

AN INTERVIEW WITH DR. GORDON LILL

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Today is the 20th of March, 1995. This is David Van Keuren. I'm sitting in Santa Barbara/Goleta, California talking to Mr. Gordon Lill at his home. We're going to discuss his career with the Navy, with the Office of Naval Research, and his involvement with the project called Project MOHOLE.

Just for some background information, Mr. Lill, can you tell me when you were born and where?

Lill: Yes. I was born February 23rd, 1918, at home on the farm halfway between Wichita and Hutchinson, Kansas. This is in south central Kansas.

Van Keuren: What did your parents do?

Lill: They were farmers. We went through the Depression on a farm.

Van Keuren: Where did you go to school?

Lill: Kansas State University.

Van Keuren: This was in Manhattan?

Lill: Manhattan, Kansas.

Van Keuren: The dates for this were? When did you go to school?

Lill: I started in 1936 and got out in 1941. I think I actually graduated in summer school, in '41.

Van Keuren: What did you study?

Lill: Geology. I majored in geology, minored in chemistry.

Van Keuren: After you took your degree in geology at Kansas State, this was during World War II, what did you do then?

Lill: It was finished before World War II. I got my BS in that [geology], and after the war I went back to Kansas State for my masters degree. From there I went up to the University of California, Berkeley to get started on a PhD. I ran out of financial assests and I had to stop and go to work.

Van Keuren: You served in the United States Navy during World War II?

Lill: Yes.

Van Keuren: Do you want to tell me about your service career during World War II?

Lill: I got into the navy through the ninety day wonder school in Chicago. I heard on the radio that the Navy was - that people with college degrees could go to this school and get an ensign's rank, commission. So, I hopped into a car with a friend of mine and we went up to Kansas City and took the physical exams to get into the Navy. I was sent for a month then on a ship, the ship USS ARKANSAS for sea duty and then shipped back to Chicago to begin ninety days of intensive training, at the end of which time I was commissioned an ensign in the US Navy. I took inactive duty and went back to Kansas to work for the Kansas State Highway Department as a geologist. Then I was called up to active duty in the Navy and shipped back to the Woods Hole Oceanographic Institution where I studied the use of the bathythermograph,

which was an ocean temperature measuring device, which was used help catch submarines during World War II.

Van Keuren: The ninety day training that you underwent at the University of Chicago, what did it cover?

Lill: It covered such things as seamanship, navigation, and use of large guns.

Van Keuren: Standard navy training.

Lill: Standard navy stuff. No languages or any of that sort of thing. It was all military stuff.

Van Keuren: Then you got called up and you went to Woods Hole. How is it that you were sent to Woods Hole; that you were selected to go to Woods Hole?

Lill: Because I had a degree in geology. I didn't know it at the time, but a man named Roger Revelle was setting up an office in Washington, D.C. He was from the University of California, and he put a block on people with degrees in science and particularly geology, so that he could ship them around the world with these bathythermographs and get them installed on escort ships to measure the ocean's temperature and help catch submarines.

Van Keuren: So, this was all part of an ASW program?

Lill: Yes.

Van Keuren: Do you want to describe your experiences at Woods Hole?

Lill: Well, Woods Hole was kinda going to school five days a week. We took weekends off and went up in the Adirondacks, up in Vermont and Maine. The fall was beautiful. We studied the use of

the bathythermograph there. Of course, the ocean temperature layers would bend sound rays. Submarines could hide under the thermocline, in the mixed layer at top. The ocean temperatures would drop off and the submarines could hide down there under this mixed layer and would be very difficult to detect.

Van Keuren: How long did your training last at Woods Hole?

Lill: I was there about ninety days. Then I was shipped down to Panama -- along with some bathythermograph equipment -- where I spent the next year or two trying to get it installed on ships. Then I was transferred back up to Norfolk, Virginia where I did the same thing. I was attached to the Commander Service Force, Atlantic fleet. From Norfolk, Virginia, I was transferred to the Bureau of Ships where I went to work under Roger Revelle's supervision.

Van Keuren: You say you tried to get bathythermographs installed on ships. Did you have trouble in this area?

Lill: Yes, the black shoe Navy wasn't particularly interested in having bathythermographs installed on their ships. I was chased off of two or three ships before I finally got one installed and somebody to take me to sea and show them how to work it. It was on a navy gun boat.

Van Keuren: You met a lot of resistance amongst the commissioned navy.

Lill: They didn't want that kind of equipment cluttering up their deck. It involved the installation of a winch and a boom to lower the bathythermograph into the water. They didn't see

any reason for it.

Van Keuren: What percentage of the Navy actually had bathy-thermographs installed, would you guess?

Lill: I have no idea. We got some installed and the Navy gradually began to get interested in it. Particularly when they invented a bathythermograph to go on the submarines. Submariners were much interested and very "glad to have it" because they could themselves hide under this layer and avoid detection by the Germans.

Van Keuren: They actually saw a use for it?

Lill: Yes, submariners were interested in this kind of thing.

Van Keuren: What about the surface ships that were sub hunting? They didn't see the use for it?

Lill: No.

Van Keuren: You said you went back to Norfolk and worked with Roger Revelle?

Lill: He was in Washington, at the Bureau of Ships.

Van Keuren: Washington?

Lill: That was after Norfolk.

Van Keuren: You came and worked for him in the Bureau of Ships?

Lill: I finished the last two years of the war in the Bureau of Ships in Washington.

Van Keuren: What did you do here?

Lill: I went around and helped install the submarine bathy-thermographs.

Van Keuren: You did this for the last portion of the war?

Lill: Yeah.

Van Keuren: This was mainly on submarines.

Lill: Installing on submarines was mainly what I had gotten involved with.

Van Keuren: Do you want to describe Roger Revelle to me. What was he like back then?

Lill: He was very tall, a somewhat sorrowful looking man. Looked very thoughtful. Very persuasive. He could argue with the high mucky-mucks in the Navy very effectively.

Van Keuren: Is he the one who had talked the Navy into installing the bathythermograph?

Lill: His office. The bathythermograph was invented at Woods Hole, by Athelstan Spilhaus and Alyn Vine. Particularly Spilhaus gets the credit for inventing the bathythermograph, but Alyn Vine also worked on it. Then Roger knew Iselin, who was the director of Woods Hole Oceanographic Institution. Somehow Roger got his commission activated and came back to the Bureau of Ships to start improving the bathythermograph. Finding out how to work it; inventing slide rules for its use, and the whole bit. Then ran this out of the Bureau of Ships.

