

Transcription: Grand Canyon Historical Society

Interviewee: Dr. Stanley Beus

Interviewer: Tom Martin

Subject: Grand Canyon River Trips, NAU, Travel

Date of Interview: August 30, 2021

Method of Interview: In person

Transcriber: Susan Seibel

Date of Transcription: August 24, 2022

Transcription Reviewers: Dick Phaneuf, Tom Martin

Keys: Steve Carothers, river trips, summer program for high school teachers, biology and geology, Northern Arizona University, NAU, research projects, river fluctuation, Grand Canyon, beach profile, beach deterioration, rodents, rats, mice, bats, publication, National Park Service, monitoring beaches, National Science Foundation, Educational Science Program, grant proposal, 1983 highwater year, beach-building, research grant, selective criteria, lab assistant, Frank Lojko, Missouri, Dixie College, St. George, Utah, Arizona Science Foundation, Flagstaff, Arizona, Diamond Creek, Lake Mead, Whitmore Wash, helicopter, camping, Lake Powell, journal, Hance Rapid, Mike Morales, Museum of Northern Arizona, Bill Breed, geologist, fossil samples, field trips, geologic features, senior editors, authors, Trevor Ford, England, *Grand Canyon Geology*, Carma Beus, quilts, Dr. Walkup, freshman English, children, Utah State University, UCLA, Cesarian, Logan, Utah, Sterling and Jennifer Beus, Idaho, Susan Beus, baby names, community college, Clarkdale, Sedona, beginning geology class, computer work, Grand Canyon formation, Colorado Plateau, Lake Bidahochi, freshwater limestone, mystery, volcanic rock, radioactive decay, George Billingsley, Gus Kotera, department chairman, Gene Hughes, Yuma, sabbaticals, Wales, London, Swansea University, fossil record, fossiliferous rocks, invertebrate, all-girls school, uniforms, teachers, parents' and grandparents' footsteps, Redwall Limestone, North Rim

TM: Today is Monday, August 30, 2021. This is Part 4 of a Grand Canyon oral history interview series with Stan Beus. My name is Tom Martin. Good afternoon, Stan. How are you today?

SB: Okay. Fine.

TM: Great. Stan, last time at the end of Part 3, you mentioned a gentleman named Steve Carothers.

SB: Right.

TM: How did you meet Steve?

SB: Well, we were both doing things on the river, river trips.

TM: Tell me more.

SB: He's a biologist, and he was working on the river, taking trips, and we realized we both had an interest in doing that and bringing some students to partake of it. So, we designed at least a beginning of a program that included high school or junior high school teachers who needed some strengthening in biology and geology or that part of the sciences, since Steve Carothers is a biologist, really. So, we designed a program where they would come to NAU for a few weeks in this summer when they were out of teaching. And they would get a sort of a crash course in geology/ biology. And we would take them on the river for 12 to 14 days on a major river trip. And they would have research projects to do every day.

TM: Like what?

SB: Well, one of the first concerns they had, of course, was what is this fluctuation up and down every day, because in the, you know, the water coming through the dam now, and it goes up during the day when there's a lot of power needs. It goes down at night. It's up and down. That's a little sort of a tide generated inside the river, and inside the river there is in the Grand Canyon. They're trying not to change things much in the Grand Canyon. So, they, they had people that— They've done it before we had. We were not the first ones doing that. One of the things they would do is survey the beach profile and record it. And they'd have a benchmark on the wall where they did it, so everybody could come back to the same place and start at the same place. And they found that, sure enough, in many cases, the river's taking the beaches away. That was a concern. They didn't want the beaches to go away. So, they decided what should they do about it? And we, in our trips with these students each summer, and we did it for several summers, each summer we would measure— One of their assignments was to measure the beach profile with a transit and so on. It was a fairly simple way, you know, they weren't elaborate, but they did it. We had a, we had a set up with a tripod and a telescope on it. Then they'd have someone out there on the beach with a pole, you know, and a stand, and measure and go right down to the water's edge and make a profile along the beach and compare them one year to another.

