here on sabbatical, and I worked with him on the sand project for awhile, Columbia River sands. Totally different from anything I've ever done before.

Up until that time, the only time I went to sea was a troopship coming back from Greenland. I thought it would be fun to go to sea. We would run offshore work out here with that dreadful ship, the Agassiz. Truly a dreadful ship -- it had been a cargo transport ship, it had a flat bottom, and it would literally fling you into the air. They called that the Agony. So we did some stuff offshore out here collecting samples, and I went to Jerry Winterer one time. That was mainly just helping other people do their work, nothing I really wanted to work on myself. Manny Bass worked on most of the samples, and he and I never did much of it together.

My first expedition was on the Washington, and I picked up the ship in Tonga and took it to Samoa. Bob Fisher came in on the Washington, he came in to Tonga at that time, and that was the starting point.

PETER BRUEGGEMAN: So this would be in the 1960s. So after your one-year appointment, they offered you --

JIM HAWKINS: Part of all this was that I was sort of holding the position for another guy and they wanted to bring him here. I was literally holding the desk for him that one year that I was here. He turned it down, and then the job was still available, and they said, "Well, would you like to stay here another year?" I had nowhere else to go, so I said yes. I got my foot in the door that way. At that time, they were two totally different groups. I think they called themselves earth science, but it might've been geology, I don't remember. Then there was the oceanography bunch., people like Bob Arthur, Jerry Winterer, and Al Engel. There weren't very many in the geologic group; I think Goldberg was in that one, and Harmon Craig.

In between all of this stuff, there was the ocean drilling program. I got caught up in that. I ran a symposium here -- where I got people that I thought would be interested in coming, and I knew I did not know enough people around, so I had them suggest other people to come. We had about 10 or 12 people who came here to plan what would you do out in the Pacific if you could drill holes in the ocean, and we had the Deep Sea Drilling Project at that time.

And so we did. We planned -- we set up an array of eight targets, and to my great pleasure, seven of those eight got done. They made it through all of the hoops and hurdles, and all but one of them got approved. The one that did not get approved was partly because they did not know anything about the area. They would have to go out and do a lot of surveying first so you can decide where you wanted to put the hole in this vast part of the Pacific.

By that time, I had done a lot of work with a ship down in the Lau Basin, down near Tonga. I knew a large amount about that Lau Basin. So we proposed five holes to be drilled out there, and actually got two in that place. Then there were some other ones that were done up in the Samoan chain. I forget where they all went now. Of the ones that this working group proposed, we got nearly all of them done.

PETER BRUEGGEMAN: When I look at your publications after you came to Scripps, I can see you did not start out in the Western Pacific. I see you publishing on southern California and Baja, volcanic rocks. And then I see, Western Pacific. How did that come about, that interest?

JIM HAWKINS: Well, there was another guy, and as I say, sheer luck. I didn't come here with the idea that I wanted to go out there. I wanted to do some work at sea, and there was this area about which nothing was known, the Lau Basin. Nothing at all was known about it. I had done some work on Samoa on land and I knew a bit about Samoa. We didn't really know much about the geometry of the Pacific, let alone the geology at that time. It was apparent that there were big, deep trenches out there, and there were shallow island areas behind them. Sure enough, if you dug into the literature way back, somebody got the bright idea that there were continental crusts out there behind these trenches. Well, it turns out there really isn't, but it is trying to become a continent in a couple of places. We thought

it would be interesting to go out there and drill holes out there, where we would find a place.

Before you put the drill holes out, you had have surveys. They had to know everything about the place. I ran site surveys out there in the area roughly around Samoa and all the way down toward New Zealand surveying around that place out there. I found any number of good projects that we could work on. In the process of doing these surveys, I also did a lot of sampling. I sampled a lot of seamounts. In fact, I found one seamount that had just arrived at the Tonga trench and was blocking the Tonga trench from the next trench to the south, like a cork in the bottle.

Up at the north end, the Samoan islands are like a ship sailing along going off to the northwest on the north end of all that.