Van Keuren: This was all in the Bureau of Ships. Was it a specific department within the Bureau of Ships?

Lill: It was in the sonar equipment department. I don't know what they called it. If I knew, I can't remember.

Van Keuren: You worked on this until the end of World War II?

Lill: Yeah.

Van Keuren: At the end of the war, when you were decommissioned, what did you do?

Lill: I went back to Kansas State University and got a masters degree and went on out to Berkeley, the University of California at Berkeley, to work on the doctorate.

Van Keuren: This was in geology.

Lill: In geology. Actually, it was a mistake. I should have gone on down to Scripps, but I didn't know it at the time.

Van Keuren: You said you didn't finish your PhD because you ran out of money.

Lill: Yeah.

Van Keuren: What did you do when you left Berkeley?

Lill: I got an offer from the U.S. Geological Survey, from a fellow named Tom Hendricks, to go to work for the USGS. So, I went back east to go to work for them and decided to stop around and see Roger Revelle who was still in town. I told him I was going to work for Tom Hendricks in the Geological Survey. He said ``Oh, you don't want to go to work for them. You want to go to work for me.'' I said ``I've told them already that I'm coming.'' He said ``I'll take care of Tom Hendricks.'' So, I guess he did. I went to work for Roger instead of the Geological Survey. Roger was, at the time, helping to start the Office of Naval Research. So I showed up in 1947, in February.

Van Keuren: You were with the Office of Naval Research almost from its beginning.

Lill: Almost. It had been going six months to a year before I

got there, but not much longer than that.

Van Keuren: Do you want to describe what the Office of Naval Research was like in this very early period.

Lill: Well, the sky was the limit. We were very adventuresome. Lots of stuff, equipment, was available as left overs from World War II. You could get trucks, you could get jeeps, you could get airplanes, and you could get ships. Almost anything you wanted, there was some surplus store of it somewhere. You could get this stuff, and ship it out to the universities, and let the scientific community use it.

The work was done in branches. There was the Geophysics Branch where I was. The Physics Branch, and the Nuclear Physics Branch, the Mathematics Branch, and the Medical Branch, the Submarine Warfare Branch, the Amphibious Warfare Branch, Surface Warfare Branch, Medicine/Medical Branch, Biology. You name it. There was a branch to run it, and they got appropriations through the Navy. Each of us branch heads had to justify our programs. The justifications had to be sent to the Hill. You got your funding that way, as a part of the Navy's budget.

Van Keuren: What were you doing under Roger Revelle, when you started off?

Lill: We were starting to get Oceanography going, on a big time scale. We helped to establish the Department of Oceanography at the University of Washington. The Department of Oceanography at the University of Rhode Island was enlarged, picked up and started by Johnny Knauss who had recently got his Ph.D. from



Scripps. The University of Miami, the Department of Oceanography, was helped. Texas A&M Oceanography was established. Scripps and Woods Hole were supported. They were already established. The Lamont-Dougherty Geological Observatory was created and flourished under Dr. Ewing with ONR support. One of the most important things I think when I think things over was the calibre of people I was able to take on-board as time went on. We got Art Maxwell from Scripps, a recent Ph.D. in oceanography from Scripps. Johnny Knauss was asked to come back and head-up the new Department of Oceanography at the University of Rhode Island. I asked Charlie Fish to think of hiring Johnny Knauss for this job. I wrote him a letter to that effect and sure enough they hired Johnny Knauss from Scripps, a recent doctorate from Scripps. We persuaded Dick Fleming, Dr. Richard Fleming, who was one of the authors of Sverdrup, Fleming and Johnson's book on oceanography to go and head up a new department at the University of Washington. He came from the Navy Hydrographic Office to go to Washington to do that.

Van Keuren: So, you were doing a lot of work trying to establish academic oceanography.

Lill: Yeah. Great endeavors in those years. It was ten years after 1947. Throughout the 1950s, almost anything you wanted to do you could do. Anything you could get money for it, you could do.

Van Keuren: You were also funding individual research proposals in oceanography?

Lill: No, generally speaking, it was institutional. We supported Scripps; we supported Woods Hole; we supported the University of Rhode Island. The directors of these institutions were the chief investigators. They got their money; they were responsible for seeing it was properly spent and that it was spent on good science. Not necessarily science that would prove immediately of value to the Navy, but the best you get. So it was a very broad supporter of oceanography, almost like the National Science Foundation. As a matter of fact, what we established at ONR, I think, still exists. It's probably the way the National Science Foundation set up their support.

Van Keuren: How did you decide at which institutions to support an oceanography program?

Lill: Well, Woods Hole and Scripps already existed. Various oceanographic people existed at the University of Washington; there just wasn't a department. They were all separate; marine chemistry, marine biology, marine this, and marine that. So, they brought it all together and called it a department. We influenced their doing that. Miami already had an oceanographic program. F. G. Walton Smith had a small group going. So we enlarged him and gave him increased support. Similarly, Charlie Fish had a small department going at the University of Rhode Island. We talked the University into hiring Johnny Knauss and letting him grow and develop and financed a new Department of Oceanography, which flourished quite well. Texas needed a department of oceanography somewhere, so Roger Revelle was instrumental in getting this

established at Texas A&M. So, we had the country surrounded. The University of Washington. Oh yeah, we started the Department of Oceanography at Oregon State University. We gave Wayne Burt ten thousand dollars and said ``We'll give you \$10,000.00 for three years. Then, we'll look at it.'' He took the thirty thousand dollars and created the Department of Oceanography at Oregon State University.

Van Keuren: Was that an average size grant that you gave? \$30,000.00 over three years?

Lill: No. Scripps, and Woods Hole, and Lamont were well up in the million dollar category.

Van Keuren: This was a million dollars over a period of how many years?

Lill: Ten.

Van Keuren: Ten years.

Lill: Our budget was...I've forgotten exactly what we used to get. It varied from year to year, but on average we got five or six million dollars a year.

Van Keuren: This was to support salaries and did it also ....

Lill: It supported graduate students; it supported research.

Van Keuren: Facilities?

Lill: Laboratories.

Van Keuren: You looked for institutions which had people already that you could build upon, and then you said that if they could coalesce into a distinct program you'd give them money to do this.