TM: So, they would bring the data from last year or a previous year and then they would get the new data and compare.

SB: Right. Right. And in many cases, sure enough, the beaches were deteriorating. And so, they thought there has to be some other things to be done about that. Anyway, we did this— This is one of the major research projects we did. But we did others, too. We had several students who were trapping small rodents, mainly mice. I guess some rats. I can't remember now. And then we had some that were— We set-up the screen to trap bats and see what kinds of bats were flying there.

TM: All right.

SB: And we had some who spent time looking at what other kind of animals were there. And a number of different things like that, you know, in both geologic and biologic

things. And at the end of that summer, each student team would write a short report to the Grand Canyon, and we'd put this all together in a book and publish it and give it to the Grand Canyon.

TM: Oh, wow.

SB: So, at least in some cases, we were keeping track of what had been done before. And so, we think this is of some value to the Park Service. We know it was, because some of our students at NAU here were actually working for the Park Service already in doing the same thing, monitoring the beaches. They would go and look at them several times a year to see what was happening.

TM: Do you remember what year did you first do that river trip?

SB: Not exactly. We did it for four or five years, and then we decided we've got it perfected enough. We know what we're doing. Let's see if we can get some government support to do it. So, we put together a project submitted to the National Science Foundation, educational science program, and they funded it for several years. And we got through the next three years doing the same thing, repeating, and generating some other activities to look at as well, and that was the end of the grant. And then we thought we'd like to continue to do this. They said we've got to write a new proposal. [Groans.] I didn't want to do that. We weren't ready to do that again. We'd already written our best shot of a proposal and so— But they did give us one more year. So, altogether over the time that we started initially until we got through with it, it turned out we had done it 11 summers altogether.

TM: My! So, this would have been through most of the 1980s?

SB: Yes. Yes. 1980s.

TM: Did you do your summer during the big flood of 1983, the highwater year?

SB: Yes.

TM: What do you remember about that?

SB: Well, I remember that at that time, there was lots of water coming down, and they would— The thing that was hard on the beaches is it's an up and down thing every day. If they let it go for a while, then that would be a beach-building process, because if they let a good stream go down and let it run over several days, it would pick up sand off the bottom and put it back on the beaches. One of the first times they did that, one of those beaches we've been measuring gained 11 feet of sand on the beach in that summer when they let the high water continue to go and— So anyway, that was the kind of stuff we were providing in experience, and it was a great experience. We had, you know, a different crop of students every year. When we had the research grant on, not only did we get paid something, it paid the student something to come.

TM: Oh, my.

SB: So, we could be very selective in picking those that looked like they demonstrated the greatest need.

TM: What was your criteria for need? What were you looking for?

SB: For the students who demonstrate that they were teaching geology or earth science or biology and needed some more background in it. That they were struggling with needing more— Some of them hadn't been trained very much in it all. They'd just been assigned that in high school so—

TM: Were you looking for inner city teachers or did it matter?

SB: It didn't matter. It didn't matter. We looked at them— We asked them when we— We advertised, and when we asked them, we said, you know, "Tell us— Justify why you would like to come on this trip and get the experience. What would it do for you?" And they will come up with answers, and we were, we were able to select— We could only handle about 30 students at a time. So, we had a choice of a lot. We did tend to concentrate on the western half of the United States just so they didn't have to come so far.

TM: Right.

SB: Although we had a few come from the east as well. And that was an exciting experience. One of the students that came the first year, and he wanted to come back the next year as a lab assistant on the river trip on that experience. So, we did, we were managed to hire him to do that, and he came four summers in a row and ended up getting a master's degree in earth science. Some of the others, of course, were only there for one year, and then they were gone, but all of them got a good start, at least, on that sort of thing.

TM: Who was the individual who came back and got his master's? Do you remember his name?

