Oral History of William A. Newman

MODERATOR: Today is May 14, 2012. I'm Peter Brueggeman with the Scripps Institution of Oceanography Archives, interviewing William A. Newman. Paul Dayton is also here because of his interest in biological oceanography.

So a good starting question is how did you decide to pursue your career.

BILL NEWMAN: That's a very difficult question, of course, as it probably is for everybody. A long series of events that added up and added up until the straw that broke the camel's back finally arrived. I was offered a job here.

MODERATOR: But did you start out being interested in the ocean at an early age? I was rabidly interested in the ocean and going down to the tide pools, and I went out and learned to scuba dive. Paul was the same way. How did you --

BILL NEWMAN: I was in the same boat. I grew up in San Francisco during the Depression, and I would go down to the docks and fish and lie over the dock and wait and look at the pilings underneath and the little critters sticking their heads out. Whoops, then you got a bite and brought up a beautiful perch of some sort. And sometimes they would buy a big one at the fish market.

MODERATOR: You were selling the fish?

BILL NEWMAN: Well, on the way home I would stop by the market where he'd given me bait on the way down to the water, and I would come back in and say, "Look what I caught." And he would say, "Hey, how much you want for that one?" [LAUGHTER]

MODERATOR: That's pretty cool.

BILL NEWMAN: But it was also seeing seashore life, going out to Duxbury Reef on Sunday, which is north of the Golden Gate Bridge. Then you went over by ferry to Sausalito and drove over for picnics, and wading around the tide pools. Like all the kids you see here, they used to bring a home starfish that stunk up the house and your mother through it out in a week or so. You have early instincts to collect. That was a beautiful little shell you found in the tide pool, and pretty soon you have a small shell collection. It all builds piece by piece.

Then there was the California Academy of Science, and everything was free in those days. On a rainy day you would go out to Golden Gate Park, and go into the African Hall and see the African animals, and wow those beautiful dioramas.

And then the Steinhart Aquarium. And you would finally bump into the guys running the aquarium because they saw you trying to get your hand into one of their little tanks, and they'd tell you no, that fish won't live at home. I said, "Well, I have a little tropical tank, it might." [LAUGHTER] So you got to know the guys at the aquarium. I eventually got to know quite a few people there. Ellsworth Doherty was a very prominent invertebrates authority and a medical doctor. But that was later in life.

So all these things were added, added, added. Went to Berkeley, marvelous professors. And so on.

I think the important thing to me was a few good books fell into my hands when I was very young. I mentioned a couple in the report I gave to Paul. Hornaday's *Natural History* [sic] for example.

MODERATOR: Yes, we have that report in the Scripps Archives biographical file.

BILL NEWMAN: It's a wonderful book for kids. A wonderful book for adults. It's a little out of date now, but it's still very good. Then there was Innes's tropical fish book, popular but it was a very scholarly piece of work. It had distributional maps of the freshwater fishes of the world, and wow, look at these patterns. Africa and South America both having cichlids, how could that be?

MODERATOR: Was this during high school you are reading these?

BILL NEWMAN: No, pre-high school.

MODERATOR: Pre-high school. Wow, you were rabid.

PAUL DAYTON: Yeah.

MODERATOR: I was too. [LAUGHTER]

BILL NEWMAN: Comes high school, you got busy with other things. Girls and such. [LAUGHTER]

PAUL DAYTON: Did Hornaday, did anybody in those books talk about drift as a mechanism of getting the cichlids over there?

BILL NEWMAN: No. Wegener, of course, had by then been translated into English. But no, that did not come up. Earl Harold at the Academy, later he was director of the Aquarium talked about the fishes and how they must've drifted. I talked to Phil Darlington at Harvard about it. Oh yes, the continents pulled apart, but when and how nobody knew.

PAUL DAYTON: That was Darlington you talked to?

BILL NEWMAN: Phil Darlington, yes.

PAUL DAYTON: Yes, I took my biogeography course from his book. And there were land bridges; there were all sorts of hypotheses in his book. And by '63 or whenever I took it, drift wasn't with us yet.

BILL NEWMAN: It certainly wasn't with him. He was a Wegenerian, things drifted but not recently enough to account for the cichlids. And like Darwin, he stuck to the evidence. There was no evidence for how you move continents! Well, obviously they fit at one time or another, but they are fixed now, there is no evidence they're moving. So he was stuck. He said the closest it could've been was the Oligocene, so those fish, being younger, had to swim.

MODERATOR: It's interesting that you said at an early age the biogeographical maps for those fish caught your eye.

BILL NEWMAN: Well, it catches your eye because these are primary freshwater fish.

MODERATOR: But it plays into your whole career. You know, I look at your list of publications, and biogeography seemed to hit you strongly.

BILL NEWMAN: Well, California is great for it. You know, you go up to the Sierras, you go from dry Mediterranean climate up to Alpine. From the palms to the pines. And everywhere you go, you have these huge changes. So, there are different animals and plants up here as well as different climates, and so you get involved in it right away. If you live in the Great Plains, my God, as far as you can see it's the same. But we have a very dynamic system that stimulates your curiosity.

MODERATOR: In your local collections, you were collecting at an early age it sounded like. Did you have a field guide, were you assigning names to them when you collected things for home, or shells? Did you do that?

BILL NEWMAN: We go out to Cal Academy, and I had some friends who were interested too. We go out to Cal Academy and look at the displays, and yeah, I did that.

MODERATOR: What age was this?

BILL NEWMAN: Ten or eleven.

MODERATOR: Wow, [LAUGHTER]

BILL NEWMAN: Well, the fishing was when I was five and six. [LAUGHTER]

MODERATOR: So you would collect stuff, and then you would go to the Academy and try to figure out what you had?

BILL NEWMAN: What you had, yeah. And you finally learned that if you talked around and asked, a guy would come out from behind. And he knew everything. And he was Dr. So-and-so. He's a PhD. Oh, a PhD. He has a PhD. So I really gained respect through many channels for PhDs. They seemed to know everything about what you asked them and if they knew all about that, they must know about everything else. And in most cases they did.

So that's what got me going. When I got to college I thought you know, I can do this. It's interesting. So I did.

MODERATOR: And you went to college as an undergrad where?

BILL NEWMAN: I went to Berkeley all the way through. I started at Menlo Junior College when I first got out of the Army. Then I said to hell with this and went out and built boats for a couple of years in Sausalito.

PAUL DAYTON: When were you in the Army?

BILL NEWMAN: I went in in December of '45, and was in nearly two years.

PAUL DAYTON: So you just barely missed the war.

BILL NEWMAN: Yep, otherwise I would be splattered all over the rocks of Iwo Jima; no, mainland Japan by then. The closest I came was strikebreaking in Chicago. [LAUGHTER] Yeah, there were a lot of strikes right after the war. And they had mobilized the army to stand by. We didn't have to do anything, but we were told what to do if need be.

MODERATOR: So why the shipbuilding? Because you needed employment?

BILL NEWMAN: I liked to sail. I used to race on San Francisco Bay when I was a kid. I had an International 14, and we raced at Berkeley, they had 14s. And so boats have always been in my blood.

MODERATOR: Where did you grow up in San Francisco?

BILL NEWMAN: In the Marina District. So I could get up early in the morning and sneak out of the house and stop by Scottie at the end of the dock and get a couple of pile worms if the fish market wasn't open, and go fish amongst a lot of old men there fishing. They would tell me this was a pogey, and this was this or that, and so I started learning common names of fishes.

MODERATOR: You are talking about weekends, right? You weren't fishing before school, were you?