Lill: Yes. It seemed to me that the country should be ringed with these oceanographic laboratories. It wasn't that the Atlantic belonged to Iselin and Ewing or the Pacific to Revelle and Fleming, but that was their main operating area.

Van Keuren: Did you have any trouble convincing the Navy that it was in their self interest to be funding ....

Lill: At the present time, I don't remember that it was troublesome. We didn't see that. It was a natural for the Navy. It was pretty easy to sell the Navy on the oceans, the necessity for understanding the oceans. There was some opposition, and Roger used to claim that they'd would still be sailing ships if they had anything to do with it -- the Navy -- but they didn't. I really think it went over quite easily. I was saying that one of the best things that I was able to do was get people like Maxwell and Johnny Knauss, and Don Martineau came to work for us from the CIA. Feenan Jennings came in from Scripps. Karl Alexis came in from the University of Nebraska to help in the solid earth sciences. Then Jean Streeter and Jean White, Evelyn Pruitt were all in the Geophysics Branch, and then Evelyn Pruitt was split off to work with the Geography Branch which was started. Streeter succeeded Jean White in the Astronomy Program. They both had come over from NRL to handle the astronomy program at the time. They took that away from the Geophysics Branch too, and decided we were taking things too far by getting into astronomy. They continued to support astronomy, anyway.

Van Keuren: You headed the the Geophysics Branch. What were your

specific responsibilities in this branch? Which sciences did you cover?

Lill: We covered oceanography which includes marine geology, chemistry, biology, and physical oceanography. We had meteorology. The Meteorology Section was headed by Earl Dressler and Jim Hughes. We were assigned Navy Meteorological officers Commander Charlie Palmer, Commander Dan Rex, Commander John Masterson. All did two years duty with us. I've probably forgotten someone. I hope not. We got into astronomy a little bit. We got into geography a little bit. These all later were given to others, but started in the Geophysics Branch.

Van Keuren: Were you also trying to start Departments of Meteorology?

Lill: We supported departments. We supported a program at the University of Chicago. We supported MIT. Henry Houghton and Tom Malone, and City College, New York University. Spilhaus went to New York University for a while. Who else? I've forgotten who else was supported. We supported these departments the same way we had supported oceanography.

Van Keuren: This was institutional support?

Lill: Yes.

Van Keuren: In 1951 you became head of the Geophysics Branch.

Lill: Yes.

Van Keuren: How did your work change when you became head?

Lill: Well, I had then responsibility for meteorology and oceanography, and for a short time astronomy, geography, and

solid earth sciences, which I hadn't had before. Before I had just been working in the solid earth sciences research, with a seismologist named Beauregard Perkins. Revelle left and went back to the University of California at Scripps. John Adkins was hired to replace him, who was himself a very remarkable man. It was a fun place to work. The sad part of it all is, eventually, as time went on, ten, fifteen or twenty years, the place became more and more bureaucratic. I guess it was inevitable. We couldn't free wheel our way through life without getting bureaucratic, but the first ten or fifteen years were ok.

Van Keuren: What do you consider some of the high points of your career with ONR?

Lill: Making the decision to get some good young people in who later became important people in their own right. I mentioned some of them. I guess the high point of the whole thing was being able to establish a system for the support of the earth sciences that is still in existence, as far as I know. I was told once, ten years or so after leaving there, they were still using the stuff that I wrote. So, I guess, just being able to see that this all got established was the high point. I can't recall any particular specific instances that were any more high points than any other. It was all high points as far as I'm concerned. I enjoyed myself very much.

Van Keuren: In terms of oceanography and support of oceanography, particularly in the Navy, had World War II changed the attitude of the Navy Department to support of oceanography?

Lill: I think so. I think it had some effect there. Maybe in the setting up it wasn't too apparent, but I'm sure it must have.

Yes.

Van Keuren: So after that the war they were willing to take a major initiative to start oceanography schools.

Lill: Particularly since the Soviet Union was involved in it.

Van Keuren: This idea to initiate intensive funding of oceanography, was that Roger Revelle's idea? Where did this come from?

Lill: I think it must have originated with Roger. I can't think of anybody else it would have originated with. It was either Roger, or Roger and Columbus Iselin sort of doing it together without really thinking of it that way. I rather imagine it was Roger Revelle. It had to be. Yes.

Van Keuren: You said earlier that the increasing interest of the Soviet Union in oceanography and earth sciences helped act as a spur to US funding.

Lill: Yes, it became a kind of competition, just like Sputnik. A huge flurry of activity started up after the Russians put up Sputnik. It was fantastic. People thought, ``My God, the Russians are putting up space vehicles, and we haven't even got anything." Boy! Did they sit up and take notice.

Van Keuren: What about before Sputnik? Was the threat of the Russians used as an incentive for US funding in anything?

Lill: We would take an occasion to point out that the Russians were going "to thus and so and thus and so" and we weren't and

perhaps we ought to think about doing it. It had its effect. We didn't scream and shout the Russians are coming, the Russians are coming, but we let it be known that the Russians were doing a lot of work and that we probably ought to be doing it too.

Van Keuren: Who did you let know that this was happening?

Lill: The admirals. Art Maxwell and I were around the Pentagon one morning. We got into Admiral Red Ramage's office by mistake, and we said ``Excuse us, Admiral,`` and we started to back out and he said ``Just a minute you two guys.`` He said ``If you want money for oceanography give me a plan. I'll get you money if you give me a plan.`` We said ``OK.`` So, we went back to ONR and sat down and we wrote a plan we called `TENOC' for ten years in oceanography. We took that back to the admirals. It had its effect. Later on someone decided that some real, professional plan writers ought to re-do it, but I never heard what happened to it. Then, we decided that what we really needed was an advisory committee at the National Academy of Sciences. We spent two or three years trying to get an advisory committee set-up in the National Academy of Sciences to advise the Navy on oceanography. We were delayed by a man in Fisheries, Lionel A. Wolford, Bert Wolford, and he together with Howie Eccles, who was also in Fisheries, maintained that there was going to be an Advisory Committee and they were going to be on it. We said ``Look, we can't set up a committee and have you guys on it when you're advising, you'd just be advising yourself.`` It took us a couple of years to get over this hurdle of Wolford and Eccles



saying they were going to be on this committee. We said no. You can't be. It's going to be an outside advisory committee. It's not going to be an inside advisory committee. We finally won. So, we got a committee at the Academy and they did a ten year program which we really got fisheries into .... I don't think we got the Geological Survey. We got some other government agencies to go in with us and help support this program.