We surveyed the daylights out of all of that, and we ended up getting about three or four holes drilled around that area.

PETER BRUEGGEMAN: Would this be like a group interest with people here who were interested in the Western Pacific. You're here, and everyone starts talking?

JIM HAWKINS: There were a lot of people -- at that time, not a lot was known. We decided with a drillship -- we didn't want to drill in the Atlantic because they had already been doing that, stitching holes across that. The idea was where in the Pacific would you go to the floor and find exciting new stuff. It turned out that the Samoa area and the Tonga area was one. Then later on we got up into the Mariana Trench area to the north; there was more done up there, but that was one of the later iterations.

PETER BRUEGGEMAN: With whom were you interacting?

JIM HAWKINS: Some of them were my former grad students like Sherman Boomer and Bob Stern, who by that time had gone off and were making a name for themselves. I made sure that the good old boys got to come into this as well, and people I'd met at meetings. There was a Brit, Lindsay Parson, and he and I turned out to be the co-chief scientists on one of the drilling rigs out there, Leg 35 of the Deep Sea Drilling Program.

It was one of those things where after a while you get to know people who are interested in similar things, and some of them are your former grad students.

PETER BRUEGGEMAN: I am not a geologist, but this knowledge of back arc basins seems to have emerged during your time?

JIM HAWKINS: I think so. At the time, no one knew what they were. In fact, they were not even recognized as such. We knew there was a trench, and right on the border of the trench there was an arc of some kind, some of them had volcanoes on and others were just uplifted coral and sea floor material. Then there were others -- like the island of Fiji is set over there, and the island of Fiji has four parts. Nobody knew how they were put together. So almost anywhere you went, you found something that was new back then. You could get a bunch of people together and say let's have a planning meeting, what would be do out there in the Western Pacific? We had the meeting right up there in T-29. We sat there and we planned that whole Western Pacific drilling program.

And as I say, of the eight sites we proposed, seven of them got done. A lot of thought went into picking where you would do this, obviously, or otherwise they would not have funded it.

I think in a way too, though, if you had a good idea, and it was just a little bit known about it -- you had to make it look like it was really interesting -- you had a better chance of getting funding then I think you do now. Now they just nickel and dime you to death with rewrite it this way and do that and so on. I think in some ways it may have stultified progress. Things have to be sharpened to a real good point before you get the money for it, and by that time people have lost interest in it.

PETER BRUEGGEMAN: And you were discovering rich, wide areas...

JIM HAWKINS: Yes, we really were. Everywhere we went, we found something new, and by luck anywhere you went out there, if you couldn't make something good out of it, you weren't a very good geologist. Something nobody had seen before. What does it mean?

PETER BRUEGGEMAN: You knew you were essentially exploring with new tools and the drilling.

JIM HAWKINS: Well, I don't want to sound pompous about it, but I think doing work as a field geologist where you clearly can look at every piece of the stuff, you are looking at what you can see, and if you can figure out where is the place I need to look to bring this together. I often thought that maybe we had

an edge on people who were not field geologists. You know, people who are lab chemists, for example, they can analyze the daylights out of a rock and make sense out of it,... if you knew where it came from and how it fits into the bigger picture.

I've always been really lucky picking my grad students. They have always been the kind of people who share that curiosity and want to know what does it all look like, not just what does that piece -- what is the cadmium content of this thing.

PETER BRUEGGEMAN: Dan Kerrick was an SIO graduate student, and he did something about convergent plate margins actively spreading?

JIM HAWKINS: Dan was one of the people early in the foray doing that kind of stuff, and he was a real good field geologist. He was able to go out there and make sense out of a lot of that stuff. He went from here to Cornell, and then I think at the end he decided to just stick to land geology. He did some very useful, made some useful insights.

PETER BRUEGGEMAN: When he was here at Scripps?

JIM HAWKINS: Yes.

PETER BRUEGGEMAN: Whose graduate student was he?

