

Oral History of  
**Jacqueline Mammerickx**

Interview conducted by Laura Harkewicz

15 May 2006

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**ABSTRACT:**

Jacqueline Mammerickx (Winterer) was interviewed in her home in Del Mar, California on May 15, 2006. She was born in Elisabethville in the Belgian Congo (now Lumbumbashi, Democratic Republic of the Congo), on February 6, 1935. She received her Candidature en Sciences (1954), her Licence en Geomorphologie (1956), and Doctorat en Sciences in Geomorphologie (1960) from the University of Louvain, Belgium. She came to the United States in 1961 and worked as a postdoctoral research fellow at the University of California, Los Angeles (UCLA). In 1965, she came to Scripps Institution of Oceanography (SIO) from which she retired as a research geologist in 1993. She participated in nine sea-going cruises, the majority of which she acted as either chief scientist or co-chief scientist. She has written numerous scientific articles on depth anomalies, morphology of sea structures and topography, bathymetry, and evolution of the ocean. She is a member of the American Geophysical Union. The interview stressed Mammerickx's experiences with bathymetry and her difficulties working as a woman scientist in a male-dominated field. She reflected on the differences between field work on land and sea, and in Africa and the United States. We also discussed her feelings about working at the same institution as her husband, Dr. Edward L. Winterer, and how their career paths diverged. The interview concluded with discussion about her recent involvement in local politics and community.

**INTERVIEW HISTORY:** The interview took place on a lovely spring morning in the study of the home of Drs. Jacqueline Mammerickx and Edward Winterer. Mammerickx showed me bathymetric charts she had constructed from sounding data and described various aspects of their production and use in the interview. We talked for approximately ninety minutes. The tape was paused once when Mammerickx took a phone call.

Laura Harkewicz  
Oral Historian, SIO/UCSD  
September 14, 2006



Jacqueline Mammerickx working on a bathymetry chart, 1978.  
Scripps Institution of Oceanography, UC San Diego.

## INTERVIEW WITH JACQUELINE MAMMERICKX: 15 MAY 2006

**Harkewicz:** ##<sup>1</sup> It is May 15<sup>th</sup>. This is Laura Harkewicz. I'm in the home of Dr. Jacqueline Mammerickx-Winterer in Del Mar. Good morning, Dr. Mammerickx.

So, I have some sort of general, standard questions that I like to ask most of my interviewees and the first one is, how did you get interested in oceanography?

**Mammerickx:** By marriage. I was trained at the University of Louvain in Belgium, and in 1960 my husband came to that university on a Fulbright Fellowship and that is how I met him, ultimately married him, and came to this country. And when I arrived here I was what is known—I first came as a postdoc at UCLA and did research on the pediments in the Mohave Desert. I'm a geomorphologist, which is the branch of geology that concerns itself with the history of the quaternary and why the landscapes are the way they are. And so at UCLA I spent a year and a half working on pediments in the desert. And finally we married and moved to La Jolla. My husband was a faculty member at UCSD.<sup>2</sup> I sought employment, in part, out of interest to have an occupation, but also because I had a J visa and somehow one of the J visa conditions was that I would have to go back to Belgium for two years before I could apply for a permanent visa. We were hoping that by working here I could justify the necessity of my presence here, and it would be apparent to the immigration authorities that there was an interest in keeping me in the country. And so I sought employment. I first worked in the Linguistics Department at UCSD with Professor Newmark.<sup>3</sup> I was a tutor in French. And then, through conversation with Bill Menard,<sup>4</sup> who was a colleague of my husband Jerry Winterer,<sup>5</sup> we became aware of a very large project that Bill Menard was engaged in, which was to essentially map the topography of the North Pacific. The Navy was interested in doing that. It was a rather large project in two ways: the size of it. The Pacific Ocean occupies a third of the surface of the Earth, so the North Pacific is one-sixth. There were many people working on that project because there was a lot of data. And so I worked there and essentially remained at Scripps for the next twenty-seven years.

**Harkewicz:** Do you know what year that was, approximately?

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<sup>1</sup> The symbol ## indicates that the tape or a section of the tape has begun or ended. For a guide to tapes see the final page of this transcript.

<sup>2</sup> University of California, San Diego

<sup>3</sup> Leonard D. Newmark (1929 - ), professor of linguistics, UCSD. Newmark founded the Linguistics Department at UCSD in 1964. Mammerickx was one of the first tutors he hired.

<sup>4</sup> Henry William Menard (1920 – 1986), professor of geology at SIO.

<sup>5</sup> Edward Litton (Jerry) Winterer (1925 - ), research professor of geology at SIO. For more information on Winterer and his experiences at SIO, as well as his discussion of his wife's work at Scripps, see his oral history at the University of California eScholarship Repository website at: <http://repositories.cdlib.org/sio/arch/oh/>.

- Mammerickx:** Yes. I started working in 1966, and when that project was completed I submitted my own proposal and stayed in until 1993.
- Harkewicz:** Had you done that kind of work before with the mapping like that at all?
- Mammerickx:** Not at all. But, it was immediately a very interesting project, and maybe I will get on to why it was interesting later.
- Harkewicz:** Your husband told me that the work that you did, though, wasn't really appreciated somehow or other? Can you talk about that at all?
- Mammerickx:** Well, I was a woman at a time when there were very few women in science or at Scripps, and there is no doubt about it that women were dismissed, by definition. My job title was in the research series. I used to joke that I got a "hunting license" in the sense that I was authorized to submit proposals and I was entirely self-supporting. When I retired I asked the departmental manager, "How much support did I ever receive from the university?" And I think she said, "Three months out of twenty-seven years." That is very low level of hard money support. The rest was always raised the hard way. And, that's the way life was, but the work was so exciting that I never minded. But it is the reason why I retired early because essentially funding dried. You know, in the beginning, you get three proposals out of three funded, then two out of three, then one out of three, and then you say, "Hey, I'm not that smart that I can have three ideas in a year where I'm better than everybody else in the nation." So, I retired by lack of determination to continue fighting.
- Harkewicz:** Yeah, it sounds like it would be pretty exhausting after a while.
- Mammerickx:** Well, that's the way it was. And so, you lived with it because as I said the work was just such terrific fun that I loved every minute of it.
- Harkewicz:** So when you got involved with this, how did you learn—if you hadn't done it before, how did you learn?
- Mammerickx:** Well, what the work was was the following. It was really a coincidence of several sort of fortunate circumstances. One of them was that during the Second World War a number of ships were crossing the Pacific, very often going from the U.S. to Hawaii to Manila to provide materials to the war effort, and there were people like Harry Hess,<sup>6</sup> who ended up being an admiral in the Navy, who saw to it that while the ships were doing this sort of rather boring shuttle you could collect scientific data. And one of the scientific data being collected was depth soundings. The principle of sounding is very easy. You send a signal to the sea floor. It is reflected

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<sup>6</sup> Harry Hammond Hess (1906 – 1969), Princeton geologist.

back, and depending on the time it takes for that signal to return you have the number of the depth of the ocean. The project was big, as I said to you, because of the size of the ocean, and the soundings were collected in sheets that were roughly a thousand kilometers east-west and six or seven hundred kilometers north-south. For each area we made compilations of the existing soundings. And then, what you needed was somebody to interpret those soundings and essentially contour them: you transformed a field of numbers into a topographic chart.

The second fortunate circumstance is that this was the beginning of the computers with the ability to handle massive amounts of data. That was a problem. There were about two hundred areas to cover the North Pacific and for each area there were several sounding sheets with the data from various ships. And so without the computers we would not have been able to dominate the subject. The leader of the project was Bill Menard, who was a professor of oceanography. Tom Chase<sup>7</sup> was essentially the manager of the project. He was handling these incredible quantities of sounding sheets. Stu Smith and George Sharman,<sup>8</sup> who was a graduate student in geophysics, were the fellows who created our ability to encode the depth soundings into a computer system. If you want to consult Stu Smith he's still in town and will be able to tell you about that. In the beginning, I was hired to just interpret the data, provide contours, because as a geomorphologist I had a sense about that.