Van Keuren: AEC, Bureau of Fisheries, and ONR, right?

Lill: I'm not sure. I don't think we got money out of AEC. I don't remember. I know we did Fisheries. We might have from USGS, but I can't recall.

Van Keuren: It was you and Maxwell who talked NAS into establishing this advisory committee?

Lill: We all worked on it. Maxwell, Feenan Jennings, me.

Van Keuren: Jennings who?

Lill: Feenan Jennings. He worked for Maxwell. He came in from Scripps. Maxwell brought him in from Scripps after he came. He was working in oceanography along with Maxwell.

Van Keuren: What was the date for this lobbying work you were doing?

Lill: It was in the 1950s.

Van Keuren: 1950s?

Lill: I don't know exactly when it started up.

Van Keuren: Let me back up a little bit. You said you went into Red Ramage's office by mistake one day.

Lill: Yeah, that's while we were over at the Pentagon.

Van Keuren: He knew you were looking for money for oceanography?

Lill: Yeah. He knew about it.

Van Keuren: How is this? How did he know this?

Lill: I forget what desk he had. The admirals in the Pentagon were the admirals, and they all had desks. They were the important people to report to the Chief of Naval Operations. They all were known around Washington as "The Admirals." When somebody said ``the admirals,' ' we knew exactly who they were talking about. They were talking about these admirals who ran these desks in the Chief of Naval Operation's office.

Van Keuren: So, he said give him a plan.

Lill: He knew about it, and he knew about us. I'm not sure how he knew us. I was a little bit surprised. He said, ``Let me have a plan,' ' so we wrote him a plan. Then we said that's not really good enough; we'll need an advisory committee at the academy to help create a real ten-year program.

Van Keuren: Tell me about the TENOC program in the Navy Department that you established.

Lill: Everything we were doing we just put it together and we called it TENOC. We wrote it more as a plan rather than separate.

Van Keuren: So, it simply encapsulated what you were already doing.

Lill: Yeah. Well, we changed it some, but not very much.

Van Keuren: So, the Navy TENOC program .....

Lill: We later rectified that, if I may use that word, by establishing this committee at the Academy of Sciences.

Van Keuren: So, the advisory committee came after the fact.

Lill: Yeah.

Van Keuren: If you were to reiterate for me, what were some of the elements of the TENOC, the main points that it emphasized. Do you recall?

Lill: We put a ten year budget on each of the institutions.

Van Keuren: These are the institutions you were supporting?

Lill: [Some narration lost to background noise.] That was essentially it. The Academy was pretty high powered, and they wrote this really big development plan for the science of oceanography.

Van Keuren: In your ten year plan, you didn't actually list research goals or objectives, but, rather, it was purely institutional.

Lill: We were really supporting basic science. Some applied science got done, I presume, but we were interested in finding out about the oceans. It was always my opinion that if the oceans cover 75% or so of the earth, then 75% of the geology must be under oceans. It turned out later that's where it was. With these spreading centers and tectonic plates, and the whole thing, were under water.

Van Keuren: In the Geophysics Section you were able to support both of them under the same funding apparatus?

Lill: Yeah.

Van Keuren: What were your relationships with the academic community that you were funding?

Lill: Well, we used to keep pretty good track of what was going on at the institutions. We didn't have any difficulties with the institutions.

Van Keuren: Did they ever come back to you and tell you what they were doing with the money?

Lill: Oh, yeah. We had a lot of contact with the universities. We just didn't sit around and wait for research papers to be published. We let the research papers stand for reports on what went on with the money.

Van Keuren: The TENOC program was established prior to Sputnik?

Lill: No.

Van Keuren: It was after Sputnik, and that was helpful ....

Lill: When did Sputnik go up?

Van Keuren: Late '57. October of '57.

Lill: TENOC would have been before that.

Van Keuren: What about after Sputnik? Did Sputnik serve as an incentive in anyway?

Lill: That didn't do too much for oceanography. Art Maxwell and I wrote a paper about the Russian program, as far as we could find out about it. Showed pictures of the Russian ships and explained about their size, and how the Russians were going to sea in these luxurious boats. We had that published in the The Journal of Acoustics.

Van Keuren: When did you publish this report? Approximately?

Lill: Sometime in the '50s. It was a paper in the Journal of Acoustics, or something like that.

Van Keuren: This acted as a further incentive for the Navy Department and other funders? It acted as a further incentive?

Lill: Yeah. That's really why we established a committee on oceanography at the National Academy. It was to help us get more money for our oceanography.

Van Keuren: Did they do this?

Lill: Yes, very much.

Van Keuren: How did the advisory committee at the National Academy work?

Lill: Well, they had a chairman. There were ten or twelve people. All the big guns were on it. Spielhaus was on it; Harrison Brown of Cal Tech; Revelle; Iselin; Ewing. Later on, the Academy had advisory committees in astronomy and various other things.

Van Keuren: What exactly does the Committee do for you?

Lill: They had meetings and they eventually came out with a report: The Next Ten Years In Oceanography. I forget when that came out?

Van Keuren: About '59.

Lill: Something like '59 would have been about right. I've got some material in there, if you could help me move my computer out where I can get it out. There might be something in ....

Van Keuren: The Advisory Committee on Oceanography in the National Academy, did it in any specific way assist your work within the Geophysics Branch?

Lill: Yes, very much. It helped. The report was published and

issued, and people paid attention to this National Academy of Sciences' name on a report. It meant something. The Navy knew this, and the Navy was impressed with the National Academy of Sciences, as everybody else is. To have them come out with a ten year report of what the federal government, particularly the Office of Naval Research, and other agencies that had a stake in the oceans, ought to be doing about it, then it helped immensely with getting budgetary increases. You could cite [that] this report says you ought to be doing so and so. So you could cite that and go off and do so.

Van Keuren: Which is why you had attempted to have it established in the first place.

Lill: It gave the ten year planning business some legitimacy. Instead of us bureaucrats in the Office of Naval Research writing a ten year report. Well, you're just feathering your own nest. It was an unbiased, outside, high, muckity-muck scientific committee.

Van Keuren: Did they have a copy of your ten year report before they wrote their's?

Lill: I don't know. They may have. I don't know. They knew about it, I think.

Van Keuren: Are there any other questions I should ask you about your career at the Office of Naval Research?