JIM HAWKINS: Well, he almost was a free agent, but I think he may have been Engel's student. I'd like to claim he was mine, but he wasn't. I don't think he was officially one of my students, although we did a lot of stuff together. I had him as my TA in classes and so on.

PETER BRUEGGEMAN: You mentioned climbing other peaks in Washington State. Did you continue that earlier interest?

JIM HAWKINS: Oh, yes. Well, the last peak I climbed was Mount Cook in New Zealand, the highest point in New Zealand. That was a few years back. My knees have gone out, and I'll never do a high climb again. But yes, I got to the top of Mount McKinley. That was a thrill. Took us two tries. I climbed some peaks in Patagonia. Little ones, there wasn't any really big stuff. I climbed in the Alps. I climbed nearly to the top of the Matterhorn, and then a storm came in, and we never made it to the true summit.

PETER BRUEGGEMAN: I saw in a Scripps annual report, that you hiked across some part of the Himalayas? Was that a combination of your geologic interest plus hiking?

JIM HAWKINS: Well, my first wife loved the mountains. That's where I met her. And my brother-in-law does too. We were climbing in the Grand Tetons. As we were going up there, we met a guy named John Roscelli (spp?), who was a superb mountaineer. And John was taking a client up there. In fact, they had been up there the day before and got chased off the top by a lightning storm and had to bivouac up on this high ridge. They were coming down as we were going up. We got talking with them, and they gave some advice on how to go, so we got up the Grand without trouble, and the weather was good.

He said something about that he was going to lead a trip to the Everest region, and the reason for this was that the guy he was with, his son had been killed in an ice fall on the west side of Mount Everest. That was a really formidable, high-altitude climb. And this guy wanted to go back in there just to see where his son had been killed.

So he said, "We're going to be going, are you interested in something like that?" So we said we were, right on the spot. So we went by way of China into Tibet. It took forever to get there riding dreadful army trucks and that kind of stuff. We got up onto the lower levels of Everest, and then we went up to a certain level, and it was as far as the father wanted to go. And so my wife and I said, "We're going to just keep on going as far as we can." We knew we couldn't go all the way to the top anyway. So we went up to a place where we could look down on Nepal, right at the place that was called the Lho La. There's nothing low about it at all. So, we got up to that, and that was glorious.

And then we thought well, we should come back and do that down there, which was Nepal. So we came back and signed up for a trip to go to Kathmandu, and then we trucked up to the border and hiked for about three weeks around the loop through Nepal. Got up on some really good peaks, and that was a glorious expedition.

We had about six people with us, and they were dropping like flies. They just could not keep going up, but Donna and I decided we were going to go up as far as we could. And we got up to this block about the size of this room, just about as high. It was a big snow block. And there were two Sherpas

lying there in the snow smoking, and they said, "It's Sherpa oxygen." We could hardly breathe, and so we said, "Well, we're going to go up there." They said, "No, we'll pull you up there." We said, "No, we will climb." This one guy bounds on ahead and cut a few steps for us, and we made use of the steps. We climbed up this thing about this big, gasping for breath. We get to the top, and this one Sherpa took my wife by the arm and took her over here, and he said, "You are there now, Ma'am." There was nowhere else to go. We were on top of this block. That was a stupendous site. We could look back and see Everest, and we were in the middle of the southern Himalayas and Nepal. That was a nice trip.

And then we went to Everest three times. The first time we went was a Sierra Club trip, and that was an absolute disaster because the leader of the trip got carbon monoxide poisoning. He insisted on sitting on top of the load under this canvas tarp with exhaust blowing in on him. He was actually wiped out, and my wife and I and another woman essentially took over things and ran the store for him for a while until he got sorted out. We've been to the Himalayas three times, all of them great fun.

PETER BRUEGGEMAN: When I look over your publications, you have co-authoring with several Scripps people. Did you have some primary collaborators at Scripps?

JIM HAWKINS: Yes, most of them were my students.

PETER BRUEGGEMAN: Which ones would you say you collaborated with a lot in your work?