BILL NEWMAN: I did, before I went to school, I think. [LAUGHTER] One day there was a ring on the doorbell, and my mother went down. And here is little Billy in his nightgown with a woman who was walking her dog. She said, "I found him around the Palace of Fine Arts feeding the ducks." [LAUGHTER]

MODERATOR: The early wanderings of a naturalist. [LAUGHTER]

BILL NEWMAN: Well, I had a very free life. My parents were busy in many ways, and they were good parents, but they let me do what I wanted to do. If I wanted to leave and wander around, I was able to get away. A lot of my friends were appalled at the things I got away with.

MODERATOR: So when you were an undergraduate, did you have a direction, or did you feel like you wanted to get a PhD?

BILL NEWMAN: No, I didn't. It didn't bite me until I got going. I started out as an undergraduate in general curriculum. I took a couple of great courses that I mentioned. Zoology 1A,

that was a good course. I took Botany 10 and Geology 10 from two great guys.

MODERATOR: What are the names?

BILL NEWMAN: The geology was Norman Hyne, I believe. He was a Harvard PhD. And the botany was Ralph Emerson, another Harvard PhD. And they gave the general introductory courses, and they were great. You could go and talk to them afterwards, and they would listen to you. You could ask stupid questions and they would straighten you out and give you good answers and get you going. Peak your curiosity.

And then of course came Ralph Smith teaching invertebrates. I took that as an upper division student. Zoology 112, it was called.

Then I got married and took Ralph’s advanced summer course my senior year at Hopkins. It was the last UC course given by a UC professor at Hopkins. Ralph later gave it at Bodega.

And Donald P. Abbott was there, and I could sit in on his lectures. I got to know D.P. Abbott, and the die was cast. This is for me. [LAUGHTER]

PAUL DAYTON: So it was by association with, basically, Smith and Abbott that got you into the pure invertebrates.

BILL NEWMAN: Yes.

PAUL DAYTON: Yes. And by happenstance, you bumped into the geologist so you got the paleo aspect of invertebrates, which was not Ralph's and Abbott's bag particularly.

BILL NEWMAN: Well, -- between a Masters and a doctorate, I went away for a couple of years in the Caroline Islands. And when I came back there was a new graduate student working on barnacles up the hill, Victor Zullo. And he was with Wyatt Durham, who was a paleontologist at Berkeley. And so Cadet Hand marched me up and introduced me to Durham as well.

BILL NEWMAN: Cadet Hand had come up from a postdoc at Scripps as an assistant professor. Well, Ralph went away, off to Finland on sabbatical. So I transferred from Ralph to Hand.

PAUL DAYTON: Was Cadet one of the Light students, or was he a Ralph Smith student, or what?

BILL NEWMAN: Both Abbott and Cadet may have started with Light, but they ended as Smith students, I believe,

PAUL DAYTON: Was Smith also a Light student.

BILL NEWMAN: Smith came from Harvard when Light was at Berkeley. Smith was a student of John Welch, an invertebrate physiologist at Harvard.

PAUL DAYTON: So you would have been building boats and then in Truk when Light was sort of at his peak.

BILL NEWMAN: No, I got my A.B. in '51 and Light (1886-1947) was gone some years before that.

PAUL DAYTON: He had already drowned?

BILL NEWMAN: Don’t recall that he'd drowned, but he was gone by then.

PAUL DAYTON: Okay, I'm asking this because I'm interested in the evolution of the science of invertebrate zoology.

BILL NEWMAN: Okay, by 1947 Light was gone, and shortly thereafter Ralph took over preparing “Light's Manual" for publication. Light had put out a little pamphlet.

MODERATOR: We have it. You ought to see it.

BILL NEWMAN: Oh, you have it. Yeah, I'd love to see it. There was nothing like it on this coast, and there was nothing like it on the East Coast. So Ralph took it over.

I had done a Zoology 112 project on barnacles when an undergraduate, was now a first year graduate student and he said, "Bill, would you like to do the chapter on barnacles?"

PAUL DAYTON: Yes, this was '51, when Smith took it over.

BILL NEWMAN: Well, the so-called 2nd edition was published in 1954.

PAUL DAYTON: Okay, but you were talking back to Smith coming before '47.

BILL NEWMAN: Well, I really didn't know anything about it all until I gotten an A.B.: after that I got to know the zoology department reasonably well. If they were still using Light's original manual back then I don't recall.

PAUL DAYTON: Okay, but I guess what I'm interested in is that in my mind -- the heart of invertebrate zoology, as I know it being from the West Coast, all sort of blossomed out of Light's lab.

BILL NEWMAN: Yeah, you're right, and D.P. Abbott took it to Stanford and Joel Hedgpeth took it to Dillon Beach and then to Oregon.

PAUL DAYTON: All of those guys – Paul Illg and Bob Fernald, the people that I interacted with at Friday Harbor, they were all Light's?

BILL NEWMAN: And so you got it from that end!

PAUL DAYTON: Yeah, I got it from that end. But something happened there in invertebrate zoology that didn't happen before or after. You had people asking deep and interesting questions about different groups and the biogenetic relationships. And Jörgensen and, you know, Haeckel, Remane, Ax and those guys were asking sort of that type of question in Europe. But not with the natural history base that I think came out of Light's group. So I'm just sort of interested if you have any insights into the dynamics.

And one follow-up question with some interesting dynamics that have confused me is those guys just seem to religiously ignore Ricketts. And he had already published *Between the Pacific Tides* long before.

BILL NEWMAN: That's true. But not that they ignored him, really. He published *Between the Pacific Tides* and Hedgpeth embellished it, but it wasn't the field handbook. Light's (4th edition) is no longer a field handbook, it's a doorstop.

MODERATOR: Right, but it was in the early editions.

BILL NEWMAN: It was, and Ralph tried to keep it that way. He kept it as small as he could. But I said look, we've got to give some ecology. He said no, the students will learn the ecology on field trips and their anatomy in the lab. This is so they can identify the specimens. And he insisted on that. But

it grew as knowledge grew, and people could always crowd in a little bit more, and so each edition got thicker and thicker.

And then it became Light and Smith Manual under Jim Carlton. Carlton said well, we can't control it, we've got to just let it become what it is. And so it grew. [LAUGHTER] And now it is just tremendous. It is almost too much. It is sort of like the *Treatise on Invertebrate Paleontology* that Hedgpeth brought out. It should have been cut in half so it doesn't wear you out handling it. [LAUGHTER] You can't take it to the lab and set it down next to you and identify what you've got. It's not really as good as it was for that.

PAUL DAYTON: When I came here you give a course in invertebrates that I sat in, and I still remember very fondly because I learned a lot. But you had sort of a -- well, you had two or three possible phylogenies for the animal kingdom. And you were obviously thinking those big-scale questions. You know, whether they came from flatworms or sponges, all of the various things that -- and I remember your little diagrams and things, and I still have them. But I think all of you guys were associated with the Light's influence, through Smith mostly, I suppose, and maybe Abbott; Abbott too.

BILL NEWMAN: Yes, and Cadet Hand and Joel Hedgpeth too.

PAUL DAYTON: And Cadet and Joel too. You know, you were thinking these really big thoughts in addition to your specialty. How did you get into that? How did that happen? Because other places don't do that so much, especially in America. They did a little bit in Germany in the '30s and '40s and then a bit after the war, but not so much.

BILL NEWMAN: Well, again, I think it is that we have a dynamic ecosystem out here. If you go to the reef that I had to take students to at Harvard; it was the dullest. A couple of seaweeds, a crab or two, and no diversity at all. "Oh, there is a little lobster." That might be the only really interesting thing for the day.