Lill: Well, I can't think of any. I think we did a very important job doing what we did. Most of the attention that's given to the oceans these days, and the benefits of the oceans,

and what we ought to do to take care of the oceans, and all that stem from our support from the Office of Naval Research. There were a few guys like Sverdrup, a few individuals running around doing oceanography. The British had some expeditions, Darwin's expeditions and so on, but nothing ever like the Office of Naval Research getting things organized. There's a whole nation, if you will, backing this study of the oceans. A whole scientific nation at least.

Van Keuren: And it made a big impact.

Lill: A big impact.

Van Keuren: This leads me on to the American Miscellaneous Society and the MOHOLE Project, which was really the first big science project in the Earth Sciences. A putative big science project in the Earth Sciences. When did you first come across the American Miscellaneous Society?

Lill: I helped invent it.

Van Keuren: Can you tell me about that?

Lill: Well it was .... You'll have to remember how things were in those days, if you could? Those old temporary buildings along Constitution Avenue and 17th Street. They had window air conditioners, so every afternoon in the summertime you would get an inversion layer across the room, about head high that you could see -- cigarette smoke. Everybody smoked cigarettes in those days. It created an inversion layer. The hot air on top and the cold air below, just like a thermocline in the oceans. It was boring to sit in there and sweat and no relief. We got together

and decided that the things we were getting in the earth sciences -- requests for money -- were really [of] quite a miscellaneous nature. So we said we need something to help us handle these miscellaneous requests, so we created the American Miscellaneous Society to help us. It was a kind of a fun thing. That was all it was. It was a kind of in-house fun joke. We had a few of them like Project SCUD, which was sugar cubes under development, where every afternoon at 4:30 we'd throw out a sugar cube, and this created a thundershower just when the buses were loading up the people in the front of the building. What it was was the up-thrust of hot air created by all these warm bodies rushing out of the buildings that caused the thunder storms. It was kind of a fun thing.

Anuway, we invented the American Miscellaneous Society. My wife claims she named it. We really had a dinner at my house with Maxwell and Jennings, and us. Carl Alexis helped. He was a geologist, helped name it. Our motto was *Illigitimis Non Carborundum*. According to Alexis, his father, who was a linguist at the University of Nebraska, [said] it was a mixture of Greek and Latin. We didn't have any idea of what it was. The thing gained some notoriety, and there was a mistake really to ever let the American Miscellaneous Society get involved with a project like MOHOLE.

Van Keuren: Who were the early members of the American Miscellaneous Society?

Lill: Maxwell, Knauss, Jennings, Lill. I think, that's about the



earliest.

Van Keuren: These were all people in Washington?

Lill: Yeah. Either in or had been. It was just a kind of fun in-house joke. It got a lot of notoriety. I was never quite sure why.

Van Keuren: How did it acquire notoriety?

Lill: Well, Harry Hess, who was the most powerful scientist in Washington at the time, came into my office in the Geophysics Branch one day. He and Walter Munk had decided that there wasn't anything exciting going on in the Earth Sciences, the Solid Earth Sciences, particularly .... There just wasn't any interest in doing anything in the Earth Sciences, and they were going to create some interest by drilling a big hole to the mantle, and furthermore, the American Miscellaneous Society was going to do it. Well, I argued with Hess for about three days against this. I said that AMSOC doesn't have any way to do this. We aren't allowed to do that. He said, "Yes, you do. Send a proposal to the Science Foundation." So, Harry said so. We sent a proposal to the National Science Foundation to drill a hole to the mantle. Bill Benson, who was at the Science Foundation at the time, called me up. ``We're not supporting any goddamn project by any outfit labeled AMSOC. Take it down to the National Academy and have the National Academy support it and send it up to us and say they're going to drill a hole to the mantle and they need some money."

Van Keuren: Benson suggested this?

Lill: Bronk was at the Academy, I guess, at that time. He said

``Fine. Send a proposal from the Natural Academy of Sciences, if you will, to the National Science Foundation proposing that the National Science Foundation fund a project to drill a hole to the mantle." They did. The Science Foundation sent out for bids. They had a committee to decide who the job should go to. A selection committee I guess they called them in those days. A selection committee, with all the bids it was supposed to consider. I guess, because by the time I got a letter from Randall Robertson of the Science Foundation, he was head of the Physical Sciences. Randall Robertson asked me to come back and head up the MOHOLE project. I was at Lockheed at that time. I wasn't doing much at Lockheed, so I thought well, this sounds exciting. I'll go back and head up the project for the National Science Foundation. By the time I got back there Brown & Root already had a contract. There was a controversy about that. I never did know how Brown & Root got the contract. I didn't have time to find out, so I decided, well, it doesn't make any difference anyway, here we are. We've got a contract, Brown & Root's gonna do the job if we can get the money, so we proceeded from there. It was a controversial project from the beginning. It was responsible for getting the deep sea drilling program going. I sat down all one night and wrote a program. I was in the Dupont Circle Hotel. Consumed a fifth of whiskey and wrote a report that I took to the AMSOC Committee the next day and the Committee approved it. It was published in the Congressional Record. I don't have a copy of it anymore. This program spun off the Deep Sea Drilling program from

Project Mohole.

Van Keuren: When was this? Approximately.

Lill: It was during the battle. There was a faction lead by Hollis Hedberg that said if you're going to do any drilling you're just going to have to go step by step by step. We can't just jump into this drilling at [a] forty-five, fifty thousand foot deep hole, willy-nilly. We've got to work up to it. So I sat down and wrote the program that justified it and said that "Ok, we got this deep drilling project. That's the MOHOLE project. Some people want to do shallow drilling. Ok. Why not that program too? If you want to do shallow drilling, go do it. Leave us Moholers alone" sort of attitude. We got the Deep Sea Drilling program started, and I sat down and wrote the justification for it. Got the AMSOC Committee to approve it. Next, the National Science Foundation started funding it. The MOHOLE project got killed mainly because Albert Thomas died. He was the Chairman of the House Appropriations Committee that handled the National Science Foundation's Budget. When he died we had no more champion on the hill. His successor, a representative named Owen, couldn't wait to kill the project. He didn't like anything that Albert Thomas liked, and he got it killed. Gordon Allott helped kill it. So, it lost its political support. We got off on the wrong foot by starting it with this silly American Miscellaneous Society. We should never have started that way. We should have said to Scripps or to Woods Hole or to Lamont ``Send us in a proposal for thirty million dollars to drill a hole to the mantle and we'll

consider it.' We should have done it that way instead of this silly thing with the Academy. So, we sowed the seeds of its demise right there at its beginning.