JIM HAWKINS: My prize is Jim Natland. He is Mr. Science right through and through. He still going strong.

PETER BRUEGGEMAN: And why would you describe him as your prize?

JIM HAWKINS: Well, he is still going strong. He got his PhD in 1975 when he was probably 25 then. He is such a polymath, I guess would be the word for it. He just gobbles up everything, and he can take this, this, and this, and say, "Look at what we've got here." Jerry Winterer is a great buddy of his as well. He actually spends more time communicating with Jerry than with me now. He was really the prize guy.

[My student Richard] Nishimori got his degree here and decided what he really wanted to do was get into business. I don't think he ever really did any geologic stuff at all.

Dave Clague is still going strong, he's up at Monterey at the aquarium.

Cindy Evans, she was one of my prize women students. She got into the astronaut training program. She was going to go to Mars. And she said one day she decided that she would be a grandmother before they ever go to Mars. Well, she is a grandmother right now. Her job has been down at NASA in Houston training astronauts on what they can see from space and what to make note of. She has probably taught more people who have been hired into outer space than anybody else.

Julie Dieu went up to Oregon and got a job up there working for the highway department designing roads in logging areas. And she is still doing that, essentially engineering geology.

Elizabeth Wright is back in the Chicago area. She teaches at a junior college that she's teaching at, teaching geology there.

PETER BRUEGGEMAN: Memories...

JIM HAWKINS: Yes, my first wife, Donna, she said, "They have become our other kids, but the nice thing is we are not responsible for them." Whatever happens is not our problem.

PETER BRUEGGEMAN: So it was fairly easy to get ship time earlier, and now it is a much more elaborate process. Science has changed, you've talked about it, the science at Scripps.

JIM HAWKINS: Well, partly it's because it has gone into the hands of program managers, and they are literally managing the programs to death. So that by the time something gets drilled, you've forgotten why you wanted to be doing it. Eight years ago you started this project. I think early on it was maybe the glory days of ocean exploration. If you had a good plan and could show how it would either be something totally innovative or how it would tie in with something already done, connecting up the dots, as it were, you had a pretty good chance of getting funded.

Of course, the other part of that is that there are so many more people, but still only one drillship. The research ships themselves are so expensive to operate.

PETER BRUEGGEMAN: You could see the changes over the span of your career certainly.

JIM HAWKINS: Oh, yes, and it was one of those things that I'm glad I got on the train when I did, and I'm glad I got off when I did. But to have a plan to do something and realize it would be five years before you have a hope of doing it -- that takes a lot of the spark out of it.

PETER BRUEGGEMAN: Certainly from my viewpoint of being involved with the archives, there is definitely a golden age.

JIM HAWKINS: Nothing that we did at sea could have been done without the captains that we had and the ships' crews. Those guys made it all work. We had a guy named Kurt Johnson. That man sat for three days without leaving his chair in the wheelhouse when we were in a typhoon off Guam. We were in it for four or five days, and I know for three of those days Kurt was sitting there in that thing tied in up in the wheelhouse keeping us heading into these things. We would literally go up, up, up, up like that, and you would go over the top, and you would feel the screw from under the water, and the ship would shudder, come down on the other side, and again like that. Endless. Other people like him -- and there was Al Arsenault. He was one of the old salts, and was a good man too. There were a couple of them that you could say, "Well, you know, he can go down with the ship if he wants," but most of them have been just absolutely superb people.

Then the marine techs... people like Bob Wilson, who was a super guy. And George Hohnhaus, he was a giant of a man, a great big burly guy. I think he had been a hard hat diver in the Navy; he was a big tough guy, and he would work around the clock for you. Really good people.

Without them, we would not have gotten anything done. I could rig a dredge, I could even splice an eye in a thimble, I knew how to do that. My dad had taught me that. But they did it, and you could concentrate on figuring out what you are going to do next and where was the best place to look for it.

PETER BRUEGGEMAN: Did you do a lot of land geology too?