Finally, the third element is that this was also the time when the discovery of plate tectonics provided a model for the interpretation of the seafloor evolution. And I was trying to find the name of the paper that started it all, and I forget. It's somebody named Matthews, and they essentially . . .

**Harkewicz:** Vine, I think, isn't it?

**Mammerickx:** Do you . . .

**Harkewicz:** Vine and Matthews?

**Mammerickx:** Yeah. Vine and Matthews.<sup>9</sup> I think that was a 1964 paper. And if you will now look a little bit at the maps that I'm showing you here you have

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<sup>7</sup> Thomas E. Chase (1931 – 1999), marine geologist at SIO.

<sup>8</sup> Stuart M. Smith (1936 - ), specialist in submarine geology at SIO; George Frederick Sharman, (1945 - ), division chief of the Marine Geology and Geophysics Division of the National Geophysics Data Center.

<sup>9</sup> Frederick J. Vine (1939 - ) and Drummond Matthews (1931 – 1997) were British marine geologists and geophysicists. In 1963, they published a paper in the journal *Nature* ("Magnetic Anomalies over Oceanic Ridges," *Nature* 199 (1963): 947 – 949) in which they proposed a theory for the observed alternating bands in the crust surrounding the mid-ocean ridges. They noted that each band was magnetized with a polarity opposite the surrounding band (creating "zebra-stripping"). They claimed that lava erupted at different times along the rift at the crest of the ridges and this preserved the different magnetic anomalies. Their proposal contributed to the theory of plate tectonics by helping to put the anomalies of the ocean crust into the proper context.

one of the South Pacific sheets, and I'm going to show the map that is underneath. Can you hold the corner here? [*Shuffling paper*]<sup>10</sup> Okay, so this is the map of the magnetic anomalies and the divide there is the map of the topography. And so you see several things. First, while in some areas we have a lot of data, in other areas you don't have any and so you have to guess what is going on. But, courtesy of the theory of plate tectonics you know that when you have an offset of magnetic anomalies between two quasi-parallel ship tracks, it implies the existence of a fracture zone between the two tracks. Plate tectonics is the model that implies that where there is a big disconnect between anomalies, there is a topographical signature to these disconnects. They are called "fracture zones." And so if you have a ship track that crosses the area where the disconnect occurs, and you observe very deep soundings, this is where the fracture zone is located. Now, if a similar magnetic anomalies offset occurs at some distance, you feel free to draw a line between the two deep soundings: you know that there is a big fracture zone, somewhere in the general vicinity. So, you can make an educated guess. Plate tectonics provided a very powerful tool for guessing where fracture zones were. And you do that even better along the trenches in the oceans where you have very few soundings. Many trenches are near continents, so you have many soundings going to the port where the ship is going to, but you don't have anything in between ports along the same coast line. And so, you can draw a trench a thousand kilometers along a coast line and your educated guess is better than pretending that there is nothing there. And that's what was so exciting about the work, it is that you discovered essentially phenomenal topographic features.

**Harkewicz:** Did you actually do these maps, then?

**Mammerickx:** Yes. And then after a number of years the Navy project was completed. The completed project was a certain black and white map of the topography of the whole Pacific that, at that time, had a large distribution. Although there were earlier maps of the ocean floor, of course, the amount of information that we were able to bring to the fore was significant. Thanks to the contributions of the Navy data sets, and the powerful tool of the plate tectonics to interpret the data, it really was a terrific time to make significant progress in understanding of the topography of the sea floor.

But it was an extraordinary, big job. When it was over I would have been let go because I was funded by soft money. And so I went to see Bill Menard and I said to him, "This is fun. Would you be willing to submit a proposal with me to go then not to the Navy, but to the National Science Foundation and chart the South Pacific?" And he said, "No." And he said, "No," in part because he was going to go on sabbatical in

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<sup>10</sup> Mammerickx showed me bathymetric charts she had drawn while explaining how they were produced.

Europe, but also I think that he was awed by the sheer size, the physical size, of all these data. But the South Pacific was different because the South Pacific had very little data so the physical labor was less. And second, the computers were helping even more to essentially process the data. So Bill Menard said, "No." And I said, "Do you mind if I go alone?" And he said, "No." And so, since then—and I cannot give you the year, but you know somewhere in the seventies I submitted proposals after proposals to do various areas of the South Pacific. And so over time then, there was an interest in having these maps and especially the combination of magnetic anomalies and topographic data. I was also able to develop “prettier” versions of the map: you see this is one of those where we added color.

There were so many things that were exciting about this job because we went from the depth sounding values to the printed map. We did it all. We found a publisher. We chose the colors. We did it all. And so there was the fun.

**Harkewicz:**

You said there was less data in the South Pacific so that it was easier to do. Does that mean you had more opportunity to just sort of fill in the blanks with your . . . ?

**Mammerickx:**

Right. You had more guesswork. And by then we really had substantiated the legitimacy of making these big guesses on where major fracture zones and trenches would be. The program was successful because people in other fields became aware of the fact that you knew what the topography was and it had an impact their research. For instance, take the case of physical oceanographers, studying deep sea circulation. If you look at the Pacific Ocean as a big bowl, the shape of the bottom of the bowl matters to the understanding of the currents that go through here and there. So they were interested in the creation of the topographic maps and they were willing to see to it that soundings were collected on their cruises although they had no geological interest whatsoever. And so it was really a period of kind of a generosity of spirit at the level of the funding agencies, that they were willing to fund ancillary programs, to have the staff onboard the ships that monitored the equipment so that data of high quality were collected, and we could go before a cruise occurred and see the chief scientist and tell him, usually a him, "Would you please make a little detour? Because the track that you are going to run we already have it ten times? And while if you went a little bit south or north or east or west we would have a new line of soundings." And the great majority of time people were willing to accommodate this request. And then for some of the cruises I myself solicited to explore new areas that no one had investigated before and then I wrote papers about tectonic reconstructions.

- Harkewicz:** You said something about it being a time of generosity?
- Mammerickx:** Yeah.
- Harkewicz:** Which sort of implies that that doesn't exist anymore?
- Mammerickx:** Today, well, I think generosity may be there but the money is not there. And so ancillary programs fall at the wayside when programs are very competitive. People are conscious of cost, and I understand that those technicians that were on board operating the ancillary programs are simply not there anymore. People find, you know, an empty ship and they man it. So there is no basic underlying program of data collections. I understand that happens also with samplings of water, et cetera.
- Harkewicz:** I know you've been on several cruises, but it sounds to me like what you're talking about here, at least, is more like you would take the data that somebody else had collected.
- Mammerickx:** Yes. And that was something that I have been criticized for, that I was not collecting my own data. Some—the atmosphere of sea-going oceanography is a little bit macho. You know, you just go with the ship. They were small ships. They were, you know, you had to face storms, and put equipment into water. You had to be strong personalities. And then, once you had data, you sat on the data. And so what I started doing was to trade data. I would give data that I had not collected to other people who would bring back. And that was absolutely anathema to some people, it was not good form to do that.
- Harkewicz:** I feel like I should ask you something more about that, but I'm not quite sure how to approach that.
- Mammerickx:** Of the data? Well, you know the—you can discuss the ethics of it. I did not go much at sea, probably because the chances to get funding were not very high, being a woman. You remember, those were the years when women were considered bad luck on ship. Okay? And so when I finally could go at sea I could go at Christmas because then none of the fellows wanted to go. They had to stay home. So I had the high rate of going at sea in December. And I remember one time my husband went with the kids on sabbatical in Paris, and so he had, you know, to empty the house and take care of the kids. And when we arrive at the airport he was there with flowers. And he said, I said, "How great to see you." And he said, "How relieved I am." [*Laugh*]
- Harkewicz:** He didn't like playing Mr. Mom?