Van Keuren: Why did Hess want to run it out of the American Miscellaneous Society?

Lill: I really don't know. I really don't know. Hess thought that was a great idea. It wasn't so much that, actually, as he wanted the deep hole drilled to bring attention to the solid earth sciences that wasn't getting it. It had been left behind. It was a good idea to build interest in the solid earth sciences that way, as far as I'm concerned. I'm just against AMSOC doing it. I lost the battle, and it didn't work as well as it would have if Scripps had been doing it. I can tell you that. Any of them, for that matter.

Van Keuren: You left ONR in '59 to go to ....

Lill: '61 I went for a brief stay at Raytheon in Rhode Island, for about a month. I couldn't stand it up there so I came back to ONR for a year. Got an offer from Lockheed to come out and work in their corporate development planning office. So, I went out there. I had a total of seven years with Lockheed, I guess. Then I came back to run the MOHOLE Project.

Van Keuren: Why did you decide to leave ONR?

Lill: Well, I'd been here ten years. I was getting old in the job, and I couldn't see any way out. I couldn't see going up in the scale because those people who were ahead of me were going to stay there. I had just about used up my credentials anyway in ten

years. I didn't have the doctorate degree which I wish I had, but I didn't, and even if I had, I was in a dead-end. There was no place to go. I finally figured out that I better get out of the way and let these younger guys come on and take it over. Somehow, Lockheed came to town, and I gave a presentation on our programs to a guy named Jimmy Lipp, who was head of corporate development planning in Lockheed. He gave me a job offer, ``Why don't you come and work for me?'' So I did. I don't know how this all happened. Maybe my old boss John Adkins arranged it. I don't know. It gave me a chance to get out of the way. Lipp came to town and wanted to know what we were doing. He sounded like an important fellow, and I gave him a presentation. I wasn't too bad in those days at giving meat paper -- we call them "meat paper presentations". They were really flip sheets. You use colored pencils, and you draw on them. You draw graphs, and you flip them over. Or else, you already have your presentation already prepared on these sheets. That kind of funny paper we used we called meat paper.

Van Keuren: The early MOHOLE project after it got funding from NSF, do you have some sense of what it was like, how it was pursued?

Lill: Brown and Root finally got busy.

Van Keuren: I mean before Brown and Root. Were you around in the pre-Brown and Root Phase I era?

Lill: Yeah, I was, for a little while and then I went to Lockheed. At Lockheed, I got wind that maybe Lockheed and Global

Marine would go together and drill this deep hole or make a bid, and I thought I better get off that Academy Advisory Committee. In case this happened, it would be awkward to be on there. It was just about the beginning that I went out to Lockheed.

Van Keuren: The real moving figures in this were Hess and .... Were there any other people who really ....

Lill: Walter Monk initially, but he sort of got into the background. Then, the scientific community was split. Some people said that this is just a big engineering stunt. You're going to waste all this money that the earth sciences need. You shouldn't support a thing like that. Brackett Hersey was vehemently against it. So were some of the scientists at Scripps. The Earth Sciences community was kind of split about it. It's an age-old argument about whether big science or little science is the way to go. My position always was that big science helps support little science. Maybe that's old fashioned, I don't know.

Van Keuren: William Nierenberg, who I was talking to about it, said that in some sense, and this is a bit of a generalization, but he thought that the geophysicists were more supportive of the project than the earth geologists.

Lill: That could be.

Van Keuren: Did you see any sign of this?

Lill: Well, I guess I didn't agree, but this doesn't mean it wasn't there. I just didn't notice it. Brackett Hersey was a geophysicist. He was much against it. There were some geologists that were against it. The big argument was that it was just a big

engineering stunt, doesn't amount to anything anyway.

Van Keuren: There was more engineering than science?

Lill: Yeah. Just a big engineering stunt. You sure could build a big enough thing to go and drill, but it's just a stunt. It doesn't benefit anybody and doesn't create any new knowledge, and blah, blah, blah. Instead of that I guess they wanted to support little science, whatever that is. It's not motivated more science, I guess.

Van Keuren: There was some fear that spending all this money on building the MOHOLE would deplete available funding for other projects?

Lill: Yes, yes. Use up all the money, and we won't have any. Reasonable enough argument I guess, from a point of view. So I would say that the idea was great. The way it got started was a mistake. It was too bad we lost our champion on the hill, in the end.

Van Keuren: Do you have any idea of how Brown and Root got the contract? There's lots of talk about political influence.

Lill: I heard rumbles around and political influence. Anything I would say about it would be really hearsay. I had no knowledge. I just gathered they had a selection committee. I don't know anything about how the hell they enacted or what they did. I didn't spend any time trying to find out, I have to admit. There didn't seem any point in it. I always had the feeling, which is based on some evidence, that the petroleum industry, if you can say the industry, was against the project. The petroleum

industry, I've always been told, considered drilling holes in the ground was their business, not the government's. I think there may be a little bit of truth in that. It wasn't helpful to have them against it. That's for sure. I was practically thrown out of Gulf Oil for coming up and asking them if they would support the project.

Van Keuren: Can you tell me about that?

Lill: A man who was the vice president for R&D at Gulf Oil. He said he didn't want anything to do with it. He wasn't going to have anything to do with it, and he didn't want me coming out and trying to tell anybody to do it. And good day, sir.

Van Keuren: You were drumming up support for the project?

Lill: I was trying to get the oil companies interested. The Gulf experience turned me off.

Van Keuren: When was this? Was it after you came back to the project after '63, or was it earlier?

Lill: Must have been. No, not after Brown and Root got the job. It must have been before that.

Van Keuren: Before, in the early days.

Lill: Yeah.

Van Keuren: What was your role in the early project? You were head of the committee.

Lill: The AMSOC committee. I was the one who brought the project to the Academy. With Harry Hess's backing, Bronk was in favor of the project. Hess was really the most powerful scientist I ever knew in Washington circles. He really had the power.



Van Keuren: How was this?

Lill: I don't know. He was a professor of geology at Princeton. He was on advisory committees; he'd been on this and that; and he had his finger in the space pie, and all over the place.

Van Keuren: In the correspondence, I've seen evidence that Harry Hess and others were trying to sell this project as an American competition against the Russians. Did you get any sense of this?

Lill: No.

Van Keuren: Did you ever feel that the US was in a drilling race with the Soviet Union?