JIM HAWKINS: I did a lot of work in the Cascades, and when I was up in Alaska I did work up there. It turned out that the Alaska Range was not unknown, but almost anywhere you went in the Alaska Range, you would find something nobody had seen before. It still wasn't very well known. I had a project up there on the Richardson Highway when it ran into Anchorage from

the North. And part way down the Richardson you went over the crest of the range, and there was a big glacier there. It's a volcanic glacier. And to me a glacier was an access road. I knew enough about glaciers that I could tell this one was an okay one to be out there by yourself. A couple of times my wife went with me. I was able to go up there and truly find stuff that nobody had known before. Metamorphic rocks, and I wrote a paper about that.

PETER BRUEGGEMAN: You mentioned Samoa early on. Was that after you came to Scripps that you started going to the Pacific, and then you are out there on a ship and you were looking at geology on land?

JIM HAWKINS: Well, I can tell you, stuff on land is obviously easier to get to, and you can see it more easily too. So when I've had a chance to do something inland, I've done it. But in more recent years, I haven't been doing much, partly because I've got two artificial knees now and I don't want to wear them out going up too many things. I have not had any land geology projects in maybe 20 years now.

PETER BRUEGGEMAN: And by the time you arrived at Scripps, plate tectonics theory was pretty well worked out and accepted, or was there still a lot of discussion? Where were you in that whole thing?

JIM HAWKINS: There were a couple of symposiums that they had that I got to go one just because you put your name in and why you wanted to be there and what you could contribute. We went to some of them, and we literally began to develop the concept of plate tectonics. It was an idea that went back to the '60s, I suppose. I don't even recall when it got started.

It was one of those things that if you lived on the East Coast and knew anything about the Atlantic Ocean -- and in a way I discovered plate tectonics in the second grade, as most people did. You could put South America and Africa together, they would fit. It looked like they had been pulled apart. But people did not believe you could do that, and there had to be another explanation.

I think it is safe to say that it was only because of the threat of the Russian submarine fleet that it got going when it did. They got the idea that you could detect a big magnetic object like a submarine with an airborne magnetometer. Of course, you can, but you have to know what the background field is. Nobody

had any notion that there was anything special about the magnetic field of the ocean, but nonetheless they thought well, we should make a survey across the mid-Atlantic Ridge and look at what the magnetic pattern looks like. That is when they found this symmetry across the ridge. And Vic Vacquier, who was here at Scripps, played a big role in developing the magnetometer that was used, as well as -- my understanding is recognizing the symmetry for the first time.

PETER BRUEGGEMAN: That was before your time at Scripps?

JIM HAWKINS: Yes, right. This would have been probably in the early 1960s or even the 1950s, and they had this idea of finding a submarine by seeing this magnetic signature. That is why they made the first survey, or one of the first surveys. I think the first survey they did was off the coast of Oregon, one of the most complicated pieces of seafloor imaginable. Maybe you have seen the picture in the book, because they have a book about magnetics. There is a very colorful pattern of things going in all directions, and that is the magnetic field there. That is because the plates have been broken up. They originally did have a symmetry, but they had been damaged.

PETER BRUEGGEMAN: So you were following along with this when you were at University of Washington?

JIM HAWKINS: No, no, the people at the University of Washington, they would say, "Well, the oceanographers might think they know something about how the Earth is formed, but they sure don't understand it." And the oceanography people would say, "Well, the geologists may think they know something about how the oceans have formed, but they sure don't understand it." They did not have this idea about the seafloor being a dynamic thing.

PETER BRUEGGEMAN: So you came to Scripps, and then you started hearing a larger view?

JIM HAWKINS: Yes, I had heard nothing but negative things about it up in Washington. And then mind you, this was back in the 1960s, and so not all that much was known about it. And as I say, one of the first detailed surveys they did was this broken jigsaw puzzle up there off Oregon, where it does not make any sense, but in the Atlantic it did. When they started running several lines across the thing, then it began to make a lot of sense.

PETER BRUEGGEMAN: It's been attributed to Harry Hess.