- Mammerickx:** Well, he did it, though. So, and so if he was gone, I couldn't go, you know?
- Harkewicz:** Yes. Yes.
- Mammerickx:** And, but mostly, you know, the data are finally paid for by the taxpayer and so they belong to the community. So any, every scientist has worked hard to devise a program and to get the funding. And so it is absolutely legitimate that for a period of time a scientist has the privilege to mine the data to the best of his or her abilities. But beyond that, you know, it's the taxpayers' money that pays for the data and they belong to the community.
- Harkewicz:** The community of scientists?
- Mammerickx:** In the field. Yes.
- Harkewicz:** So, if you can exchange it with somebody else for information....
- Mammerickx:** Yes. That's right. They can exploit it, etcetera. So.
- Harkewicz:** Well, that makes sense. Well, let's talk a little bit about this whole being a woman and not being able to go to sea and stuff like that.
- Mammerickx:** Ah.
- Harkewicz:** If you don't mind?
- Mammerickx:** No. I think I've told you everything there was to.
- Harkewicz:** So, I mean eventually you did get to go to sea?
- Mammerickx:** Yeah.
- Harkewicz:** And, besides it being in December being gone over the holidays or something, do you feel like it held back your career then, the fact that you couldn't go to sea?
- Mammerickx:** No. What I do feel is that finally when you were at sea and where the chief scientist—you were a woman chief scientist, it happened in the later years. There was no prejudice then. I was chief scientist on the ship that you—. You know, there is a saying in French, and I'm sure it exists in English that "The captain is master of the ship after God." Well, when you are the chief scientist you are the master of the ship's program until such time that you get into port. Occasionally, the captain resumes control and determines where it goes, because there is bad weather and then you stop going to go where you were. The captain says, "You know, we have

to take a detour to avoid a storm or whatever." So you bring in a lot of money when you have funding, and so they respect that. And all the scientific staff and the navigation staff were unambiguously supportive of you when you were finally accepted onboard.

**Harkewicz:** Was your first cruise difficult then?

**Mammerickx:** No. My first cruise was not as a chief scientist, it was as a participant. And so, you know, you learn while doing it. And I've always felt that in some way going at sea was, in fact, a lot easier [*Laugh*] than being a mother and in charge of a household, because there you have to do everything, while on the ship you have all these people who do everything else for you. And so you bring a competence and a program, but essentially you have very, very qualified people and every time something doesn't work you call this person or that person and they fix it. So, in a sense I felt—I shouldn't say that [*laugh*]—but I felt that you have a better support system onboard a ship than you do in running a household and educating kids.

**Harkewicz:** Well, that makes sense. I mean, some of my interviewees have said that they really liked going to sea because then all you had to worry about was doing your science.

**Mammerickx:** That's right.

**Harkewicz:** So you're not alone in that.

**Mammerickx:** That's interesting.

**Harkewicz:** But, as long as you mentioned it, what was it like to have your doctorate, and be a scientist, and have children? What was it like to do all that?

**Mammerickx:** Well it was so, so long ago in the acceptance of women in professional careers that one started with very low expectations, that I was expecting nothing very special to happen. I was not expecting to ever be in charge of anything. And so it's, I guess what I'm saying is the times were, the field of oceanography was so new and the ocean was so large that there was, finally, possibly, room for women. I mean, my field is relatively narrow, and there were not, really, not many people in it. There were two people at Lamont, Bruce Heezen and Marie Tharp,<sup>11</sup> who did what I was doing in the Atlantic and I was doing it in the Pacific. Bob Fisher<sup>12</sup> was

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<sup>11</sup> Bruce Charles Heezen (1924 – 1977), geologist and oceanographer at Columbia University's Lamont-Doherty Geological Observatory; Marie Tharp (1920 – 2006), geologist and oceanographic cartographer at Columbia University's Lamont-Doherty Geological Observatory. Heezen and Tharp's discovery of the Mid-Oceanic Ridge contributed to the theories of plate tectonics and continental drift.

<sup>12</sup> Robert Lloyd Fisher (1925 - ), research geologist, SIO.

working mostly—I mean, he did work a lot in the Pacific, but in the charting context he was especially in the Indian Ocean, and then there was a Russian guy named Gleb Udintsev<sup>13</sup> who was working with the Russians. I mean it was really very open.

**Harkewicz:** So you were one of the few people doing this, then?

**Mammerickx:** All together, men or women.

**Harkewicz:** Okay.

**Mammerickx:** Yeah.

**Harkewicz:** Your husband said that people didn't understand what you were doing and that they didn't appreciate it.

**Mammerickx:** I wonder why he says that. When you were on the research series you were not one of the players, and administratively you were not any part of the structure of the university. But, the other side of that is that I did not have any responsibilities.

**Harkewicz:** Can you explain that little bit better?

**Mammerickx:** When you are a faculty member you teach your subjects, but you are also part of the instructional, educational corporation. And so you meet with students, you train students, you have an opinion on appointments, you have the opportunity to advocate the importance of your field. I was never involved with that at all. I never attended any meetings. So that was it. I was totally marginalized, if you will, but in a sense, when you talk to the faculty members it's a responsibility and, I guess, a privilege, but it is also a burden because it's time consuming. And in my case zero time was consumed to do that, because I wasn't part of it.

**Harkewicz:** Did that make it easier, you think, then to raise your children?

**Mammerickx:** Absolutely. Absolutely. Because I actually never worked full-time. Most of the time I worked three-quarter time. I went to work when they went to school, around eight-thirty, and came back in mid-afternoon, ate lunch at my desk and worked all the time on what I was doing. And so, I missed all the talks, for instance, so that was bad. And so, you see, did I miss the progress in my career? Actually, no, because I wouldn't have wanted to have more responsibilities because that was fitting me just fine the way it was.

**Harkewicz:** So obviously it's a very personal way of looking at a thing?

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<sup>13</sup>Gleb Borisovich Udintsev, Soviet marine geologist, Vernadsky Institute of Geochemistry, Moscow, Russia.

- Mammerickx:** Yeah.
- Harkewicz:** I wondered if, as far as what it was like to go to sea or to be in the position that you had, was it any different in Europe.
- Mammerickx:** Oh, I think Europe was much worse. [*Laugh*]
- Harkewicz:** Worse?
- Mammerickx:** Right. I mean, things were better in this country than they were there.
- Harkewicz:** Okay.
- Mammerickx:** Right.
- Harkewicz:** Do you think they've caught up with this country now?
- Mammerickx:** You know, it's hard to say.
- Harkewicz:** You were involved in a German-funded cruise?
- Mammerickx:** And a French-funded cruise.
- Harkewicz:** I just wondered if it was any different.
- Mammerickx:** Yes. It was different, but not at a level of being men and women. I mean, not at that level. They operated differently. Yes.
- Harkewicz:** Let's talk a little bit about what it was like when you first came here, as far as the Scripps community and socializing. Did you find it difficult with the fact that your husband worked at Scripps? Did it make it difficult or easier, do you think?
- Mammerickx:** I think that it may have made it difficult for him in the sense that we were in the same department and so there is always a concern of conflict of interest. And so I think that we were both very conscious of the problems that it might present: I have never worked with him and he has never worked with me. And we have never written a proposal together and I'm sure, I know, that he has always recused himself from any, you know, review. And I suspect that some people may have resented the fact that—because although you have no conflict of interest there is the appearance of a conflict of interest whether you like it or not. But that would be, you know, true everywhere. And so I think that there is a lot of self-restraint in this, that you try not to be open to legitimate concern.