SB: Yeah, let me think on it a minute. Gosh, I know it very well. Got a mental blank now that you asked me. I could have told you yesterday.

TM: Exactly. If I hadn't asked you, it would have been fine.

SB: Frank Lojko. Frank Lojko. He was from, I think, from Missouri, and he'd been teaching there for a number of years. He had a good background, fairly good background already. But he was anxious to come and help, and so he came. And in fact, one time he stayed over— He got permission. He got, he got a sabbatical, I guess, from when he was teaching in Missouri and came out and just stayed through the year, through that school

year, or at least for a half the school year anyway. And at that time, I was not using my office very much, so I let him use my office while he was there. But he went on to join eventually— He moved out West and joined the, well, the university in St. George, Nevada, or St. George, Utah. I can't think what it's called now.

TM: Dixie? Dixie College?

SB: Yeah. Dixie College. Dixie College. And I think he's still there. He probably retired by now. He was a Dixie College on the faculty there, given the experience he had and his master's degree.

TM: Do you remember what he got his master's in?

SB: No, not exactly. I think it was, in part, evaluating what our program had done and its effect on students. I know it wasn't just that, but it was something like that. He was very much involved in, you know, student training and responses and so on. At later time, I remember, after we were through with most of this, he insisted that we put together a little report on what we had done, which we did, and submitted it to the annual state— What is it? The state science— It's a program every year that the state does that is supported by the state scientist people and—

TM: The Arizona Science Foundation or the National Science Foundation?

SB: Something like that. I can't remember what it was. They have— They do it every year. And they have— They shift it around in the parts of the state where it's going to be. But in that time, they did bring it to Flagstaff. I know of one time when we were involved with it. So, they did have this kind of thing going, and Frank insisted that when we're going to have it that summer, we'd give a report on this program that we've been doing. So, we did. It was a, it was a fairly brief one, but it was— And he got a publication out of it. He submitted it to the— I think it was— It was an activity of a state organization that did it.

TM: All right.

SB: Anyway, that was the result if one of the things we had done, and it was a great experience. When I was doing it, part of the time, I was able to bring along some high school students sometimes just to go with us.

TM: Really? Like from here in Flagstaff?

SB: Yeah, including my own grandchildren, some of them. And so, my older grandchildren got to go on the river trip. After this was all over with, and we were done and I wasn't doing that anymore, the younger ones were disappointed because they didn't get to go.

TM: I don't blame them.

SB: Some of them I managed to get done, anyway, but I didn't get all of them. The older grandchildren got a chance to go on a river trip.

TM: Nice. Would that trip end at Diamond Creek or would it go all the way out to the next reservoir downstream at Lake Mead?

SB: It would usually end at somewhere just below, let's see, just below Diamond Creek, or we could fly out.

TM: Was that Whitmore Wash? Would you fly out there?

SB: Yes. Sometimes we would have, we'd have an airplane meet us, I mean, a helicopter meet us wherever we were going to come out, near one of the ranches in southern Arizona. And a helicopter would fly us there. They have a landing field there. They would fly us back to the Grand Canyon or something like that, where we were going. We had come back to the Grand Canyon and then the students all went home from there, you know, wherever they were going.

TM: Okay. Do you have any stories that you remember about the river and the river trips?

SB: Well, one or two times when we went, the beach river worn down quite a bit, and the water was high as they were trying to rebuild them. And we had trouble camping because we camp on the sand wherever possible. The sand was underwater, you know, it was high water. So, we had to camp on the rocks. That was kind of a challenge. There were some places where we, that wasn't true, but in other places, we just didn't have any sand beaches to camp on. And, uh, so did the other people who are running the river have this same struggle, you know, the same problem. But that fluctuated quite a bit over the years, and as you say, when the river first— when the, when the lake was full-full. Once it did that, then they couldn't let too much high water out because they were generating power at the dam, and the power system could only accommodate 30,000 cubic feet a second. I think it's still that way. Any more than that, and you have to send big jets out below and down. And so, if they had to do more than that, if the, if the water coming in, if Lake Powell is enough, they'd have to send a lot of the water down the side. But they could only handle 30,000 cubic feet through the dam, through the generator. And sometimes the river's higher than that, sometimes quite a bit higher than that. So, that was a problem I had to deal with in various ways. I can't— All of these different things happened, you know, during that period of time, that 11-year period, when we're doing this regularly. I can't fit each one— If I look in my journal, I might have it recorded somewhere, but I don't always do that. When I was on the river, I didn't, couldn't even take my journal. I just took something to write on each day what we were doing. But it was a great experience. I really enjoyed it, and I did have a good time with it.