JIM HAWKINS: I think that's a fair assessment. I never knew the man, but I think most people would give him lots of credit for it. But then people can go back more and say well, you know, there was someone else who said it back in the '20s, and back, back, back, and so on. But I think Hess was one of the first, partly because he was involved, I think, in the Navy. And he was involved in this 'how do you find a submarine' bit. But that's my guess, I don't know that as a fact.

PETER BRUEGGEMAN: Well, I know like Robert Fisher has told me that he thinks at the time people at Scripps realized more what was going on, it's just that they had not published on it, but I don't know. I've only heard that from him, and I know there are historians teasing out these nuances on plate tectonics. I just wondered what you thought about it as you came here to Scripps and you were in this fertile environment, certainly, with so many of the players.

I am very late to the Scripps party, only since 1984. But you definitely learn people's qualities, and in the Library here, there's Bill Nierenberg and his booming voice, charging into the back door of the library for whatever needs.

JIM HAWKINS: I always liked him. He had gone to Columbia, and he knew about two rock units in New York City. At least once a year he would stand in my door, and he would say, "What the hell you doing? What am I paying you for? Tell me what you're up to." And so I would tell him what I was up to. I realized at the time, he did not really care what I was up to, but he wanted me to know that he cared enough about what his people were doing to go door to door. I always admired him for that.

So invariably we would end up in the Fordham ice schist that he knew about in New York, and I could always plan on that. But I assume he did it to everybody else too. He came by almost every year, or at least once a year he would come by, "What you doing? What the hell am I paying you for?" So I would tell him what I was up to, and then we would go off to the Fordham ice.

PETER BRUEGGEMAN: Did you interact a lot with Jerry Winterer or Harmon Craig or any of your colleagues?

JIM HAWKINS: Well, because of the separation of the units, I knew of Jerry as a person, but I did not know what he did. It was not until they reorganized things, and they had what became

the GRD. Because it was the geosciences division, and he was in oceanography; there were people like Jerry and Bob Arthur and Mike Mullin, they were all in the oceanographic thing.

PETER BRUEGGEMAN: So you interacted with Ed Goldberg on research? Or just as a colleague?

JIM HAWKINS: No, I just went to his classes and learned how to teach. No, I had very little to do with Ed. You know, other than timidly pointing out to him -- it took a certain temerity -- pointing out to him that green clays were not necessarily an Arctic product, they were simply in the Arctic water from the source that they came from. And Ed realized that yes, why not?

I'm trying to think of the other people who were here at that time. Manny Bass, I guess we've already been through Manny Bass. He was here. He got annoyed with the place, and I think part of it was because he did not get tenure here. But Manny would never publish anything. To my knowledge, when I was here -- he never said, "Here is a reprint of one of my newest papers." He was always working on a project that never got finished, and so then he left.

PETER BRUEGGEMAN: That's not good.

JIM HAWKINS: No, and I have no idea whether he was advised to leave or whether Harmon may very well have said, "You better get a better place than this." I think he went to Honolulu then and was in the geology department there, and then stepped off from that. I'm not sure where he went after that. He was a very bright guy. Very bright.

PETER BRUEGGEMAN: Is there something you can think of that we have not talked about?

JIM HAWKINS: Well, I think one of the things that I can say is that nothing I have done that is worthwhile here -- I could not have done it without all of the people, what I call the infrastructure. I mean, truly.

PETER BRUEGGEMAN: What sort of infrastructure are you referring to? You mentioned the ships, and I understand that, and the techs.

JIM HAWKINS: Yes, the running of the ships themselves. The fact that when you have a computer problem, I know I can call Karen Fong, and Karen Fong will direct me to someone else who

will come in and fix it for me. There are people that are kind of hidden in the woodwork, but without them the place would not work. I think Karen is one example of that, a very vital type of person to have.

And then, the whole support team. They've got it all structured so that if you want a green pencil you've got to go to this woman, if you want a red pencil you've got to go here. But they all work in GRD, as a very cohesive unit. They seem content with each other.