- Harkewicz:** So, it sounds like you had to be aware of what other people thought?
- Mammerickx:** You want to not create difficulties, okay?
- Harkewicz:** I didn't ask you this when you first mentioned it about your visa issue: did your working at Scripps then alleviate that problem?
- Mammerickx:** Well, not really. What happened was we had to hire a lawyer to stir us through Immigration. And finally, we made a demand, "Could I have this exemption from going back for two years from the U.S.?" And then the children were born, etcetera. And they said, and I was still teaching French, and they said, "French teachers are a dime a dozen. No." Meanwhile my husband had spoken to somebody in the Navy about the problems with Immigration and so they wrote a letter to the effect that if I went back to Belgium I would have taken my daughters with me and so the emotional hardship would have been on him and therefore to keep him as a happy scientist he had to keep his American children near him and be contented. And so they granted the exemption. [*Laugh*]
- Harkewicz:** I guess whatever works, then?
- Mammerickx:** That's right.
- Harkewicz:** How long did you teach French before you actually started working in oceanography?
- Mammerickx:** Only two years.
- Harkewicz:** And then you started working at Scripps?
- Mammerickx:** Right, speaking of prejudice, though, I want to talk about one time I felt that I was prejudiced against.
- Harkewicz:** Okay.
- Mammerickx:** I've never said it.
- Harkewicz:** Please do.
- Mammerickx:** The equipment, the machine to collect the depth data is a very simple, unsophisticated tool. That's probably why I was good at using it, because I'm not a physicist. [*Laugh*] And on one of the French cruises I went on, they had onboard a swath system. It was called the "Seabeam." And so instead of having a line of soundings that went up and down and up and down wherever you went, the Seabeam system generated a swath map several miles wide as you moved along, and that's why I wanted to go on

that French cruise, on the research vessel *Jean Charcot*. When I came back at Scripps I said, "My god. This is just revolutionary. We should have that equipment on the Scripps ships." Enough people were convinced of it, and after a number of years, the equipment was installed on the *Washington*.<sup>14</sup> But when the first cruise was manned to go to sea, not only was I not the chief scientist, I didn't go. [Laugh] At that time, you see, it was so pervasive, the sexism, that nobody thought that there was anything untoward with this. They wouldn't have thought of asking me.

**Harkewicz:** But you were on the French cruise, right?

**Mammerickx:** Well, the French ship had been collecting Seabeam data several years. But when the Seabeam system was finally installed on the American ship—and I can't even remember who the chief scientist was, but it wasn't me. And I felt I was the one who made the case for it. But sexism was so prevalent that that's the way it was. I mean you could not let that stop you. You could only pursue the avenues that worked for you and ignore the ones that didn't.

**Harkewicz:** Were you able to, at least, use the data that they collected?

**Mammerickx:** No, because they were privileged to use their own data exclusively, as I explained earlier. Over time though these data became available after the scientists had published their results.

**Harkewicz:** Was there ever any tension involved with the sharing of data? I mean, besides what you mentioned earlier about the ethics issue?

**Mammerickx:** Well, some people refused. They had data in critical areas and you learned to live without. Oceanographic data are very costly to collect, and so even after you use it, its value is still there. I mean, it keeps its intrinsic value. And so it's really a very philosophical difference. And of course, for my purpose it was a philosophy that served me well. But now that I'm outside of the field I still think that. I mean when you look at all. Look at the instruments that are sent into space, if somebody else can make use of the data they should use them. I mean, considering the investment. You collect rocks on the moon. You look at them and then you publish your work and then you put it in the data collection for some others to use for other ideas, other purposes. I think that there is a fundamental obligation. Now, some fellows would not release the data and then you live without them.

**Harkewicz:** Is that a unique perspective, you think, though, to think that the data should be shared amongst the people at large, and so on?

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<sup>14</sup> R/V *Thomas Washington*

- Mammerickx:** You know, it's hard to say. It probably depends on the fields. But, the data that are now being collected by Dave Sandwell,<sup>15</sup> you know he does not sit on data. He makes them immediately available. Data is, are infinitely reusable.
- Harkewicz:** So, it's not like different people would try to publish the same kind of paper using the same data, because other people are looking for different things but using the same data? Do you have any concern about using something that you haven't actually physically collected yourself, that they maybe weren't collected properly?
- Mammerickx:** No, no. I mean, look: this is what the field of history is based on.
- Harkewicz:** You're right. I just was curious about your perspective.
- Mammerickx:** I mean look, look at your interview. I don't think that it has very much value, but assuming it had—I mean, not for your work, but my contribution.
- Harkewicz:** No, the interview with you has incredible value.
- Mammerickx:** Oh, does it?
- Harkewicz:** Yes.
- Mammerickx:** Let's suppose then you use it for your purpose, getting your thesis or whatever, you put it on the web, and some other person will use it trying to use a different perspective.
- Harkewicz:** But that does bring up a point, though. With historical evidence you always have to cite the original source. Is that also true with the evidence that you get, the data?
- Mammerickx:** Well, look at the back of that sheet. I certainly did not list all the cruises and name the scientists. I certainly did not do that. Maybe I should have. It may be proving a point against *me*, that I should have given the names of all the scientists who collected data.
- Harkewicz:** As long as you know where you got it from.
- Mammerickx:** There were lots of cruises.
- Harkewicz:** I imagine that you'd have to have a whole other sheet with just a list of scientists or whatever?

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<sup>15</sup> David T. Sandwell (1953 - ), professor of geophysics, SIO.

- Mammerickx:** Yes. Well, look, look what's happening in the newspapers now. Often you see that the fellow who has written the piece is at the top, and at the bottom they say these three other people have participated. They didn't use to do that. So, there is a greater awareness of who the contributors are.
- Harkewicz:** Right. Makes you wonder if they don't want to take responsibility for all the information, or if they're giving credit to . . .
- Mammerickx:** No. I think they give recognition, you know, to those. I mean, look at movies. You know, when you see old movies there are the five actors and the director. And now, you want to leave the movie house and they start showing the credits....
- Harkewicz:** Right. An hour's worth of credits?
- Mammerickx:** Yeah. And sometimes you see—the caterers? [*Laugh*] We always stay because we like to see where the movie is shot and that's the last thing, if they say it at all. So you have to endure all that stuff. Yes. Definitely, it's a greater awareness.
- Harkewicz:** You're right. Everybody plays a part.
- Mammerickx:** Yeah.
- Harkewicz:** I believe that your husband said that you looked for a home in La Jolla but you couldn't afford it at the time?
- Mammerickx:** Right. Yeah.
- Harkewicz:** So you ended up here in Del Mar?
- Mammerickx:** So we came here. Yes.
- Harkewicz:** And, what was it like—did you do things with other people that worked at Scripps at the time, when you first came here?
- Mammerickx:** When you have your work, you have a household to run, and kids, you have no, no time. That's all you do. Yes. One of the exciting things for me when we came to Scripps was that I could have lunch with people who had written the papers that I read. And that was an experience that I never had in Europe. Because Belgium is a small country, the people who wrote papers were in the abstract. And here you knew them. Again, because oceanography was such a small field then, either the scientists were on the staff at Scripps or they traveled from other institutions, and so to know not only one but several people who wrote papers that I worked with, to me

was a very exciting experience. And so at lunchtime, on the lawn there, you had—this community.

**Harkewicz:** The fact you were a woman didn't affect that at all?

**Mammerickx:** Well, I was brought up by brothers, with brothers who were older than I was. And so in a sense I was never aware of the fact that I was a woman. You know, people on the outside—you are in a group of ten. Nine men and one woman. All the men see that the woman is an odd person, but the woman herself does not see it. And so, often I was the only woman on board and it didn't bother me. And as I have said, both the crew and the captain and everybody was very cooperative, so I never noticed I was an oddball person.

**Harkewicz:** So you didn't feel like you were treated any differently?

**Mammerickx:** Not at all. Not at sea. Not at all.

**Harkewicz:** I guess I need to ask you this, though, too, because we didn't have very much biographical information on you, were you born in France or in Belgium?

**Mammerickx:** No, I was born in the Congo.

**Harkewicz:** Oh!

**Mammerickx:** And I stayed there until I was seventeen and then, when there were no universities in Central Africa, so I came back to Belgium to go to university. And I went back then to do the field work for my Ph.D. thesis.

**Harkewicz:** In Africa?

**Mammerickx:** Yes. In Katanga, a province in the southern Congo. Africa at that time was very peaceful—and I suppose this is a very politically [*laugh*] dangerous field to tread on—but there was what one called “Pax Belgica.” Belgium had provided the infrastructure of the trains, and the industries. There was apartheid, and yet at the same time the black populations were not animated yet by the political ferment that led to independence. And as a woman alone I was able to spend three months in the savannah doing fieldwork with fellow workers who were black men, totally unmolested. I took the boat that went from Kisangani to Kinshasa,<sup>16</sup> along the Congo

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<sup>16</sup> The cities Lubumbashi, Kisangani, and Kinshasa were formerly known as Elisabethville, Stanleyville, and Léopoldville, respectively. The names were changed in 1966 when the Belgian Congo became the Democratic Republic of the Congo. The country was known as Zaire from 1971 to 1997, when the name was changed back to the Democratic Republic of the Congo.