TM: So, we— You and I first met, albeit incredibly briefly, in possibly 1991 or '92, where a big boat, a motorboat was stuck in Hance Rapid, had gotten hung up on the rocks

there. And your trip was on the shore, and they were able to get a rope from the boat to the shore, and y'all grabbed the rope and pulled that boat off that rock. I was very impressed.

SB: So, we had a big crew who can do that with.

TM: Yeah. A big crew to do that with.

SB: Good. Good. Good.

TM: You ended up writing a book on Grand Canyon geology with Mike Morales.

SB: Right.

TM: Can you tell me how you met Mike?

SB: Well, he was at the Museum of Northern Arizona. He was the geologist at the Museum of Northern Arizona. He had just been there not a very long time because for many years while I was there, Bill Breed was the geologist.

TM: Oh, then wait. Let's go back and tell me about Bill. What do you remember about Bill Breed?

SB: Well—

TM: Sorry, I'm going to change subjects here.

SB: Well, Bill Breed was the geologist at the museum when I first came, and right away I got acquainted with him, of course, and with the museum. And after the first year, we actually did a little bit of research together with some of the fossil material that we were working at. Published one little, short paper on one of the fossil samples that we worked with, and we work together off and on through— Eventually I was able to spend a number of summers, both before and after this big adventure that I had with the river trips, working at the museum, assisting part of this summer.

TM: Oh, really? Okay.

SB: And they even paid me a little bit to do it.

TM: What would you do there?

SB: Well, I was collecting fossils all this time, and I would bring the fossils into the museum and sort them out and identify them and catalog them and so on. It was mainly things like that. I had— They had an older guy who was there for many years that had this great, big, old rolltop desk. I'll never think of his name now. He was quite a bit older than I, but he retired after a while, and he let me have his desk and the office that he used

when he was there, you know. It was great, and so— I only did that part time and not every summer, but many summers I did spend some time at the museum, which was a great experience. And for a number of years worked there with Bill Breed and with others that were there.

TM: Do you remember any particular anecdotes of working with Bill?

SB: Not any particularly, because we, we just had an assignment of one or two months is all time in the summer that we, that I would be there. But we had some good experiences. And then later on, and I think the reason Michael Morales came, because they wanted Bill to get his PhD if he was going to continue to be the geologist the museum, because Mike Morales had a degree, a graduate degree, and Bill did not. But that didn't happen, and so eventually, Bill ended up doing some other things. And Mike Morales came. Yeah, Mike Morales came and took his place. He went on, and he did do a lot of other things. He led field trips all over the world. Geology trips. So, I had an exciting time, I think, much of those last few years. I remember going to his funeral, which they just had a memorial service at the museum after he died, passed away. And I can't remember what it was. Some time ago, after I had been there quite a while.

TM: And so, Mike Morales. What do you remember of Mike?

SB: Well, I didn't do very much things with him. We worked on different things, different aspects of things. He worked on some of the other fossil materials and geologic features, as well. But we did collaborate finally when we decided to do this thing on the Grand Canyon. Not only did we collaborate, we had other people help us. We had a whole raft of people because of the book, as you know, had a lot of different authors. We were the senior editors. We wrote parts of it, but more, well over half of it was written by other people. And we just put it together, you know, and edited it, and—

TM: Did you come up with that idea? How did that all come about? Do you remember?