Lill: No. No. Never. I don't know where this rumor started or why. I never had any feedback that we were in a race with Russia.

Van Keuren: There is considerable information in the files of the National Academy MOHOLE committee in Washington on the Russian programs. They were being given intelligence reports on Russian drilling from the Bureau of Commerce and other government agencies. But you knew nothing about this.

Lill: No, and I didn't use the Russians on that project.

Van Keuren: On this particular project.

Lill: The Russians are always there, you know.

Van Keuren: There was considerable disagreement in the project about whether they ought be drilling one hole or two holes, or whether they ought to be doing sedimentary drilling first, whether there be one boat or two boats. I've seen evidence from as early as 1957, from Maurice Ewing correspondence, that there was scientific disagreement on whether the drilling projects

should emphasize penetration to the mantle or sedimentary sampling in the deep open basins.

Lill: Yes. That's why we set up two programs.

Van Keuren: This directly divided the committee in half.

Lill: Yes. We set up two programs. The MOHOLE project and the deep drilling project spinoff, the shallow water sedimentary drilling. The National Science Foundation funded them, and away they went. Sure enough they found out all kinds of things.

Van Keuren: You helped to write this program.

Lill: I wrote it.

Van Keuren: You wrote the proposal.

Lill: It's in the Congressional record somewhere. It must have been in some budget hearing. My mind gets kinda hazy on all this.

Van Keuren: Why did you write this proposal? You were head of the MOHOLE project at this point.

Lill: Well, to appease the shallow water drillers, so we could get on with the Mohole project of drilling to the mantle. The project proposal wasn't to drill a bunch of shallow holes. It was to drill to the mantle. We started up these people who are interested in shallow water drilling and let them go do it. Global Marine and others knew how to do that. So, off they went, and the Deep Sea Drilling Program was born.

Van Keuren: Who were the people who were really in favor of sedimentary drilling.

Lill: Hollis Hedberg was one. He was an influential man. Guys like Bracket Hersey and, who was that chap from Scripps? I'm hard

pressed to remember. The AMSOC Advisory Committee eventually had some people from the petroleum industry on it, and they were for the shallow drilling. They proposed doing the shallow drilling as a step-by-step learning process. To drill deeper and deeper and deeper and step by step by step until we eventually get to the point where we can drill clear down to the mantle. There's nothing wrong with that idea either. It just wasn't what we were set up to do. So, we decided to spin it off. I think it was a good idea. I think that it was good that the Science Foundation began to fund it. We developed more knowledge about the earth [from it] than we had learned for years before.

Van Keuren: Within the AMSOC committee, is there any generalization that can be made about those who favored sedimentary drilling as opposed to those who favored drilling to the MOHOLE? Did they have any characteristics in common?

Lill: Well.

Van Keuren: Why, for example, did Hedberg and colleagues favor drilling to the sediments as opposed to the MOHOLE? Did they have some professional interest in it?

Lill: Yes, he was a petroleum sedimentary geologist. He made a lot of money for Gulf Oil, I imagine. I don't really know, but he was a very successful petroleum geologist. He was interested in it.

[Pause]

Van Keuren: You were explaining why Hedberg and associates favored sedimentary drilling.

Lill: I really don't know why. Whether it was a delaying tactic to hold up this big project or what. I guess you have to give them the benefit of the doubt and say, ``Well, it was the reasonable thing to think, the reasonable thing for them to want to do. As I said, it helped develop an awful lot of knowledge about the earth.

Van Keuren: There was a real breakdown in relations within the National Science Foundation in 1963 between Hollis Hedberg and Frederick Seitz. Do you know anything about ....

Lill: I don't know what they disagreed on.

Van Keuren: I was going to ask if you knew anything about their disagreements.

Lill: I guess Hedberg was chairman of the AMSOC committee, at that time. What He and Seitz got into, and why, I don't know. At least, I can't recall it. Merle Tuve, who was a reknowned scientist at the Carnegie Institution, Geophysics, I asked him one time ..... I had been making a speech down at the Academy, I forget what it was .... During the Academy meetings? It might have been. I had kind of got a mixed reception. I asked Merle why all these people are against this project. He said, "God is up, the devil is down. The space program, it goes, but the devil is down there, won't go there." Maybe, it made as much sense as anything. God is up and the devil is down.

Van Keuren: Did you have any familiarity with Bill Bascom and his team of engineers?

Lill: Yes. I've known Bill for many years.

Van Keuren: Would you like to tell me about him and, for example, his role in the AMSOC committee and the joint committee.

Lill: He was staff member at the National Academy and AMSOC committee.

Van Keuren: What was he like to work with?

Lill: I was always uneasy around him, and he was always uneasy around me, but we never had any tangles.

Van Keuren: Why were you uneasy around him?

Lill: I don't know. polarization. I've only known one or two people that I'm polarized with at first meeting. Maybe we're too much alike. I suppose it happens to everybody.

Van Keuren: He essentially ran the drilling technical team.

Lill: He did a lot. He did an awful lot for the project. He went off, you know, and set up a group, an engineering group, to advise Brown and Root. They invented a hole re-entry system, and the ability to keep position on the deep sea. Turned out that the hole re-entry system was a good anchor, among other things.

Bascom and his group made a good contribution, even though Brown and Root found it awkward to be taking advice from them.

Van Keuren: Was this really a big engineering project, as opposed to a big scientific project? A lot of the difficulties were really engineering.

Lill: Well, it was. In some sense they were right to begin with, but it wasn't going to take money away from small science. Small science was going to be funded, it wasn't ``Ok. You don't get any money this year. We gotta spend it all on MOHOLE." No way! Things

don't work that way in Washington. You can't get money from Congress for one thing and go spend it on something else.

Van Keuren: This was a problem, you felt in the project, with people wanting you to do sedimentary drilling?

Lill: What we were getting funded for was MOHOLE, not sedimentary drilling. So, the Science Foundation had to set up sedimentary drilling as a separate program.

Van Keuren: When you came to the Foundation in 1963 what was the feeling within the National Science Foundation about the MOHOLE Project?

Lill: Some of the people there sort of sneered at it, but I didn't have any real problem with them.

Van Keuren: Did you find strong support within the Foundation for the project?

Lill: Oh, yeah. Pretty good. Leland Hayward who was Director when I came. Yeah, he supported it. Hayward used to help. I'd come in and work on Saturdays, and he would come in and help me. He spent a lot of time on it.