PETER BRUEGGEMAN: And long-established. I mean, we have seen around Scripps other things change and merge, but GRD is very stable, long-lived.

JIM HAWKINS: I hope it stays that way, because it brings together people who are of a like interest, namely the hard parts of the Earth. The rocks, essentially, and the stuff that compose them. They go off into all kinds of appendages from that, people looking at the gases in the rock, people like Dave Hilton. But that is all part of the story.

PETER BRUEGGEMAN: Did you interact with Francis Shepard much at all?

JIM HAWKINS: No, not really. Well, I will say this; the first book I ever bought that I did not have to buy in geology was Shepard's marine geology book.

PETER BRUEGGEMAN: The *Submarine Geology*?

JIM HAWKINS: *Submarine Geology*, the first one. He had two. So I got it, and then I went to his class. It was awful, just awful.

PETER BRUEGGEMAN: I've heard that.

JIM HAWKINS: He was a terrible lecturer, and could not follow a train of thought more than three feet. That was a big disappointment, but I think others maybe had a similar experience. Shepherd was a perfectly nice person, and his wife, Elizabeth, another delightful person.

I don't know if you mentioned Harold Urey, but Urey was here at that time too. He was a fine person. Frieda Urey held the women at Scripps together, at least in the earth science part of it. My first wife -- she arrived here, and she had been a faculty

wife in other places, but not here. And Frieda Urey took her, and she became one of Frieda's women.

PETER BRUEGGEMAN: Did you live locally?

JIM HAWKINS: We lived in Bird Rock initially, and it wasn't until I got tenure here that we decided well, now is the time to get a house. I bought a place up on Sugarman Drive. Right at the very bottom of the hill is a place on the east side. It is all covered with picket fences and so on. That used to be my place... 8527. It was one of these big Drogin houses.

PETER BRUEGGEMAN: Steve Drogin or his father built it.

JIM HAWKINS: This would have probably been the father, I don't know. The house was built in the '50s. We had a house there, and it was really great. I used a bicycle to work every day, and it was handy. Our son went up to the school right up on top of the hill there.

PETER BRUEGGEMAN: So you felt part of the social fabric a department because of Urey's spouse?

JIM HAWKINS: Well, my wife did.

PETER BRUEGGEMAN: Well, you were already part of the fabric.

JIM HAWKINS: Yes, I was. In fact, I wrote a paper, and I had the pleasure, I must say, of being able to write a paper with Harold Urey about meteorites. I made some minor contribution to it.

I remember Harold at that time -- he never knew, but he would always marvel at why the moon was exactly where it is. If it was any closer, it would come in, and if it was any farther out, it would go away. He never understood the modern view of it, that it is a splash of Earth that was splashed off when something hit, and splashed this glob of stuff off, that was following the law of the gravitational field. It either came back in, and that which is out beyond would have kept on going, and that was just globbed together right there. That was why the moon was formed right there. Harold would say, "I wish I could understand. Why is it there? Right exactly where it needs to be to fit." It was just the leftovers; that's the modern thinking about it, anyway. He was a nice guy.

As I say, Frieda was a mom for all of the women. She held them all together.

PETER BRUEGGEMAN: Of GRD, or larger?

JIM HAWKINS: Well, I think of all of Scripps. It was not just GRD, but it was all of Scripps that Frieda kind of held them together.

PETER BRUEGGEMAN: In the sense that there were social gatherings, or what did she do?

JIM HAWKINS: Well, I don't know that we ever went to any big social gatherings ourselves, but I know that Frieda had things for the women. The Scripps women would have teas and whatever, trips to the museums and that kind of stuff. Frieda was supermom for the faculty wives. I don't know whether that applied only to the earth science people, but I suspect it might've been for everybody at Scripps.

PETER BRUEGGEMAN: Was it through the aegis of the Oceanids at Scripps?

JIM HAWKINS: They didn't exist then. They are an outgrowth of that, I'm sure. You could put it that way.