SB: Well, I had toyed with that idea for a while when I was at the museum earlier on and talk to Mike Morales about it at that time, and we decided we could do that if we want, if we could invite these other experts to contribute their part of it. We couldn't write the whole book of the Grand Canyon. We didn't know all of the Grand Canyon that well, even though we'd been there many times. So, we really— We did parts of it together, and we had all these other authors come in. We even had one Englishman who came and spent a couple of summers in the Grand Canyon, working with Bill Breed and— Trevor Ford was his name. One of the authors. He wrote one of the sections in that book, and a number of other people that had worked on it worked in the Grand Canyon.

TM: Did you— How did you get the word out that you were looking for people to submit, experts in their field, to submit about, you know, this concept of a—

SB: Well, between the two of us, we pretty well knew the ones that we thought we needed to have help, and so we invited them to contribute. In most cases, we invited them

to contribute. I invited Trevor Ford to, you know, because I knew him well. I spent— He spent a couple of summers in there. He must have been there for a couple of years in Flagstaff. And he brought his wife over, and he'd had a lot of experience he loved. Later on, when we went back fairly late in my career, we took a field trip with a group of students to England. The field trip. And Trevor Ford was his guide. Trevor Ford was our guide. I knew he could do that, you know, and he got in with us and joined us. It was a nice experience.

TM: Very nice. And that book was published through the Museum of Northern Arizona? Is that right?

SB: Yes. And then later on, it was picked up by— the publisher now shown on it is—

TM: Is that the Grand Canyon Association?

SB: No. No, it's not. It's a major publishing company. The first issue, I think, was published by the museum. But the second issue, when we revised it some and did it as a revised version, that was picked up by— Well, look at the book and see what—

TM: Yeah. Yeah. I'll check when I get home.

SB: It's a major, major publishing company I think from England originally.

[Transcriptionist's note: Dr. Beus may be referencing Oxford University Press, which published *Grand Canyon Geology* 2nd Edition, by Stanley S. Beus and Michael Morales.]

TM: Okay. Where's Mike now? Do you remember?

SB: He left the museum after a while, not too long after we got that book published. He left to go back, I think, somewhere in the middle West. I don't remember where he is now. But he did leave, and they have since brought other people in, you know, to— What's his name? The one who's there now came quite a few years ago when Mike left as the geology expert at the museum. I should know his name, too. I do, if I can think of it again.

TM: Yeah. No worries.

SB: And he was interested in, especially in paleontology and different kind of things. He's been inside of a— He's been a dinosaur hunter in some ways, you know, and so he's been involved with that. I know his name very well. If I think about it a minute, I'll tell you.

TM: That's right. That's right.

SB: He's still there, still there. I just saw the other day that he was still listed as the geology expert there.

TM: So, you started working at NAU in the early 1960s.

SB: '62.

TM: '62. When did you finally retire?

SB: Officially, I retired in 1992 but stayed on for a couple of years because I had some students doing theses that weren't finished, and I stayed on. I can't remember how they manage that now, but they gave me— They retired me and then they gave me some kind of a stipend to work with some of these grad students that were still working with me. It wasn't a lot, but it was some. It was helpful to do that. And then right away after, I did retire. I shifted to full retirement from the state. I'm still on that retirement process.

TM: Okay. And what of your family life? What did Carma do here in Flagstaff? I mean, she was raising your children.

SB: Well, Carma was a quilter. She made beautiful quilts. And then there's— When she had time, she did that much of her life. I think I told you earlier that she, when we first came to NAU, they badly needed somebody to teach one of their English classes and Dr. Walkup, the president, asked her if she would do it, because he knew she had a master's degree in English and had taught English in high school for several years. And so, he invited her to, and she agreed to do it, but she said, "I'm only going to do it one year. I've got young children." She said, "Because I want to use the money to buy some of the furniture that we'd like to have." And that's where we got that. We got a set of furniture like that. So, that's where they came from. She got those in that one year that she worked for the, taught freshman English at NAU.