Van Keuren: What about the other staff members?

Lill: Oh, I'd get a little static. Nothing serious.

Van Keuren: Was there any sense within the Foundation -- I am referring here to all the lobbying that was going on by the sedimentary drillers and Hedberg -- that the Science Foundation had committed itself to funding a project to go to the Mohole, and that they were limited in this?

Lill: I'm not sure of your question.

Van Keuren: I get the sense from going through some of the literature, through the correspondence, that the National Science Foundation saw itself as funding a project to drill to the mantle and that there were a number of people within the Academy, particularly the AMSOC committee under Hedberg, that was trying to push them into doing a sedimentary drilling program, and the Science Foundation people saw themselves as having been given money by the Congress to drill to the mantle, and they didn't have the flexibility to redirect this money.

Lill: You couldn't. You had to go get separate money, which we did. You had the mantle, MOHOLE money. You can't take that money and spend it some other way.

Van Keuren: But you don't think that people like Hedberg understood this? Why did they continue lobbying?

Lill: I don't know. A lot of people think you can do that. You can't. You can't do a lot of things people think you can do. You can't bank money. We used to bank money at the end of a fiscal year. If we had money left, we used to give it to Geological Survey or somebody and get it back when the new fiscal year started, but Congress caught us on that. Can't do that.

Yeah, it was simply a matter of ``Ok, if you guys want to go drill shallow holes, let's go do it. That's a good project. That's a good thing to do.' ' It was. It was a smart thing to do. We had this other thing going with MOHOLE. We still thought it was a good thing to do too. But it lost out, and the other one survived.

Van Keuren: You see then [as] the reason that it failed, eventually, was because it lost its political support?

Lill: I think that was the thing that triggered it. Yeah. There was no way we were going to get Albert Thomas' successor to sponsor it.

Van Keuren: There was a lot made about the overruns and the escalation of costs on the project. What is your feeling about this? Did you have a sense about why this was happening?

Lill: No. I never came across a big project yet that didn't have .... It's just people's inability to predict how much money they're going to need into the future. They can't do it. They say it is going to cost ten million. It ends up costing twenty. Well, what about this over-run. Well, we didn't figure it right. There was no way to tell. This happened, or that always happens.

Van Keuren: Do you think, in spite of the over-run costs, the escalation costs, that if Albert Thomas hadn't died it still ....

Lill: No. I can't say that. When we discovered how much the project was really going to cost it threw us for a loop. We had a number in the safe, thirty-nine million. It came in triple that. Something horrendous. I don't think even Albert Thomas could have saved it. He was gone before that. We were just dumbfounded. Called up Leland Hayworth from Houston and told him. He almost fell out of his chair. The cheapest bid was that much.

Van Keuren: This was to build the drilling platform. What is your opinion of Brown and Root?

Lill: I think once they got going they did a very creditable



job. Took them a while to get started. It was a brand new idea for them. They'd never done before, but neither had anybody else. So it took off to a slow start, but they got going, and they had some good people, very good people.

Van Keuren: So you think they were up to the job, eventually.

Lill: Yeah, they were able to make some very good subcontracts. Mathematical subcontracts with people like GE on the stress/strength of materials in that platform. All kinds of stuff that industry came around and copied out of our reports. The petroleum industry got a big benefit. Nobody actually built drilling rigs like we had, but it got them interested in it, and they sent people to town to read our reports and copy them, which were public information so there wasn't anything wrong with that. Yeah, I think Brown and Root did a good job.

Van Keuren: Once again, if you were to summarize what you think went awry with the project, what would you say?

Lill: Well, it was the death of Albert Thomas, plus the fact it started off in a kind of a slipshod way. It started off wrong. The cost turned out to be much more than anybody ever guessed, looked like it was going to be. You get up into talking hundreds of millions: there's very little that justifies spending a hundred million dollars, very little.

Van Keuren: Particularly at this point in time.

Lill: What are you going to do with a hundred million dollars?

Van Keuren: What do you consider to be the project's legacy, both positively and negatively?

Lill: Positively, was the spinoff of the sedimentary drilling that created new knowledge all over the place. One example: they discovered there wasn't sediment that was older than the jurassic in the oceans. That's as old as the ocean sediment gets. It's all been subducted and turned around and wiped out. Nobody ever thought of that before. They still haven't found any older. That helped create the Deep Sea Drilling Program, which is finding out these kinds of things. Negatively, I guess the lesson is don't start out a project like this one started out. We didn't start it right. It worked as long as it lasted, but it really should have been done differently.

Van Keuren: This is the first time that the National Science Foundation ever attempted to actually administer one of its projects.

Lill: That's right, and they weren't set-up to do it.

Van Keuren: Was this a mistake?

Lill: It was alright for NSF to fund it, but they should have funded it with some outfit to handle the whole thing. NSF was trying to handle it itself.

Van Keuren: Do you have a sense of why they decided to go ahead and handle it itself, even though it ran against their history and experiences?

Lill: No, I don't. I never really thought about it then. They weren't set up to handle a big engineering project. That's for sure.

Van Keuren: After MOHOLE was concluded in '66, what did you go

on to do?

Lill: I went back to Lockheed. Left there and came back to Washington to be deputy director of the Coast and Geodetic Survey, in is now called NOAA, National Oceanic and Atmospheric Administration. The Coast and Geodetic Survey's name was changed to the National Ocean Survey and later on changed to the National Ocean Service.

Van Keuren: In conclusion, do you think it was a good idea to suggest drilling to the mantle?

Lill: Yes. I still think it would be a good thing to do, but maybe this time, you can't tell, it may be ought of sight, too costly, for what benefit you'd get out of it. The Russians may carry it off and may do it, and we don't have to worry about it anymore. But I don't know what they are going to learn.

Van Keuren: Do you have any final comments about this episode in the history of earth sciences? About the MOHOLE.

Lill: No. I don't think it's as bad as it's been painted. It's always been talked of as the big fiasco, and costing a lot of money, and nothing ever came out of it. An awful lot came out of it. The Deep Sea Drilling Program came out of it, and engineering advances on off-shore platforms. Design and construction came out of it. It's engineering, but engineering is still important.

Van Keuren: Do you think then, in your opinion, that the MOHOLE Project is directly responsible for the incubation of the DSDP program?

Lill: Yeah. That's what stirred it all up.

Van Keuren: Thank you very much.

Lill: Ok.