River, a boat a little bit the *African Queen*, as a girl alone, totally unmolested. ##

**Harkewicz:** ## Okay. So you were talking about when you did your field work in Africa.

**Mammerickx:** In Africa. So when I then came to UCLA I also did fieldwork in the Mohave Desert, and I was a little bit, at that time, a little bit more apprehensive to be alone because there was more population in the areas where I went. And [*laugh*] I'll always remember, I studied pediments, and pediments is land, certain land form at the foot of the mountains in the Mohave Desert. And so in a motel I would leave in my room, "Today I'm going here and there," and I would tell them at the desk: "If I don't come back tonight go and read the note and look for me."

**Harkewicz:** That's a good idea. [*Laugh*]

**Mammerickx:** And so when I started going at sea, I thought that was absolutely totally easy, because you were not alone doing fieldwork.

**Harkewicz:** When you came here and worked in the Mohave Desert, were you married at the time yet?

**Mammerickx:** No.

**Harkewicz:** Had you met your husband?

**Mammerickx:** Well, I had met him but he was divorced, and I'm Catholic and so that presented a number of problems, so it took us some years to work through these problems. And so I lived in the desert and I was uncomfortable doing fieldwork then.

**Harkewicz:** In this country?

**Mammerickx:** Outdoors, in any country. Going to sea is totally safe because you are never alone, on your own.

**Harkewicz:** You said you didn't have any problems when you were in Africa? Why was it that you were uncomfortable when you came here?

**Mammerickx:** I . . . I don't know. Africa is sort of empty—where I went to do fieldwork, and I had a crew of two or three people walking with me. And then we went where there was nobody. And once in a while we would meet villagers who often would stand on the pathway to look at me, because they had never seen a white woman. They had seen a white man. In a sense, if you look at, for instance, a fox or what have you, you will stop

and say, "Oh, a fox." [*Laugh*] And so there was a curiosity. But no, no, while if I went in the Mohave Desert I met people I didn't know who they were. I mean, I remember a certain day I was doing a transit somewhere and all of a sudden there is this guy next to me. And he said, "What are you doing here?" And fortunately I had a hammer with me. And so I said, "I'm a geologist and I'm doing fieldwork. And what are you doing here?" And he said to me, "Well,"—there had been a crime committed, a girl who had been murdered right there—and he said, "I'm investigating that." And I just went back to my car and drove all the way back to UCLA, [*laugh*] and said to my husband, "Guess what happened?"

**Harkewicz:** Yes. I could see that would be disturbing.

**Mammerickx:** Yes. You never know who you meet.

**Harkewicz:** Did you miss doing that kind of work?

**Mammerickx:** No. I was glad to find that in oceanography you could do fieldwork without being a woman alone at the mercy of you-don't-know. I mean, men are simply bigger, you know, and although ninety-nine percent, or 99.9 percent of them are benign, you see around you enough cases of assaults so that you are concerned.

**Harkewicz:** Yes.

**Mammerickx:** Yes.

**Harkewicz:** Kind of a sad statement on society, though.

**Mammerickx:** Yes.

**Harkewicz:** Was it strange to you in any way to come to this country and interact with blacks here as opposed to where you were in Africa?

**Mammerickx:** No, because blacks here, especially in California, were totally part of the society and so some of—I mean, again it sounds like a cliché but we are very great friends with a black family. So it's not a problem.

**Harkewicz:** That didn't seem odd to you at all?

**Mammerickx:** No. No.

**Harkewicz:** Well, that's interesting. I started to ask you the question about socializing at Scripps, and I wondered, as a faculty wife, if there was any kind of pressure put on you to entertain people?

**Mammerickx:** I don't know if it's a pressure but it's an opportunity. And there was certainly a willingness, on my part. I mean, being a traditional housewife, I know how to cook. And so my husband was involved for many years in the Deep Sea Drilling Project, and there were site visits of committees and we have always had parties. And people would come. I could cook for large groups and so that was not a problem. So actually, I was glad.

**Harkewicz:** Well now, he told me, and you can . . .

**Mammerickx:** I wonder what he's told you.

**Harkewicz:** You can tell me if I'm wrong. He said that, because of your European background, you were used to entertaining with fine linen and nice dishes and stuff like that, and not used to the old hamburgers and hotdogs American-type thing? And I wondered what you might want to say about that? He said it was a little awkward for you initially...

**Mammerickx:** In the beginning, yes, because again where I came from when you entertain you'd have sit-down dinners. So I remember, in the beginning he would say, "But don't spend all your time in the kitchen." [*Laugh*] So I had to change that. And so when we had these groups for the drilling project I had learned to make these big casseroles, and so everything was ready before the people came. And that was very different. We had graduate students. For a year he had the seminar come here. But, I was involved with the church and I know that they would tell us that we should try to be open to the undergraduate students, and I always felt that that was beyond the mechanics of the thing. Graduate students are fine because there are ten or twenty, depending how broadly it is, and so that's okay. But entertaining the undergraduate students, there is no formula that is comfortable, or that is easy to pull off, essentially, given the fact that you have to do everything yourself. You know, back to the household chores.

**Harkewicz:** Undergraduate students from Scripps?

**Mammerickx:** No. They would be on the upper campus.

**Harkewicz:** Okay.

**Mammerickx:** No, Scripps only had graduate students.

**Harkewicz:** Right. It doesn't seem like you'd have much of an opportunity to interact with undergraduate students, period, anyway?

**Mammerickx:** No. No. Right.

- Harkewicz:** But, I know that you taught at SDSU<sup>17</sup> for a while?
- Mammerickx:** Yeah, evening classes.
- Harkewicz:** And what was that experience like?
- Mammerickx:** Well, that experience was the following—the funding then, you know, I've told you I've always had to write proposals. And so, once in a while the proposals would not come through. And so I considered teaching at San Diego State as a means to continue a professional existence without having to write a proposal, once you were in. I did it for four semesters and after four semesters the department chairman said, "Are you going to come next semester?" And I said, "Well, I would like to have the opportunity to discuss with you whether I could become faculty, a real faculty member versus," what is the name of the . . .
- Harkewicz:** A lecturer or something like that?
- Mammerickx:** No, they are . . . whatever. The name may come later. But, there is a kind of a faculty that . . .
- Harkewicz:** Adjunct faculty?
- Mammerickx:** Adjunct. So, "Could I be part?" And he said, "No chance whatsoever." And so I said, "Well, then, I'm not interested in staying if those are the terms." You know how you cannot really see yourself, how competent you are. You know, you are not a good judge of that, although one thinks one is great. [*Laugh*]
- Harkewicz:** Did you ever want to teach at UCSD or at Scripps, though?
- Mammerickx:** I think that I knew there was no point in trying so why bother to try to get a faculty appointment?
- Harkewicz:** Why do you think there was no point in trying?
- Mammerickx:** I think that there was this underlying perception that—I mean, look, the first woman at GRD<sup>18</sup> was Miriam Kastner.<sup>19</sup> And she was the only one for many, many years. And then we have Lisa<sup>20</sup> now. And so the prospect to be appointed as women was dim.
- Harkewicz:** I see. Do you have any regrets about that now?

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<sup>17</sup> San Diego State University

<sup>18</sup> Geosciences Research Division

<sup>19</sup> Miriam Kastner (1935 - ), geophysicist and professor of geology, SIO.

<sup>20</sup> Lisa Tauxe (1956 -), geologist and professor of geophysics at SIO.