TM: And then you had more children.

SB: Yes. When we came here, we had three children. I'm trying to think of the time, of the framework. And we— Well, those three children were born while I was in the service, you know. I mentioned the twins were born just before I was released.

TM: That's right.

SB: But the next thing, I don't know, we came to Utah State University, and I was there for two years plus, two years— More than that. I was there for three years, I guess. Two years and finished my master— No, no. Two years. Three years, I guess. I finished my BS degree in two years, and then I worked one more year, got a master's degree and then went straight to UCLA. And we didn't have children while we were in Logan, Utah at Utah State. We had some more after we moved to UCLA. One— The next one was— That was the bad one. The next one was a boy, a big boy, too big. Maybe I mentioned that before. I don't know.

TM: You did. You did.

SB: Okay. Well, my wife couldn't do it the regular way. We were at UCLA. A fine medical hospital there, but her doctor that had been attending her was out of town when she was ready to deliver. And the doctors that took over for him just— They struggled all day to get her— And finally had to do a Cesarian, and the baby died within a few hours after he was born. But then we had two more. A son who came about two years later. Then a daughter. Then we had five children when we got through with it. Had lost one.

TM: And your son's name? And your daughter's name?

SB: Sterling, and the daughter is Jennifer.

TM: Okay. Nice. Okay.

SB: I'll tell you an interesting story about— It's kind of a family tradition.

TM: Please.

SB: When we came home from the military, we came to Utah first and then up to Idaho, because I had grandparents in Utah. And we were staying with my grandparents. We hadn't seen them, you know, for most of the two years we were gone and more. But we had these three children. The twins were brand new. So, we settled at night that night in there. We had one of the spare bedrooms, and we were just settling down. And the grandmother came in, tried not to disturb the sleeping children, but she said— Well, my grandmother's name was Susan Beus. She said, "What did you name your twins?" Marsha and Michelle. She said, "Oh, the names people use now! What's the matter with Susan?"

TM: Oh, my!

SB: Maybe I'd mentioned it before. Later on, she did get some grandchildren named Susan, but then she didn't have any. That was a family, that was a family story for quite a while. Oh, what's wrong with Susan?

TM: Not named after me??

SB: Yeah.

TM: Oh, that's cute.

SB: Well, that's about it. When I retired, I did continue to work for a while with geology. I ended up— because within a couple of years, they were telling me that they wanted me to teach a geology course at the community college in Clarkdale, just out of Sedona.

TM: Oh, my. That's a little bit of a drive from here.

SB: Yeah and— Well, by that time we had, I had moved to Sedona, so it was fairly close.

TM: Okay. Very, very close. Yes.

SB: So, I taught, I taught for several years, not full-time, but I taught, like, maybe once a year I'd teach a geology class. They had just offered a beginning geology class, and the one who was doing it wasn't doing it anymore, so they said, "We can't offer it unless you could teach the course." I said, "Okay, I'll do it." I did it off and on for several years. I can't remember how many, not a lot. But over a period of about eight years, I think I taught several geology courses at the community college there in Clarkdale, and so that was enjoyable too. I was just teaching, you know, beginning classes, and what finally made it difficult for me was this— They were trying to save time and money then, and they scheduled a class in which I had to teach by using the computer part of the time and communicate with the students. And they could communicate with me. And I thought, well, I can try that. And so, I did. I just met them once a week for a day. And then we did all these other things by, you know, by computer work. And the problem is they could, they can ask me questions at any time. Well, I should have known better. They pestered me with questions all day, you know. I learned the other people had announced, well, said when they set up that course, they said, "Well, there are only certain days that I will answer the phone" or get on the computer, so. But I learned after that first time. But then they were going to get even more of that, and I said, no, that's too complicated for me now. I don't want to have to do that anymore. So, that's when I quit and officially retired from everything.