Here -- holy mackerel. You go out on a reef and there are all kinds of kelp and seaweeds and sea grasses. Every tide pool is teaming with umpteen different kinds of fishes and invertebrates. And then as you go up and down the coast, it changes rapidly because of the California transition zone. Abalone the size of dinner plates, where abalone in most of the world are the size of less than a little tiny sauce dish. It's

just a very dynamic place both in diversity and ecosystems. It's the same as I was saying about the palms to the pines eco-tomes that you see here. It just -- nature grabs you here. And I think that's what had a lot to do with it, and still does.

PAUL DAYTON: I wanted to hear your take on that, and I agree with you, of course.

BILL NEWMAN: I never thought of it quite this way.

PAUL DAYTON: Well, nature grabs people in all sorts of other habitats, such as in the coral reefs. And it does not produce a Light school of invertebrate zoology, which had all of the people that it influenced -- all of the West Coast anyway. So I'm still thinking that there was something special going on at Berkeley in that era. And I'm still a little confused by what seems to me a lack of recognition of Ricketts right over there, thinking really interesting thoughts. But maybe just being a little outlandish with his behavior is something.

BILL NEWMAN: Well, when you took invertebrate zoology as an undergraduate at Berkeley, you read Ricketts. That was one of the books you read. And he was not put aside at all. We lost him prematurely. There was great mourning over that. He got -- he backed into a train.

PAUL DAYTON: Yeah, well, the train ran over him.

BILL NEWMAN: It ran over him, yeah.

PAUL DAYTON: Anyway, I just wanted to get this since we got into it. It's a little early. Can I go back to Truk?

BILL NEWMAN: Oh, Truk was a wonderful experience.

PAUL DAYTON: Because here I see you as a young fellow teaching high school or something in Truk. And spending two years, that's a good amount of time to learn quite a lot of coral stuff.

BILL NEWMAN: Oh, it was a great place.

PAUL DAYTON: Did you learn quite a lot from the natives, and did you really get out on the reefs and suck that in like you did the Bay Area?

BILL NEWMAN: Yeah, I built a boat out there so I could get around.

PAUL DAYTON: I think that this is what interests me. Why don't you go ahead and just talk a little bit about the time at Truk.

MODERATOR: So after your Masters degree you went to go teach in Truk.

BILL NEWMAN: Yes, and I took a wife and one child. And there was Peter J.R. Hill, who was from Ann Arbor, Michigan, a botanist who had been in Palau for two years before that. He was a PhD candidate too who was killing time doing something interesting. And he arrived at Pacific Island Central School at the same time I did. We were both hired to head up the little science department there.

The purpose of the school was to take the upper 10 percent of graduating high school students, give them a two-year prep to for college; give them an extra shot in the arm. And then they went to Fiji or Hawaii, mainly. Some went to Jamaica to medical or dental school too. And some studied administration and some became lawyers. And now they are the big chiefs and honchos out in what was then the Trust Territory of the Pacific Islands. It’s now all broken up into separate states, and many of those students are still notable among them.

I've had a great bunch of students in my life and they started in Truk. But Truk was also a great place. It would be the largest atoll in the world if it weren't for about seven high islands that stick up in the lagoon. It is 40 mile across a lagoon filled with patch reefs and deep lagoon waters. And it was pristine despite having been badly damaged during the war; it was a Japanese Pearl Harbor. But as far as you could see then, it had fully recovered.

The Japanese had been starving there; we’d more or less bombed the hell out of them before bypassing them and cutting off their food supply route. So they were starving, and they dynamited the reefs and ate the songbirds, and the rats, dogs and cats, which was a blessing. So it had a hard time up until '45. And by the time I got there 9 years later you couldn't tell much if anything it happened. That was impressive to me; how fast things recovered.

So to get around you needed a boat. Well, first you needed transportation. So I imported a motor scooter, a Cushman, from Guam. They flew it down. And with that I could get around.

So the shop foreman at the school said that he would work with me on weekends to get material and build a boat. So I built a 12 foot boat. It was practically four feet wide. And he said it should be thin and narrow like the Okinawan canoe. I said no, no, I want a platform. I want something that is stable and that I can go around and be secure in. I don't want a little canoe; sure, I could go across from this island to that in a hurry, but I may not get there. So it was a fat little boat but a safe one.

I went down to the dump and got a back window out of an old truck and made a windshield and a canvas top. And oh, solid comfort in that you didn't burn up in the sun, you could go around in the rain, and the rain would pour down and go dripping off the side. And you are just cruising along. And it would take the slop and the waves beautifully. A delightful little boat.

I saw it when on the CARMARSEL Expedition. The radio operator at Truk had bought it from me when I left. He had lengthened it four or five feet, and 10 years later it was in the junkyard there at Truk. One of my friends there showed it to me. That wooden boat had really lasted!

The reason I could build a boat is because I built some in Sausalito before.

MODERATOR: Right.

BILL NEWMAN: So with a boat and a motor scooter you could get around. And so Peter and I developed fish spears, and I was like Darwin; shooting little birds. And I speared every fish I could see. And in those days it didn't really matter, because there were very few people and plenty of fish. And those days, as we all know, are all over. Guilty, Your Honor. But no, we didn't take the big fish, just the little fish.

MODERATOR: You were taking fish to eat, or just to make the study?

BILL NEWMAN: Oh, we ate them, yeah. Well, I also collected a lot. Lizards and fish. When Fanning -- no, that was later. I took those back to Harvard. Fish from Truk went to Paul Needham

at, most of the mollusks to Rudolf Stohler, both at Berkeley. So, I am a collector. But oh, I am a collector: you ought to see my garage. [LAUGHTER] I've got every tool I ever bought.

MODERATOR: So you built a boat because you just wanted to get around, but you also wanted to collect. And did you snorkel or anything like that?

BILL NEWMAN: Oh, yes, we snorkeled. And the snorkeling had just really come in. There was a Palauan salvage guy who had a barge and a hookah rig to take up Japanese cables. The Truk lagoon was laced with copper cables, and copper was valuable. So he went around pulling up cables and cutting them up and exporting the copper. So he got me into hookah, and damn near drowned me. He took me down about 10 fathoms. [LAUGHTER].

MODERATOR: Yeah, that would be pretty deep.

BILL NEWMAN: Yeah, it was too deep, and I just kicked and screamed all the way down. But he got me down, "You're okay now," he signaled and went off, when we reached the lagoon floor.

MODERATOR: Did you know to equalize the pressure in your ears?

BILL NEWMAN: We would stop, and he would put his hand up to his face plate under his nose, you know, to get me to snort and sneeze. It was frightening to go down there. The water was not terribly clear. We were in the murky part of the lagoon. When we got to the bottom, I started looking around, and a few *Halameda* and all sorts of forams including *Amphistegina* were growing. And he went off and poked around in all of this oozy stuff and came up with a big beautiful sea cucumber. He took it and squeezed it, and it squirted strings of sticky elastic material that stuck to his arms, which he would latter rub off.

So we finally got back up, and I said, "What do you want that for?" And he said, "You wait and see." And he had a gal on the stern of the barge with a little brazier, and she sliced up the sole of this great big, ugly-looking, sticky sea cucumber. And she sautéed it in butter and little onions. Oh, I've never had anything as good; Bêche-de-mer, and I've never had any since. So that was my introduction to an underwater breathing device.

Later, when we went to Fanning, we bought a compressor and scuba gear in Hawaii. And we taught ourselves to scuba. We read the directions the gear provided and were very careful.

MODERATOR: Where was that?

BILL NEWMAN: On Fanning. Yes, I came here after Berkeley, but when there a couple of graduate students and I got an NSF grant for a summer expedition to Fanning.

MODERATOR: So it would be in the '60s you are talking about now.

BILL NEWMAN: Yeah, the early '60s. I came here for a year from Berkeley following my degree. We went to Fanning Island the summer of 1963, and from there I went back to Harvard (Museum of Comparative Zoology), in part to work with George Clarke on establishing an oceanographic relationship with Woods Hole. That didn't work out, so I got back here.