- Mammerickx:** No, because, as I said, I probably was not thought of very much from, you know, the exterior evidence. At the same time, I loved my job. I had a terrific time doing that, and who can say that, that all aspects of it. I've explained to you how you went from the sounding—I mean, when you write a paper you submit it to a journal and they print it for you. I did the actual printing of the maps. I mean, I found a printer and I discussed the colors with samples. It was—you know?
- Harkewicz:** It's like your baby from the beginning to the end?
- Mammerickx:** Yeah. I had one employee, an illustrator, who drew the line. But except for that, you, from A to Z, it was a very creative—in all work, no matter how menial it is, if you can introduce a dimension of creativity it gives value to the work. My husband says, "You're always moving the furniture." And I said, "The redeeming value of housecleaning is to rearrange." [*Laughter*] That's why men like cooking. They like cooking because there is creativity in cooking. There is zero creativity in laundry, for instance, but they fortunately have a machine that does it completely.
- Harkewicz:** I'll have to think about that. How can you make laundry more creative?
- Mammerickx:** Creative.
- Harkewicz:** Well let me ask you though, you were talking about writing proposals and you said you were on the research staff? So did you have to have anybody on the faculty or anybody else that you would have to put on your proposal at all? Is there . . .
- Mammerickx:** No, I had one, one employee that I supported, Isabel Taylor.<sup>21</sup> There was a terrific group of administrators who were all women. You see, [*laugh*] in a sense it's a little bit like colonialism. You know, you have, like the white folks in Africa and all the blacks doing the work. Well, you look at the faculty. It's all men and all the women do the work. [*Laugh*] I mean, let's be honest about it. Jaynel Moore<sup>22</sup> was the departmental business officer. I was never friendly with the men of the faculty, but boy, I was buddies with the secretaries and Jaynel. And so in their way they were very supportive. And so on the grant you always had to give thirty percent to the university. And so because of that contribution then you have the right to the services of the university, which was access to the administrative staff that developed the budgets, and managed your budgets, and then deal with the NSF<sup>23</sup> that wants to know, X, Y, Z. So . . .

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<sup>21</sup> Isabel Taylor ( - 2004), research assistant, SIO.

<sup>22</sup> Jaynel Moore, laboratory business officer, Geological Research Division, SIO.

<sup>23</sup> National Science Foundation

- Harkewicz:** So, when you're talking about the administration, you're talking about the secretarial staff?
- Mammerickx:** Well they are more than secretaries. I mean, these women who are heads of departments, like Jaynel. Moore. They managed large amounts of money, they buy equipment. They are terrific administrators.
- Harkewicz:** What time period are we talking about here?
- Mammerickx:** I think it's still that way.
- Harkewicz:** Okay. But, I mean when did that start? You know, you said that Miriam Kastner was the first faculty person and that you didn't . . .
- Mammerickx:** What started?
- Harkewicz:** When did the women take over in administration?
- Mammerickx:** They were always there.
- Harkewicz:** Always there?
- Mammerickx:** This has always been true.
- Harkewicz:** Okay.
- Mammerickx:** Yes. That women managed the programs.
- Harkewicz:** So, when you wrote proposals . . .
- Mammerickx:** Men managed the equipment. They are the ones who make the machines go, and throw them in the water, and collect, and the women did the management.
- Harkewicz:** Sounds about right. [*Laugh*]
- Mammerickx:** Yes. [*Laugh*] That seems to amuse you?
- Harkewicz:** Yes.
- Mammerickx:** I mean, it's not any different when I got to Scripps. I look at all the technical offices, there are girls, and look at all the shops, there are men.
- Harkewicz:** Yeah. You're right. That's the same way it is today. Did you ever try to write a proposal for the Navy?

- Mammerickx:** It was for the Navy and NSF. You went where there was money to be had, you know.
- Harkewicz:** So, it didn't matter as far as your, because you were . . .
- Mammerickx:** Being a woman?
- Harkewicz:** Yeah.
- Mammerickx:** No. I think that there was an awareness at the time that somehow women were being given degrees and that they were going to be wanting jobs. And so, at the level of NSF, I'm sure that they said, you know, "Once in a while we have to let a woman in." And I guess I was lucky that I was it.
- Harkewicz:** How did that work? If you were using data that other people had collected did you... I'm trying to picture how this worked. If you were to write a proposal, were you aware that somebody was going out on a cruise and you wanted them to collect data? Or, were you aware that there was something there that you could . . .
- Mammerickx:** I would propose to chart an area or solve a plate tectonic problem. I produced something that did not exist before: the general topography of the sea floor. And knowing the topography of the sea floor is of interest to other disciplines. So it has an intrinsic value and it has a derivative value. That is, as I went around the Pacific there was a willingness to continue a long-term program of exploratory topography, knowing where the trenches were and all that.
- Harkewicz:** Obviously the plate tectonics revolution must have had a big effect on your study?
- Mammerickx:** Without it you lacked the vision to do this.
- Harkewicz:** So, if there hadn't been . . .
- Mammerickx:** Without plate tectonics it wasn't worth funding this.
- Harkewicz:** And so, you were able to . . .
- Mammerickx:** Because you couldn't make sense out of the data.
- Harkewicz:** How do you use these things in order to learn about the evolution of the ocean surface?
- Mammerickx:** I think that the topography of the sea floor is a consequence of plate tectonics. It does not create plate tectonics. It's a result of it.

- Harkewicz:** I guess I'm still a little confused about when you would go out on a cruise—what made that different from when you were using other people's information?
- Mammerickx:** When I went on a cruise it was not for mapping purposes. It was to solve plate tectonics problems. An issue of abandoned spreading ridges. It's one of the little things that I did. I analyzed big undersea fans. There are big areas of sediments that come from the land in the northeast Pacific that have spilled on the sea floor and you have underwater rivers. Now, it's a pure intellectual interest. It has no application, but you know that as you learn. You know, why do we go to Mars? To understand.
- Harkewicz:** So, that was a totally different subject than this interest?
- Mammerickx:** Right.
- Harkewicz:** Okay. I understand.
- Mammerickx:** I did not go at sea to map. No.
- Harkewicz:** How long would it take you to do something like these maps?
- Mammerickx:** Oh, a chart like that, let's say two years.
- Harkewicz:** And you would analyze the data yourself, then, too. Right?
- Mammerickx:** Yeah. Right. And process them. I learned, as I've said to you, I had a colleague, Stu Smith, in the Data Center who was very cooperative into making the data available and doing the processing.
- Harkewicz:** Did you interact with the BT<sup>24</sup> girls at all?
- Mammerickx:** No.
- Harkewicz:** So, when you're talking about the soundings you are talking about bathythermographs, right?
- Mammerickx:** Not bathythermographs. Depth Soundings: bathymetry.
- Harkewicz:** Soundings? Okay. That's different then?
- Mammerickx:** You see, oceanography is an environment in which most scientific disciplines do their thing. And for instance, chemists look at the water and

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<sup>24</sup> Bathythermograph.

it really has nothing to do with the geologists who look at the rocks. They just happen to work in the same environment under water.

- Harkewicz:** But I guess I was confused because I know I read some of, or looked at some of your papers and there was a mention of bathythermographs and magnetic anomalies, and . . .
- Mammerickx:** Bathymetry. That's topography. Bathythermographs, that is measuring the temperature of the water.
- Harkewicz:** Okay. I'm sorry. So, I've got the two confused?<sup>25</sup>
- Mammerickx:** Yeah.
- Harkewicz:** I apologize. So, are you involved with any of this kind of stuff anymore?
- Mammerickx:** No. What happened, and here I, if I can walk through this paper, is—ah. Where is that? Oh, let me get that book in here.
- Harkewicz:** I'm sorry, you're like on a leash here.<sup>26</sup>
- Mammerickx:** What happened is that—. [*Background noise*] I was made obsolete. I was made obsolete.
- Harkewicz:** You were made obsolete?
- Mammerickx:** I was made obsolete.
- Harkewicz:** By technology?
- Mammerickx:** By the discoveries of Dave Sandwell. The methodology used to do the topography was to send a sounding from a ship to the bottom of the sea floor that came back. What Dave Sandwell found was that if you looked at the surface of the water, of the seawater, with satellites, you see an entirely different instrument, and you notice that the sea surface is not flat but it, it has a gravity response to topography of the sea floor. So, if you analyze that sea surface with the satellite data then you can derive, ultimately, the topography of the sea floor. And so we wrote a paper together, and it's the last paper that I wrote, where I used his data, and he's a co-author.