PETER BRUEGGEMAN: It was definitely a Scripps oriented thing?

JIM HAWKINS: Yes, I remember Harold, when he had his 80th birthday, my wife got to carry in the last cake. She was 75. They had 16 cakes, five years apiece, maybe it was eight. Anyway, they were increments of age, and my wife got to carry the last one in. They all came marching in for Harold and set them down around him. He was always a very dignified guy. I never saw him not wearing a suit and tie.

PETER BRUEGGEMAN: I can see them wearing suits and ties up on the main campus there, but it's hard to envision down here at Scripps.

JIM HAWKINS: Well, they didn't down here. When I was teaching mineralogy and beginning earth sciences, that was taught on the upper campus. I was sort of told that I didn't really have to wear a necktie, but a jacket would be a good idea. You can imagine being up there in the fall, and what the falls can be like here, really hot.

The campus has all changed now, but those big buildings that are right there at the edge of the street, they were not there, of course, then. They had a big dining hall in there, and they had classrooms around that somewhere,... low structures.

PETER BRUEGGEMAN: What did you teach at Scripps? Which graduate courses?

JIM HAWKINS: I helped invent a sequence of courses that we taught for the new incoming graduate students to bring them all up to a common level with what we thought they should know. We had four separate classes. I started with the supernova that condensed to make the terrestrial system, and I would bring it right on down to the making of the planets and making Earth, and then brought them into plate tectonics.

PETER BRUEGGEMAN: So you had a whole flow to it.

JIM HAWKINS: Yes, and that was the part that I taught... the hard parts of the Earth, ... make an earth, and make the continents and make the ocean basins. Peter Lonsdale would teach about the fabric of the sea floor, how the plates spread and all of that kind of stuff. We had one about sedimentology, and then -- I'm not sure if we had a separate class on oceanography, or they would have taken Joe Reid's class, probably it was the latter.

We set up the thing so that in the course of the first year, they had three different quarters. And in one quarter they would take two classes, and in the spring, that's when I would teach the mineralogy course. Because a lot of the people we brought in had never taken a course in mineralogy, that would be taught both for the upper campus students and the grad students who needed it. Some of them had already had it.

We probably had about seven different courses I taught at various times.

PETER BRUEGGEMAN: Is that sort of approach still in place today, a core curriculum?

JIM HAWKINS: No, I don't think so, we don't have that many students. Those who are in what you might call geologic things are tangentially geologic in the usual sense. I think Dave Hilton has students working on gas chemistry. I'm not sure what the pattern is.

PETER BRUEGGEMAN: Yes, I know what you mean, it is not like it is a large program.

JIM HAWKINS: No. Especially when we had it combined with the first sequence of courses, the upper division undergrads would take them as well. Often they were better students than our grad students. They were really very bright people.

Since I don't have to fuss with it, I have not paid much attention to what is going on now.

Well, I'll tell you, to go back to square one, I just felt that I've had more than my share of good luck. I really have. I've always felt that I've been treated well by Scripps. Maybe there are some people who think they have not been, but I have always thought that I have been treated well. Especially, as I said several times, without the support structure we have available here, you could not do anything.

PETER BRUEGGEMAN: Have you been fairly independent, not needing as much? Is that what you think maybe someone else may say they have not been treated well, that they needed more to do their research?

JIM HAWKINS: No, I don't know that, but over the years I've had big needs like for ship operation help, and I've gotten it. Since I retired, I have sort of been funding myself, and I don't feel like I need to have my hand in the till anymore.

PETER BRUEGGEMAN: Your research money during the active part of your career, was it all NSF, I assume?

JIM HAWKINS: Yes, NSF. I must say that GRD has been very supportive, because when I said I would give up my billet if I could keep my lab and office space and get some minimal contribution for research support, I got that.

As I say, I jumped out the window and landed in the soft spot.

PETER BRUEGGEMAN: Well, I think we're done then.

JIM HAWKINS: Okay, very good. Well, I enjoyed it.