The point of this was that we bought a three stage compressor in Hawaii and the single stage “Aqualung” regulators that we took to Fanning. And we taught ourselves to scuba.

MODERATOR: That was nearly a decade after the introduction at Truk.

BILL NEWMAN: It was neat to get underwater and be able to stay there. We first snorkeled at Fanning. When we moved to the outer reef to look for the 10 fathom terrace I’d read about in a book (Harold Wiens’ *Atoll environment and ecology*), it started getting deeper and deeper, and you could not stay very long. So we decided to try the scuba out.

So Steve Wainwright, who was the head of the expedition, Chuck Stasek, who was a mollusk man, and I were forced us into scuba, because we wanted to get deeper. And thank God we did, because while there we got out to the edge of the reef. At the 10 fathom break where it drops off and just goes down into the blue as far as you can see. And there were huge corals, great big table corals were growing, standing all around this edge and up onto the reef to 40 feet of depth or so. And since we’d surveyed from the lagoon across the island and seaward cobble ramparts, and down the surf channels to outer seaward reef at 10 fathoms, we knew what was there.

Well, a huge wave storm came in from I don't know where across and reef and up the outer cobble rampart. We couldn’t go out and look at things until about a week later.

The wave storm had lasted several days, but we didn’t go until after things had settled down. When we did we were astonished to see many of the huge corals we knew were standing upright below “wave base” had been torn us and either gone down the slope or had been broken up and were being made into cobbles in the surge channels. It was not wind, not cyclonic activity, just the waves coming in from somewhere and persisting for a few days. It did a tremendous amount of damage that explained how the ramparts were built

Fanning is in the doldrums so to speak; no big storms hit that end of the Line Islands. Tropical storms make up to the west and continue. They get more intense as you go west before split into two channels, one going to the Philippines, the other over to the Marianas and then up to Japan. But Fanning itself, far to the east, is a very quiet place.

But the terrestrial evidence for storms was just tremendous there. If we had not experience that wave storm, I would have guessed that things must have changed. But no, every once in a while the island is hit by a wave storm, and the likelihood of having experienced much larger ones than we witnessed would explain what we saw on land there.

MODERATOR: So we are going to go back to Truk now. So you just did that one dive with that fellow in the hookah rig, and then you are back to snorkeling and collecting?

BILL NEWMAN: With the hookah rig, yes, and then snorkeling. And Peter liked to snorkel too, so we got a bigger boat for the school, an old double ended lifeboat, so we put in a well for an outboard. And we would take the students all over the lagoon on field trips, which was really great because they were pretty good swimmers. Surprisingly, not as good as you might think though. As the principal of the school said, "Don't ask them to climb a coconut tree. Their feet are soft from wear shoes and socks." Well, they were sort of that way when it came to the reef and water.

But they were interested in learning the Linnaean names of things, and we were too. So we went and we collected and we got a handle on what was going on. I learned a lot from Roughly's *Great Barrier Reef* which I’d brought with me, the only book at that time that was really any good and available. It was a wonderful book.

MODERATOR: So then after your teaching in Truk, you went to where?

BILL NEWMAN: I left Berkeley with a Masters degree, went to Truk for two years, came back to Berkeley and went on for a doctorate.

MODERATOR: I see.

BILL NEWMAN: Yeah. The die was cast by then.

MODERATOR: When was the barnacle die cast… was that when you came back after Truk?

BILL NEWMAN: No, barnacles go way back to Ralph Smith and Don Abbott.

MODERATOR: Oh, that's right, you referenced that.

BILL NEWMAN: Yeah, way back, really back to the docks in San Francisco. I could see the little devils down there eating away. And then my father had a boat later on, and I scraped barnacles off the bottom of it for him. And I looked for barnacles at Truk, and I published at least two papers on them. But there isn't much there.

MODERATOR: You published what?

BILL NEWMAN: I published two papers on barnacles from Truk when I got back. But the diversity is very low, and that stimulated me to write an ecological paper on fish being the cause of the lack of intertidal barnacles in the Central Pacific, which is in part true. But it was also true, and I didn't realize it at the time, we were too far from the source. The diversity falls off as you go east across the Pacific.

MODERATOR: The barnacle diversity?

BILL NEWMAN: Everything. The corals, everything.

PAUL DAYTON: Yeah, and that’s before the East Pacific Barrier, and it really does. And that took a while to understand.

BILL NEWMAN: Well, I don't think most people understand it yet. We do, but they don't. [LAUGHTER]

PAUL DAYTON: Well, basically at that time that pattern was not established, I don't think, was it?

BILL NEWMAN: Well, there was a feeling for it when it came to the terrestrial biota, and Peter Hill knew something about that. But if it were known for the marine biota, somehow I had yet to catch on.

Now surely Darwin didn't know about it. He talked about island-less gap between the Pacific proper and the Americas. That was the East Pacific Barrier, something propagules could not easily get across. But he did not know about the general decline across the Pacific. By my time, the people who studied in Hawaii probably understood it, I think quite well. But it hadn't infected Berkeley. That's no excuse for me, I should've picked it up earlier. I should've picked up seafloor spreading earlier too, because all of the facts were tumbling around here. It took that graduate school student at Woods Hole or Lamont to noticed that the magnetic anomalies on either side of the Mid-Atlantic Ridge matched, oh boy!

PAUL DAYTON: There are the cichlids. The cichlids are one of the prime examples. But there are many others that Darlington couldn't deal with in his book.

BILL NEWMAN: Well, he was wrestling with it when I talked to him about it.

PAUL DAYTON: Yeah, I wrote him from the Antarctic.

BILL NEWMAN: You did?

PAUL DAYTON: In '63 I wrote him because I had just had his course, and then we had a --

BILL NEWMAN: Well, that was when he was writing *Biogeography of the Southern End of the World* (1965), when I was at the MCZ.

PAUL DAYTON: Yeah, and at that point he was interested in that. And I actually sent him some *Glossopteris* stuff that I had gotten from some geologists. But the geologists were anti-drifters, and they got a guy named King from South Africa to come to the Antarctic.

BILL NEWMAN: Yep, I asked everybody at Yale, at Bingham Oceanographic, when there helping with Will Hartman’s summer

course. Asked if they could've drifted recently? Nope, no mechanism.

PAUL DAYTON: Cretaceous just can't be that fast, was their mindset. But in '63, this King fellow from South Africa came through McMurdo, and he was an older guy, very famous. And I heard he was a drifter. And I had been struggling with Darlington's book, and I had just taken the class. So I asked him if he would give a talk. So the geologists all had to come to be polite. And he gave the drift talk which was based on various geological things.

Then they started hammering him politely, and there was a guy named Hamilton, a young Turk from USGS, and he was there. And he stood up to the American geologists and defended King. And he based it on paleomagnetic evidence.

BILL NEWMAN: Hamilton of Mid-Pacific Mountain fame?

PAUL DAYTON: That's the guy in Denver, Warren B. Hamilton.

BILL NEWMAN: No, that's another Hamilton.

PAUL DAYTON: Yeah. And I thought he won the argument hands down that evening at McMurdo, and those guys were really cold about it. But you know, it was a hot topic in the early '60s.

BILL NEWMAN: Yeah, but it didn't break here until later. In fact, Dick Rosenblatt and I put in for a grant, NSF, to go to the Mid-Pacific Mountains (1968), that's how we did the guyot work. We were going to look at the Mid-Pacific Mountains as having been island steppingstones from the west to the east to help get stuff across to the Hawaiian archipelago.