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<sup>25</sup> Bathythermographs are acoustical measurements related to water temperature. Bathymetry is the underwater equivalent of topography. In a later email, I asked Mammerickx if she had to take into account bathythermograph data when she produced her charts because soundings vary with temperature and density. She responded, “Good for you! Yes, the depth data had to be corrected by a factor that had to do with depth and water temperature. Those were known as the ‘Matthews table.’”

<sup>26</sup> Mammerickx moved in order to look for a binder on a desk across the room. She remained attached to her microphone via an “extension cord” set-up to the recorder.

**Harkewicz:** Okay. Let me come over there.

**Mammerickx:** This is the gravity map that he created and he handled his data as the same scale as I was doing. So, here is an area of the sea floor that is two degrees North-South, and essentially three degrees East-West. And, he has all the values, the gravity values of the sea surface over there. And underneath it you see that those are the soundings data and you see how very few of these there were. But, if I put my sounding data on top of his gravity data, it guided me and I was able to find, in the South Pacific, what I've called the "Foundation Seamounts." A series of, a chain of seamounts that is nearly as big as the Hawaiian seamount chains, just thanks to the combination of his gravity data and very, very few soundings. But at the same time I was convinced that he, essentially, had the future of the field by this discovery. He could combine the sounding data that were collected by then. You see, I don't know the year. It's somewhere in the nineties. So that they started collecting soundings seriously, let's say, in the 1940s. He had fifty years of sounding data, and if he could combine them with his gravity data. The satellites cover the whole ocean in no time. This technology would essentially dominate the field. It would have required of me to be retrained in the processing of satellite data. And I was, by then, in my mid-fifties. And so, I said, "This is the end of it." And I retired.

**Harkewicz:** But they're still doing soundings on ships anyway, aren't they?

**Mammerickx:** Well, unfortunately no, you know, they don't.

**Harkewicz:** Really?

**Mammerickx:** No. Some geologists, Hubert Staudigel<sup>27</sup> for instance, is studying the petrology of the seamounts. So he would collect the sounding data for his own interest, but the other cruise is doing something else. They don't do it anymore because the institution does not keep this core group of technicians who were, year in, year out, on the ships collecting the other way . . .

**Harkewicz:** Which is what you said earlier?

**Mammerickx:** That's why it was a period in time, a kind of a, you know, a time of enlightenment and renaissance where every scientist felt that he had a greater commitment to the field besides his own narrow interests.

**Harkewicz:** So you would collect things that you wouldn't necessarily need?

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<sup>27</sup> Hubert Staudigel, research geologist at Scripps.

- Mammerickx:** That's right.
- Harkewicz:** Because somebody else would need it? Well, I've asked this question to most people that I have interviewed—What do you think about people who refer to the sixties as being the “golden age of oceanography.”
- Mammerickx:** Do they say that?
- Harkewicz:** Yeah. Is that what you're referring to?
- Mammerickx:** Yeah, but it's more than the sixties. I would say the seventies and the eighties, and even into the nineties. It's only more recently that the budgets of the National Science Foundation have, if not decreased, things are more expensive. You do less than you used to. And then, also, you have an explosion of fields. The fields that didn't exist before and so there are people doing things that one didn't do at that time. That was a time of renaissance and exploration, and I think that time is over now and that's normal.
- Harkewicz:** Is there enough soundings available with the satellite information to get these things?
- Mammerickx:** Well, you know, it's an interesting question that you ask there . Is the large scale topography of the seafloor completely known now? I don't know. When I go to AGU<sup>28</sup> meetings I always go and look at the maps. And although some new and large seamounts are still discovered, big features are not. And I ask myself: Do we know everything?
- I've stopped working in science now and I'm a volunteer in a number of organizations and what you always have to do is to raise money. And in that field, there is a sort of a financial law that applies when you raise money. It states that twenty percent of the people will give you eighty percent of the money. And so, if you apply that to the sea floor it should be that twenty percent of depth coverage would give you eighty percent of the topography. But I think that these fifty years of the “golden age” brought in less than twenty percent of the data and so I expected that the satellite coverage would discover new large topographic features. And for the Pacific I have not seen that to happen. And so I say to myself, " I don't know the answer to your question. I don't know if the satellite data really gets the whole story.”
- Harkewicz:** So, even though the satellites might be looking at a larger field they're not—

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<sup>28</sup> American Geophysical Union

- Mammerickx:** I wonder if they catch—because you see, the map they use, uses the satellite data but also the old data. So when they don't have the old data, do they see anything?
- Harkewicz:** Well, at first I thought you were going to tell me that you compared your data with his and you got the same kind of thing. But not, what you're saying is that you combined yours?
- Mammerickx:** Yes. They combine both.
- Harkewicz:** I see.
- Mammerickx:** Yes.
- Harkewicz:** So, you can't—it's sort of . . .
- Mammerickx:** And so when he only has—because they, I mean sometimes, I told you that these sounding sheets were a thousand kilometers east-west, and six or seven—this is a big chunk of land. A thousand kilometers, if we're here from San Francisco, okay, that's a thousand kilometers. And then from say, that's from the ocean to—I'm less sure of that—but to the boundary of California. Some of these sheets you had only one or two sounding lines. California would fit in part of one of these large sounding sheets. Imagine having to guess the topography of California from having one or two topographic profiles. And so there are big areas of the ocean, still are, especially in the South Pacific, where the only a little data. There is no sounding sheets that had no data at all. You always had at least one, or two, or three lines. But that still means that there are vast areas where there are no soundings, and now that none are being collected, I mean, I don't know. Okay?
- Harkewicz:** So, explain to me again, because before you said you use your educated guess to fill in spaces? So, how does that relate to what you just said?
- Mammerickx:** Well, the educated guess goes for these, the big fracture zones, and you see how distant they are. They go along the trenches. But then in between all these big features, then there are sort of blank areas where unless you have data you don't know what is there. It's flat.
- Harkewicz:** So, is that designated then on the map that it's missing information?
- Mammerickx:** There's these areas that are the same color. Okay?
- Harkewicz:** I see.
- Mammerickx:** So, those areas are areas where you really need data to . . .

- Harkewicz:** Okay. So, it's like any other kind of map from the period of exploration where . . .
- Mammerickx:** When you had no data you didn't know what it was.
- Harkewicz:** Well, how does it relate—can you take geological information—I mean, this shows my ignorance again, but does the geological information from the ocean bottom relate to the . . .
- Mammerickx:** Topography of the land?
- Harkewicz:** Yeah.
- Mammerickx:** No.
- Harkewicz:** No?
- Mammerickx:** Because the processes are different. On the ocean floor you are having the spreading ridges where new igneous rocks are being generated, and then the slides towards the trenches they are cut off by the big fracture zone. And once in a while you have chains of seamounts. The land is made in a fundamental way by—much of it is sedimentary rocks that sort of float on the lithosphere and they are shaped by erosion. So the only common topographic features on the land and the oceans are volcanoes. But, except for that, they are very different. They look different.
- Harkewicz:** So, the fieldwork that you did in the Congo and Africa really didn't have any . . .
- Mammerickx:** There's no, no.
- Harkewicz:** Really didn't have anything to do with it?
- Mammerickx:** No.
- Harkewicz:** So, did you have to learn a whole entire new field then?
- Mammerickx:** Well, you had to read the literature, to know.
- Harkewicz:** That's interesting. I believe mentioned that your husband mentioned that you were involved in local politics. Is that correct?
- Mammerickx:** When I went into retirement and by then my daughters were grown up and gone to college. I, oh, I—yeah, there is a little story associated with that, too. When I came here for the first time, I came with a fellowship, a grant,