Well, we know now those mountains weren't even there; they were down south of the equator before the Hawaiian archipelago got started. They had drifted all the way across the equator and up to their present position. And in fact, the north end the Hawaiian archipelago you can dredge Cretaceous guyots alongside the Miocene guyots that developed around them and now support reefs. That NSF proposal was reviewed, we were funded, and we went out there with Harry Ladd from the Smithsonian and Ned Allison from San Diego State, without the foggiest notion seafloor spreading account for the geological setting!

MODERATOR: When was this?

BILL NEWMAN: That was 1968, our MidPac Expedition (Styx-7).

MODERATOR: MidPac Expedition, okay. That work was part of MidPac.

BILL NEWMAN: Yeah, it's amazing, but I don't think young people realize how fast we progressed, it has been exponential in the last 40 years.

PAUL DAYTON: That's what I wanted to get into. Because these are major world views that have happened in my lifetime. The asteroid too. You know, every one of them was fought hard by the establishment. And now they are just fully accepted. But that did not come easily.

BILL NEWMAN: It did not come easily, which is astonishing. All of the evidence was just screaming at you.

PAUL DAYTON: That's what I wanted on your record. [LAUGHTER]

MODERATOR: So why was it not accepted so easily? It was just so far outside, it was just a big paradigm shift that it was --

PAUL DAYTON: Threatened.

MODERATOR: A threat?

PAUL DAYTON: Of threats to the --

BILL NEWMAN: Well, Darwin worried about it, and he said yes, continents have moved, but not in recent enough times to account for what we see biogeographically. The fit goes back to Bacon (1500s) who suggested it was more than coincidentally. As soon as the charts were good enough, holy mackerel, Africa and South America fit together. And that was done with little ants floating around on little boxes of wood with sails. They charted it well enough that you could see the fit. And with that screamed at you -- but there was no evidence as to how that could have happened.

The evidence Wegener laid out was finally published in English in 1922. It created a great stir, but even in English when it should've taken a hold, it didn't for want of a mechanism.

In hindsight, it's easy to say well, they should've seen it. Phil Darlington was struggling with the fact you can't just

plump primary freshwater fish in sea water and expect them to get across the Atlantic and breed on the other side. They couldn't have done it. But how can continents moved apart?

PAUL DAYTON: The lungfish and ratites were part of that too. Same sort of thing. It's all in Darlington's book, and he just wouldn't take the drift.

BILL NEWMAN: Well, the first guy who used biological evidence that I know of to suggest continental drift was Darwin's friend Hooker, Joseph Hooker, the botanist. He had been down in the Antarctic, and overwintered once at Kerguelen. He collected in New Zealand and Kerguelen, and then he got up into India where he was incarcerated by some Indian tribe, and almost didn't get him back. Well, he wrote to Darwin about his belief that there had once been a great southern continent, as he could see its fragments all over, the scattered southern flora in India, South Africa, South America, New Zealand, and Australia.

He'd got araucarian fossils on Kerguelen, so he knew that Kerguelen had likely been part of Antarctica. Way back. And Darwin said no, there must have been a land bridge. I've searched and searched but Hooker never mentioned it again. Darwin had discouraged him, and this is when Hooker was a young man. Whatever, he went on to become head of Kew Herbarium and that's not bad.

PAUL DAYTON: He went on to be fully famous, so he could've pushed it.

BILL NEWMAN: Yes, he could've pushed it, but Darwin talked him out of it.

MODERATOR: How did you get recruited to Scripps, or how did you come here?

BILL NEWMAN: Well, Cadet Hand had been at Scripps. Cadet was now my professor. He brought us down one Easter week and we went on the E.W. Scripps. We went out to Channel Islands and dredged for a week, Easter week, and so I got a pretty good look at Scripps.

MODERATOR: That would've been in the '50s.

BILL NEWMAN: Yes, the '50s. So I got to know Scripps. I had heard of Scripps and all of that, because of the big isopod man, Bob Menzies, was there, and I would send him stuff I had

collected. And Hedgpeth had been there. So I knew about it. So I not only finally got here for a visit but went out for nearly a week on the E.W. Scripps!

MODERATOR: Do you remember who you met when you came here.

BILL NEWMAN: No, we didn't meet anybody, it was an Easter holiday and the place was deserted the weekend we arrived. We went down to Point Loma and got on the E.W. Scripps, and went out to sea. And Bob Clark, who was here from England, went on that trip. The others, Harry Fitchman, Frank Gwilliam, Meredith Jones and Jack Tomlinson were invertebrate zoologist from Berkeley.

PAUL DAYTON: Bob Clark, the invertebrate guy?

BILL NEWMAN: Yeah, Bob Clark from New Castle-on-Tyne, yeah.

PAUL DAYTON: With the peristalsis.

BILL NEWMAN: Yeah, the worms… he had been teaching at Berkeley for a year or two.

PAUL DAYTON: And this was in the '50s?

BILL NEWMAN: I have a picture standing on the old Scripps pier. I'm behind of Clark and Fritchman looking at Scripps. I've compared that to the picture at roughly the same spot on the new pier, and you can see the differences where the trees have grown and disappeared and the buildings have shifted. I'll send it; would you like to see it?

MODERATOR: Oh, you know me, I'll add it to the archive.

BILL NEWMAN: Well, that will date that trip. It must've been in the '50s. It was later than I thought. E.W. Scripps. Yeah, it had to be later. So I was a graduate student.

MODERATOR: So would that be before Truk or after Truk.

BILL NEWMAN: That would be after, actually 1957.

PAUL DAYTON: Okay, that make sense, because Bob Clark taught me at Friday Harbor in '65; he was a visiting professor.

BILL NEWMAN: Okay. So you knew him too? Yeah, he was a good man, I liked him.

PAUL DAYTON: But he didn't seem that old. [LAUGHTER]

BILL NEWMAN: Well, he was older, but not much. So where were we?

MODERATOR: I was asking how you got recruited to Scripps. How did that come about?

BILL NEWMAN: When I got back from Truk, I was at Berkeley. And it was the first summer after getting back. Paul Horrer, who was a consultant down here, was doing work for San Diego dredging the Bay to see what effect putting in a secondary sewage outlet in San Diego Bay proper had had. They used to dump raw sewage directly into the Bay before converting to a secondary sewage outfall. So they needed someone to study the samples and give them a report on the condition of the samples. I said well, that's kind of useless, I don't know what they were before. They said no, we just want the data. Well, fine. So I came down, and I had a brand new '57 Chevy. So this was in '57.

MODERATOR: So you had your PhD by then?

BILL NEWMAN: No, no, '57.

MODERATOR: When did you get your PhD?

BILL NEWMAN: '61. Seems like it stretched over a lot of time and it did as it included boatbuilding and Truk.

MODERATOR: It's a grand story; they should make a movie. [LAUGHTER]

PAUL DAYTON: But they were planning the outfall in '57, because it didn't get constructed until '63.

BILL NEWMAN: This is in the Bay. It was primary to secondary into the Bay, not the ocean.

PAUL DAYTON: Oh, okay, the Point Loma outfall.

BILL NEWMAN: Yep, the Point Loma outfall came afterwards.

PAUL DAYTON: Way afterwards!

BILL NEWMAN: Way afterwards, yeah. The big step was getting raw sewage out of the Bay. But some sludge was still coming in. So they wanted to know if conditions had improved.

MODERATOR: So you were brought down to work on that?

BILL NEWMAN: Yes, I was employed by Paul Horrer. And there is a report in the library of that. It's been used since but it doesn't get cited because it's soft literature, but it's been used. (Newman,W. 1958 Sedimentary and biological characteristics of San Diego Bay floor in 1958. Marine Advisors, La Jolla, for the State of California Water Pollution Control Board, 38pp.) So I sampled 28 bottoms in San Diego, so we had a busy week.

MODERATOR: So how long were you here doing that?

BILL NEWMAN: Just a week or less, eating pizza for breakfast and lunch leftover over from dinner, for several days.

PAUL DAYTON: And back with all of this disgusting stuff. [LAUGHTER]

BILL NEWMAN: So I got a good handle on San Diego Bay. And because of that report people knew about me here. And so when they needed somebody for the collections, I was asked if I'd be interested in coming down to Scripps?

MODERATOR: This would be after your PhD or when you were finishing it up?

BILL NEWMAN: I was headed towards finishing.

MODERATOR: Okay, and then you were starting to -- you got these recruiting feelers from Scripps.

BILL NEWMAN: Well, with four kids, I was looking; where was there going to be a position when I finished?!

PAUL DAYTON: And they were just establishing the invertebrate collection and needed a curator?

BILL NEWMAN: No, the collection goes back, way back. It was in the old library. William Ritter established it.

PAUL DAYTON: You were the first curator?

BILL NEWMAN: With title, yeah. Sam Hinton took care of the invertebrates as a sideline, as a director of the aquarium. Hubbs had been in charge of the fish. So they hired me, and then they hired Dick Rosenblatt. I was curator of invertebrates, so that was plankton and benthic at the time. And Dick was fish. So for various reasons, it was obvious to me that I would do well to shed the plankton. And so, with Bill Fager on my side, we got Abe Fleminger to take the plankton. That not only took a big load off my shoulders but was good for SIO.

MODERATOR: So they wanted a professor and a curator for that position.

BILL NEWMAN: No, they wanted to hire me as a curator. I said no, I want to be a professor.

MODERATOR: Because you wanted to teach?

BILL NEWMAN: I wanted to teach. I'd taught zoology 1A at Berkeley; 500 students in the fall, 100 students in the spring semester. Those were semesters, not these little short quarters. And it was a traumatic experience and it gave me a dislike for undergraduate teaching. Well, here I could teach invertebrates in the lab etc., and that would be good for me. And you need to be a professor to have students, or you should be. So I bargained for professorship. And since I had a couple of offers elsewhere, they agreed to take me. And so I came.

PAUL DAYTON: And what year was that?

BILL NEWMAN: My mind has gone blank re dates! [LAUGHTER]

MODERATOR: Well, he got his PhD in '61, so it would be around there.

BILL NEWMAN: Yeah, it was right away.

PAUL DAYTON: Okay. Then you went to Harvard?

BILL NEWMAN: I was here a year, and then I went to Harvard after the summer on Fanning. I was at the Museum of Comparative Zoology a couple of years.

PAUL DAYTON: You took a leave from Scripps because you are already in Harvard?

BILL NEWMAN: No, I left. I withdrew my retirement from here and from Berkeley where I'd been a lecturer and an associate when I was a graduate student, as I needed it for money.

MODERATOR: So you came to Scripps, and then you applied for a better position or you were recruited for what you thought would be a better position at Harvard, so you left Scripps and went to Harvard?

BILL NEWMAN: Well, I had a choice when I came here, and I came here instead. And I regretted that. So I asked Ernst Mayr if he would take me, and he said sure, come on.

MODERATOR: That would be at the Museum of Comparative Zoology?

BILL NEWMAN: Yes, comparative zoology, the MCZ. It was a wonderful experience. I have no regrets. But a growing family; I had four kids by then; it cost 10 percent more to live back East. The kids were okay in grammar school, but you had to send them to private high school if you expected them to be college prepped. I could see the writing on the wall. I looked at my peers there, and most of them were independently wealthy and they could afford the situation.

The MCZ gave me free membership at the faculty club, which helped. Which is a great place, because you could sit down next to all of the greats and chitchat with them over lunch. The Faculty Club here is up the hill, so we don't benefit from it. And at Scripps people don't sit down and talk with each other anymore anyway, from what I can see of it. Staff Council lunches and meetings are gone, that was the last we did of that.

MODERATOR: So back in Harvard, you realized financially you were perhaps better off --

BILL NEWMAN: Financially it looked bleak, and then, of course, I had a five-year contract, and there was no way of knowing what came after that. There were other opportunities in those days, back that way as well as here. By good fortune, Bill Fager and Carl Hubbs said come on back.

MODERATOR: How long were you at Harvard then?

BILL NEWMAN: Two years.

MODERATOR: Two years, and then you were back in the same position?

BILL NEWMAN: Same position.

MODERATOR: They didn't fill it or anything, it sounds like.

BILL NEWMAN: No, and I came just in step. I didn't come with tenure or anything.

MODERATOR: So what were you teaching at Scripps in those days?

BILL NEWMAN: In those days, it was just straight invertebrate zoology. As you know, I held seminars on what we call historical geology now. Paleontology, origin of life and evolution. The atmosphere; the origin of the oxidizing atmosphere. Photosynthesis, coral reefs with Joe Curray, all that great stuff. And here we are. [LAUGHTER]

MODERATOR: You know the '60s, has been described as the Golden Age of Oceanography. Do you think that's true, of marine science? You were here in a big period.

BILL NEWMAN: The '70s too. In fact -- I shouldn't say this about our premier institution – but we were just a little bit behind on things such as seafloor spreading and hydrothermal vents.

MODERATOR: Are you referencing Lamont Doherty?

BILL NEWMAN: No, oceanography in general. There were people here trying to get into those things. I remember on hydrothermal vents, Mel Peterson; he was way ahead of his time on that. He was looking for fallout from hydrothermal vents downwind of the ridge crest. But he did not look for the vents themselves; he found the fallout, but he never quite made the step.

Revelle and Fisher went out to the trench going under Australia, and they named a seamount there Capricorn Guyot, and said it looked like it was going down into the trench. Well, if the seafloor wasn't spreading, how in the hell could that be going down? But that never got off the ground here. It took the discovery of symmetric magnetic anomalies about the Mid-Atlantic Ridge in the late ‘60s or early ‘70s to really clinch things.

PAUL DAYTON: Oregon State found the vents?

BILL NEWMAN: Yeah, and Woods Hole re the Galapagos vents. It took finding animals down there to shake the geologists loose from their glue. [LAUGHTER] They were astonishing, exciting times, and then they moved fast!

MODERATOR: So you came back to Scripps. Then did you start going on expeditions?

BILL NEWMAN: Yeah. I didn't have any other expeditions than E.W. Scripps in undergraduate days or whenever that was. Maybe it was in graduate days, I forget. Pre-Scripps, I had one expedition, the E.W. Scripps. We dredged deep and dredged shallow and worked the coast. That was my first expedition out of Scripps.

MODERATOR: How did that happen here? You heard there was a ship going on to someplace and you would go 'I can do some work,' and you would propose it to Scripps, or did you have to have research funds and pay for part of something? How did you get --?

BILL NEWMAN: Okay, in the early days, and it hadn't changed much I don't think, you'd write a proposal. You had some question you want to get answers to, so you write a proposal of what the story was, why it's worth doing, and how much ship time you need to do it. The proposal went into the hopper, and some got rejected, some got accepted.

In those days, acceptance rate was pretty reasonable. You didn't work a year to write a proposal and have it turned down every time. You worked three or four weeks to write up a proposal, and six months later, well, maybe next time they'd have room for you, maybe. So within a year or so you could expect to know yes or no. Acceptance rate has changed for the worse, I'm afraid.

MODERATOR: So you were always trying with opportunities if they were going someplace.

BILL NEWMAN: Well, not if they were going. In those days, we had our own ships. We took Horizon on CARMARSEL. We fund that ship, so it was our ship. It sat down here until someone picked it up and took it. It wasn't every Tom, Dick and Harry, using the ships and they were crammed up.