from the American Educational Foundation, and that is something that goes back to the earlier part of this century, during the First World War. At the end of the war Belgium was essentially devastated and the American government gave loans to the Belgium government so it could get itself together. A little bit like the Marshall Plan, but it was earlier. And so a time came then when Belgium had to pay back the U.S. for the loan. I mean, you hear that in the news everyday, the World Bank, and all that. But the United States had a very enlightened policy. It said, "Instead of giving us money back, fund students and send them to be educated in America." And there I was, in the early sixties, this program dating back to the 1920s was still operative. They still had money. And so, I got one of these fellowships and I came here. And I didn't hear from these people for many years. And then, all of a sudden, in the 1990s they wrote me a letter, out of the blue, and they said soliciting money, and saying, "Have you thought of all the good things we did for you? [*Laugh*] And it is payback time." And I was outraged, because I felt if they had given me a loan I would have had the sense of obligation, but this was a grant. And I really don't think that I owed them anything. And then I came, after mulling around over that, after self-examination, I said, "They have a point. I owe something back. So, what can I do for my community? That's how I will pay back." And at the time, the library in Del Mar was held in trailers and I would go there with my daughters in the time they were preparing for their exams in the summer. And the sun beating in these trailers, it was just awful. Del Mar wanted a library. I wrote, with other people, I wrote to the city council saying, "We need a new library." And the council members said, "Thank you." And they put it in a drawer [*laugh*] and that was the end of it. So the members of the committee said, who were people not necessarily living in Del Mar, they said, "It's only if you are on the city council that something can happen, so you should run for the city council." And by an extraordinary set of circumstances I was elected to the city council. [*Laugh*] And so, that's how I went into politics.

**Harkewicz:** Are you still on the city council?

**Mammerickx:** No. I was only on the city council for four years, but I have remained a volunteer to develop the park north of Del Mar on the San Dieguito, the river, and one of the reasons I'm so committed and interested is that it's a geological project.

**Harkewicz:** I see.

**Mammerickx:** That, that way I can bring to bear my training as a geologist.

**Harkewicz:** Well, that's noble.

- Mammerickx:** And land use. And that. [*Phone rings. Recording paused.*]
- Harkewicz:** We should mention to the audience that there is a library in Del Mar now.
- Mammerickx:** Oh yes.
- Harkewicz:** You were successful with that.
- Mammerickx:** But what actually— life is complicated. So on the city council you work on a library project that was then submitted to the voters and they defeated it.
- Harkewicz:** Ah, I see.
- Mammerickx:** But meanwhile the public awareness had been raised and the library came into existence later through the efforts of others. I learned humility.
- Harkewicz:** But you were saying that the work that you're doing along the San Dieguito River is using your geology. How are you using your geologic background?
- Mammerickx:** Well, right now there is a project of restoring a lagoon. And again, that is also a long, a long and complicated story. Do you know that there are nuclear facilities in . . .
- Harkewicz:** San Onofre?
- Mammerickx:** San Onofre, and so some years ago Southern California Edison wanted to build a new reactor at San Onofre and the Coastal Commission told them, "If you want to do that you have to do mitigation measures elsewhere." And we submitted a proposal to do this mitigation in the San Dieguito Lagoon and essentially got the project. Southern California Edison is going to start doing the Lagoon restoration this fall. And my geological interest is that they are going to dig into the lagoon and I'm hoping that they will find whatever in the sediments that—and so, there was a geological aspect to that program that is of interest to me.
- Harkewicz:** So, it is an intellectual [rather than a political] program?
- Mammerickx:** Well, yeah. Right. There is a lot of science that went into it.
- Harkewicz:** All right. Well, my few final questions, then. I guess this is a really broad question but I ask it of everybody, so if you can try to answer it. What do you think Scripps has meant to you?

**Mammerickx:** Well, a sense of adventure. I think the discovery. I had the sense to be an explorer. When I was a child in Africa we looked up to Henry Morton Stanley and, you know, "Livingston, I presume?" and all these stories. And so I had the feeling that I was an explorer.<sup>29</sup>

**Harkewicz:** That sounds pretty exciting. What do you think made Scripps successful, in your opinion?

**Mammerickx:** In those years I think the enthusiasm and the novelty of the field. It was extraordinary, you know, to discover an entirely new environment where scientists in old classical endeavors of science, physics, chemistry, found like a new toy to play with, and a big one at that.

**Harkewicz:** What do you think has threatened its success?

**Mammerickx:** Is the success threatened?

**Harkewicz:** What has threatened Scripps' success?

**Mammerickx:** Hmm. I think that to the extent that the ocean is an environment rather than a discipline, that there is a greater difficulty to define programs. Now that we are beyond the discovery, that science in the ocean is not that different from science on the land, with its complexity and its vastness. I think that may be a reason.

**Harkewicz:** So that makes Scripps not as unique as it was in the past then?

**Mammerickx:** I suspect, yes.

**Harkewicz:** Okay.

**Mammerickx:** For instance, one of the concerns that people like my husband and myself have is that you have scientists, you know, who don't think that they have to go at sea. But geologists feel that way, too, as there are geologists now who never go in the field. And they do absolutely legitimate science.

**Harkewicz:** But you and your husband think that that's the wrong way to look at things? Is that what you're saying?

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<sup>29</sup> Henry Morton Stanley (1841 – 1904), journalist; David Livingstone (1813 – 1873), writer and explorer. In 1871, Stanley led an expedition into the interior of Africa in search of Livingstone, who had become a national hero in England due to his writings and lectures about mysterious Africa and his goal to end the slave trade. Livingstone had been missing since 1864 when he mounted an expedition in search of the source of the Nile River. Stanley found Livingstone in Ujiji, a small village on the shore of Lake Tanganyika on November 10, 1871, nearly eight months after he had started his search. Stanley greeted Livingstone with the now famous words, "Dr. Livingstone, I presume?"

- Mammerickx:** No. It's just, we noticed that, you know, it is a passing of an era. And maybe the sense that older people feel obsolete. I mean, they had their time and now the fields are elsewhere, and not necessarily having to do with the seagoing—the ship life as a tool.
- Harkewicz:** Hmm. So, would you say that the lack of, or the decrease in exploration is the biggest change you've seen, maybe?
- Mammerickx:** In the sense that the exploration: mission-accomplished. I mean, what there was to explore has been explored. Back to the story that twenty percent of the data is giving you eighty percent of what you needed to know. So there's no point in going anymore. Find one more seamount? You know.
- Harkewicz:** What do you think it would be like for you if you were just going into the field now?
- Mammerickx:** I've left now for enough years so I cannot answer that question.
- Harkewicz:** Okay. I was just curious. Is there anything else? I have all these questions on like the structure of the institution and stuff, and it sounds sort of like . . .
- Mammerickx:** I can't address that part.
- Harkewicz:** Because you didn't have that connection? Is there anything that you wanted to tell people about your experience at Scripps or about the science?
- Mammerickx:** That it was mostly a positive one. It was an exciting place to work.
- Harkewicz:** And as far as community, did you have anything that you wanted to add about that?
- Mammerickx:** No. No. It was a good community with people engaged in exciting work.
- Harkewicz:** How does it compare to your local, political . . .
- Mammerickx:** Politics? Yeah. Well, you know, where I am now, all the people, most of the people I deal with are volunteers, and volunteers are a self-selected group. They are nice people. You don't go into volunteering if you if you're jaundiced about something. You want to go to participate.
- Harkewicz:** Do something? Yes.
- Mammerickx:** Yes.

**Harkewicz:** What do you do for creativity now?

**Mammerickx:** That.

**Harkewicz:** That?

**Mammerickx:** That. Yes.

**Harkewicz:** And rearrange the furniture?

**Mammerickx:** And rearrange the furniture. [*Laugh*] Uhm-hmm.

**Harkewicz:** Okay. Is there anything else you want to add?

**Mammerickx:** No. I wonder why you wanted to talk to me because . . .

**Harkewicz:** Because one of the things done by oral history is that we try to fill in the gaps of information, and we have very little information about you.

**Mammerickx:** Oh. Okay.

**Harkewicz:** There's nothing in the archives about you so that's why we wanted to talk to you.

**Mammerickx:** Well. There you go.

**Harkewicz:** So, if you have some stuff you want to give to the archives . . .

**Mammerickx:** Okay.

**Harkewicz:** Then, let's end. ##

## TAPE GUIDE

Tape 1, Side A

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Tape 1, Side B

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