MODERATOR: That's what I'm getting at.

BILL NEWMAN: Okay, I see what you mean. No, those were the glorious days of Scripps before -- even in the very early times when I was here, there was a boat down on San Diego Bay, a motor launch. A nice substantial diesel launch that you, or if a visitor came and wanted to get some samples, you could go out on San Diego Bay. You would just call up and say can I get the boat this afternoon? Yeah, it's available. Take it out in San Diego Bay and do some dredging, come back that evening and no charge. It was all a service of Scripps. And your students could take trips.

PAUL DAYTON: I think it was the same boat that Jim Stewart was using quite a lot too.

BILL NEWMAN: Yeah, a nice little diesel launch. That's gone. We had that little tug, the Ellen B. Scripps.

PAUL DAYTON: The tug was something else, it was awful.

BILL NEWMAN: Yeah, but you could go out in the ocean with it. And we were out there. [LAUGHTER]

MODERATOR: He has a strong stomach, remember.

PAUL DAYTON: I don't. [LAUGHTER]

BILL NEWMAN: We took a whole class to sea one time, Bob Hessler and I, and I think Ralph Lewin was along, and Lana Cheng. It was on the Ellen B. Scripps, and it was during one of the big damn storms, and the students all got green and sick, and even Spencer Luke, who had an iron stomach, was eating soda crackers. And after we came back, the Scripps Log reported that 20 oceanography students were transferring to Marine biology. [LAUGHTER]

MODERATOR: That's funny. So did you ever get seasick, or did you have an iron stomach yourself?

BILL NEWMAN: When I was young, I got a little seasick. But as you get older -- it never bothers me much.

MODERATOR: Tough guy. Good for you.

BILL NEWMAN: Well, no, one time we were going over to Santa Cruz Island. No, not Santa Cruz, San Clemente. We went all night. So I am eating beef jerky. You had to be up and alert

because you were in the shipping lanes. And about, oh, 3:00 in the morning that jerky began to act up. And I was ill.

MODERATOR: That would be a test, the jerky.

BILL NEWMAN: The jerky was an excuse, it was the up and down, up and down, and no visible horizon!

MODERATOR: I've been on dive boats going up to the Channel Islands, and I know what you mean.

BILL NEWMAN: Yes, get in the water as fast as you can.

MODERATOR: So were you regularly getting funding for research from NSF, I imagine?

BILL NEWMAN: Not heavily funded, but well-funded. I didn't have any big program going, but I ran a research program, and funded stuff for 15 or 20 years.

MODERATOR: Who did you interact with at Scripps, or were you kind of an independent actor?

BILL NEWMAN: I interacted quite a bit. As I mentioned, the first big expedition was CARMARSEL with Curry and Shepherd. I was a PI on that. And that stemmed from Truk. I gotten to know Joe Curry, and he was interested in sea level, and I was interested in sea level. And chatting with him, I started raving about Caroline Islands and how there was a two meter nip you could see here and there, plenty of evidence for a higher stand. Well, while Fairbridge in Australia favored a higher stand, Shepherd and Curray at SIO did not. I said I think it can be demonstrated, and that got the expedition going.

So Joe talked to Shepherd into an expedition, and we brought some really great geologists with us; Josh Tracy from the Smithsonian, Norman Newell from the American Museum, and Art Bloom, then a senior graduate student doing cores of mangrove swamps. He could go down 60, 80 feet in mangrove swamps through layer upon layer of mud back the Pleistocene, no, the beginning of this interglacial. It's like going through the ice cores. So we had a really great group on this expedition.

We had the R/V Horizon and a gutsy skipper whose name I forget. He would take that ship anywhere. Single-engine, single screw; you reversed the engine to go backwards. He would come into the dock, vroooom! And the people on the dock would be

flabbergasted that he could bring that vessel in without a lot of whooping and hollering and boats pushing and pulling and people screaming;, it was all done, vrooom-vrooom-vrooom, clank, and there she was.

Anyway, we would go across the lagoon and see big relief on the presumably smooth floor, such as all those bumps, no, they aren't bumps, they must be holes! We found karst topography at the bottom of Truk Lagoon floor. In other words, during a low stand or stands of the sea the limestone parts of the island were karst out to varying degrees. It generally starts out as holes, and they get bigger and bigger until they connect leaving pinnacles, and there were plenty of those elsewhere about the lagoon.

So here we were going over drowned karst in the lagoon, which is 20 fathoms to the general lagoon floor, and the holes were nearly half again as deep. It had been karst out during the Pleistocene lowstands of the sea over the past million years or so, but we didn't determine exactly when. It was incredible stuff.

MODERATOR: You were one of the principles on that expedition. What was your particular research interest that you were doing on that?

BILL NEWMAN: Sea level.

MODERATOR: It was sea level?

BILL NEWMAN: Yes, one of my first papers (1959) had involved sea level, and after this expedition we attended a GSA-AGU symposium meeting in New Orleans, and we all gave papers on sea level.

MODERATOR: Were there other expeditions on which you were a principal?

BILL NEWMAN: Dick [Rosenblatt] and I were the PIs on MidPac (Styx-7) and I was PI on two R/V Alpha Helix Expeditions as well. What other expeditions there were I've forgotten, but there were a few such as with Carl Hubbs, Bob Hessler and Peter Lonsdale.

MODERATOR: Oh, there is a huge list. I could nod my head when you say the names of them, but I could not come up with the linear thing. There's a lot.

BILL NEWMAN: But it got to the point that the return on your proposals got less and less. Circumstances changed. So I got out of the expeditions.

MODERATOR: Because for a given amount of time you could direct your attention somewhere else and get --

BILL NEWMAN: Well yes, you had accumulated more material than you could possibly work up. So there comes a time to really back off from that and work in the lab.

MODERATOR: I have looked at your publication list on the Scripps site. You are really just still turning out a lot of publications.

BILL NEWMAN: I keep busy.

MODERATOR: You keep very busy.

BILL NEWMAN: Narrower and narrower, though.

MODERATOR: Is some of that data or stuff you have acquired over the years or just current collaborations?

BILL NEWMAN: It's a little bit of both. But you don't live long enough or have enough energy to do the things you should do, that's the thing. [LAUGHTER] A lot of it will go with the wind.

MODERATOR: I saw separately a list of your grad students that we maintain in the archives. Are there some whose work you are particularly proud of, other than all of them?

BILL NEWMAN: Well, let's see. You know, many have retired and some have died. Well, they were all worth their salt and some did pretty well. Would you like me to highlight some?

MODERATOR: Well, anybody --

BILL NEWMAN: Well, one of my best students, Tom Dana, got his degree, and he and his brother went down to Mississippi and do organic farming.

PAUL DAYTON: So he dropped out?

BILL NEWMAN: He dropped out as far as academia was concerned. He wanted a job in Mississippi, none came up, so he said the hell with it. A brilliant student, and in fact he was originally Fager's, and Fager gave him to me. And we did the *Acanthaster* stuff.

PAUL DAYTON: Yeah, I liked him.

BILL NEWMAN: Good man. Another was Ed Gomez from the Philippines who wanted to stay in the states when he graduated. I said Ed, you are a government-subsidized PhD, you've got to go back for at least a couple of years. He said, "If I do I'll never get out of it, because my family will hold me."

PAUL DAYTON: They did.

BILL NEWMAN: And he had to go to work in a limousine.

PAUL DAYTON: But he is been a real player in a lot of games, he has done very well.

BILL NEWMAN: Yep, a good man; he instigated and built the marine lab at the University of the Philippines, did big conservation projects with *Tridacna*, the giant clams, and he had a lot of good students that he has sent all over the world. He's an internationally important figure out as well as within the Pacific Rim. Was asked to be the president of the University of the Philippines I understand, but he declined and he’s now retired.

Before Ed there was Tom Scanland who did a lot of good ecology before going into consulting, only to die prematurely in the Philippines.

Another early student was Barry Kues who did a great masters and then went off for his doctorate in paleo elsewhere, and I lost track of him. He ended up at the University of New Mexico where he published on a wide range of extinct animals, but he is now retired.

And there was Ray Bauer, a first-class shrimp man. Publishes in the field and has a book out on shrimp. Publishes regularly on shrimp. He's a good man, but he too is now retired.

MODERATOR: What about Tim Gerrodette?

PAUL DAYTON: Tim was my student.

BILL NEWMAN: Not mine, went to fisheries (SWFC) a good man.

PAUL DAYTON: Yes, he is.

BILL NEWMAN: Mike Huber was another bright guy but didn't land a job here and so emigrated to Australia. Taught at Townsville but colleagues there told him he'd never be accepted in Australia. So he said screw you and went into consulting in Australia. He married an Australian girl, I believe, and was director of the Madang Lab in New Guinea for a while. He did a lot of good research. But, in spite of writing a very successful textbook on marine biology with Peter Castro (now in its 6th edition), he drifted away from academia.

Steve Piper was at the same time as Mike, and as you probably know, he now works on climate in the Keeling Lab. He was probably the brightest of Stanford students and I stole him from -- whoops, I shouldn't say this.

MODERATOR: Don't say it. [LAUGHTER]

BILL NEWMAN: Anyway, then came Mark Grygier.

PAUL DAYTON: Smart guy.

BILL NEWMAN: A very smart guy and conversant in a number of foreign languages. He lived off some wonderful postdocs all over Scandinavia and the Smithsonian and elsewhere after finishing. He did a lot of work in Okinawa and ended up at the Lake Biwa Museum in Japan, and that was perhaps 15 years or so ago. And he has done very well there. He will retire by 65, as they retire them early over there. And he was elected to the International Commission on Zoology Nomenclature: he's a rules man and therefore a good man for that.

Laguna, yes Jorge got his Masters degree here, not a PhD. He was a Colombian who grew up in Panama and came here on a San Diego scholarship. Ended up in Florida and worked with the fish and game on conservation of manatees. He has written quite a popular book on his life and interest in the natural history of Florida, and he's presently Environmental Manager of the Florida Department of Health. He was a contemporary of Debbie's, as you know --

MODERATOR: At the Birch Aquarium, right?

BILL NEWMAN: Right, Debbie Zmarzly at the Birch Aquarium, a really bright gal who did some solid taxonomic revisions after her degree, and she seems to be happily there.

Another was Tracy Baynes, an academic somewhere, but I have lost track of what she is doing.

MODERATOR: Tracy Baynes went to Florida.

PAUL DAYTON: Yes, for a while, but she is now running an educational program for underprivileged children.

BILL NEWMAN: Something like that, yeah, Mike Latz told me something like that!

PAUL DAYTON: They go out on a ship. STEP is the acronym. She's doing a good job.

BILL NEWMAN: Yeah, I think she is. Mike Latz knows her, he keeps track of her.

Bob is --

MODERATOR: The last name?

BILL NEWMAN: Bob Van Syoc. He came from the Cal Academy, and is still at Cal Academy, but he now has a place up at Sea Ranch up the coast, and he is going to live and work mostly up there, something made possible by the Internet!.

MODERATOR: So is he the only one that kind of continued your curatorial lineage?

BILL NEWMAN: Yeah. Well, no, I believe they have collections at Lake Biwa, and Mark would be involved in that.

PAUL DAYTON: Maybe Ray? I don't know what does.

BILL NEWMAN: I don't know that Bauer has collections beyond what is need for his research, I just don't know. I wouldn't say that I have any legacy on collections per se. I don't know anyone who does. [LAUGHTER]

PAUL DAYTON: One thing that I have to bring up lest it get lost, is the -- I think the famous course on marine arthropods. You want to talk about that and the other courses like that that you taught?

BILL NEWMAN: Well, marine arthropods -- I had started it when I first came here, and a lot of Fager's students took it. They liked it and that's one of the things that got me back. [LAUGHTER]

Then we hired Bob Hessler, who was also interested in marine arthropods, so we shared the course which eventually he largely took over.

And the same can be said of general invertebrates, they went to Nick Holland. So, sort of left with nothing to do, I started a biogeography course. And that went pretty well. I guess that was the last course I offered.

MODERATOR: How has Scripps changed, would you say, over the years? That's a standard kind of question we ask. Obviously, you mentioned getting on ships changed significantly from the '60s until later such that you --

BILL NEWMAN: This would take another hour or two. [LAUGHTER]

MODERATOR: Well, we don't have to have a lecture on it, but --

BILL NEWMAN: Well, I don't think anyone who was here in the good old days; that is, up to '70s and even early '80s, would think that Scripps is better than it used to be. It has changed character tremendously. Like so many other things, it is getting too big. As McGowan would say, "Our oceanographers used to be a hearty cadre of impoverished sailors who were thrown in stinking boats and sent to sea." [LAUGHTER] We were devoted and worked hard. But now most sit in their labs on the land in front of their computers.

MODERATOR: So the nature of doing science here at Scripps has changed.

BILL NEWMAN: It has pretty much gone from individuals to big programs. And that loses tremendous opportunities, I think. It limits flexibility.

PAUL DAYTON: Truncates the creativity of small guys and independent people. The Abe Flemingers wouldn't have a niche anymore, would they?

BILL NEWMAN: Right, that wouldn't have worked. It's no longer academia. It has become a government lab.

MODERATOR: Or it's modern academia -- perhaps what one sees here, isn't it like that all over, and you are just talking about the changes in science?

BILL NEWMAN: At the Department of Integrative Biology at Berkeley? No, there are still independent people working there. I don't see a big program, do you, Paul? Sure, there are some big genetic programs, you have to have a coalition to get enough funds to buy the equipment and the expensive chemicals and all of that, and the lab technicians. But there are still a lot of independent investigators in the ivory tower. Thank goodness for the ivory tower.

PAUL DAYTON: I think just from when I came, when I was a little kid in Arizona and the Gulf, I remember a Scripps ship coming into San Carlos Bay. And we were there camping, and there was nobody else in San Carlos Bay except for our winter camping. And the Scripps ship came in, and they rowed ashore, and they were really nice. And we gave them clams. But it was fun, they clearly were having a good time.

BILL NEWMAN: Yeah, seeing the world and understanding it.

PAUL DAYTON: They were asking questions that everybody at Scripps understood. You know, where do the seamounts come from? What lives here in the Gulf? That was the first cruise since Ricketts, they told me. I don't know if that's true, but that's what they told me. You know, it was the exploration arm of science, which to me seems like a lot more fun than the big science.

BILL NEWMAN: Yeah, the days of the Vermilion Sea.

Older people always think they had the best of it, I think; the younger generation is going to the dogs. And there is a lot of truth in that. But the younger generation doesn't know the difference, and that is the saving grace. They will go on and think these are the good old days, and I don't think they're going to like the future either.

MODERATOR: It's just that things a very different.

BILL NEWMAN: Very different, yeah.

MODERATOR: And it is what it is now. It certainly was a golden age back then.

BILL NEWMAN: Well, you remember Eisenhower warned us about the military-industrial combine [sic]. Well, there is a science-governmental combine that I find very upsetting.

MODERATOR: Paul, do you have any other questions?

PAUL DAYTON: I don't at all. I've enjoyed this.

MODERATOR: I have too.

BILL NEWMAN: You're very kind.

PAUL DAYTON: This is been very good. Thanks, Bill.

BILL NEWMAN: Well, thanks for inviting me.