TM: So, I've got another question for you about the Grand Canyon and its formation. What are your thoughts on how the Grand Canyon came to be?

SB: Well, and the fact that the river has cut down so deeply into the Canyon there means it's had a lot of cutting power, and the Canyon does have some major structures in and a major part of it is the Colorado Plateau uplifted the different parts at different, different rates, but it happened. And the main interpretation is— We don't know if this is right or not, but there was a, there was a stream flowing across most of where the Grand Canyon is now, but it was up on top, and the plateau rose against it. Little by little, with the stream maintained by down cutting. Now, that's not entirely acceptable to everybody. We don't know if that's really right, but it had to involve something like that. Either the stream was already there, or else the stream cut headward erosion into the Canyon. Maybe some of both went on. I don't really know. Nobody knows that for sure, I think, but that's the feeling, essentially. It had to be cut by a steady-flowing river with sufficient gradient, you know, to erode down into the rocks as the plateau rose against it. Something like that. It probably wasn't as simple as that even if it did happen that way, but that's the best, one of the best explanations we have for it. There are still people who don't agree, disagree about how it happened that way.

TM: There's some discussion about a body of water to the east, this Lake Bidahochi, that may have drained west.

SB: Drained. That would drain into it, would provide quite a bit of drainage, yes.

TM: Right. And then there's also the freshwater limestones on the west side of Grand Canyon that kind of confuse things.

SB: Yep. Well, those may have been local lakes and ponds that had freshwater, were still above the main river or remain above the Canyon, anyway, and were deposited. I don't know. I don't know how to answer that exactly.

TM: Okay. Well, it's a mystery still, still remains.

SB: Yep. The evidence is that, at least from those who've been looking at it more recently, that the Canyon is not, was only there about 5 million years ago. Before that, it was not there. And one of the evidence is that there's some sediments and some volcanic rock, as well, developed on the north side with parts of it on the south side of the Canyon. And that's not— That doesn't work if the Canyon was already there. So, when that sediment was forming across both sides of the Canyon, the river was not there yet. The Canyon was not there yet. And that's why they've tried to tie that down to something like 5 million years ago as when the Canyon existed.

TM: As the date on the basalt, so the Canyon would be younger than that.

SB: Yeah. They can date volcanic rocks pretty carefully, they think, in terms of— It makes some assumptions, of course, because they measure the radioactive decay. And that declines gradually in a predictable way through time, but it assumes that the actual decay rate has never changed, or the influence of it is never changed, and we don't know if that's really true, but that's— We hang much of our dating in the geologic record on that decay, measurable predictable rate of decay of radioactivity from the rocks.

TM: And that makes sense. Yeah. So, that gives you a start point, and then you have time to build the Canyon, and that's that, to make that happen. So, you know, trying to line everything up to make it work. Yeah. I would think that some of your master's students might have worked on that or looked at it, anyway, a little bit.

SB: Well, some of them looked at it, I guess. Most of the master's students that I dealt with and the others that were working in this area were doing portions of the Grand Canyon, like George Billingsley.

TM: Like George.

SB: One canyon. That's enough. By the time he'd rambled up and down that a few times and put together a geologic map, we knew the details of what the rocks were there. More than we had before. And that's what— There are numerous series of students who were

doing it. In fact, I just had a call today again from my colleague Gus Kotera. He was the department chairman after I served for about three years. Then he took over and served for a number of years and helped the department grow. I mentioned that when I first came here, I was a lone wolf—

TM: Yes.

SB: —and when we finally got a program going that it took off, and it went pretty steadily, and by the time I retired, there were 16 geologists on the faculty.

TM: Sixteen.

SB: Sixteen geologists.

TM: Wow. Congratulations.

SB: So, it had been— It had a pretty had a pretty successful growth.

TM: Yeah.

SB: Anyway, Gus was the chairman after I was for some time, and then they— I think Gene Hughes is the president who moved him down to Yuma finally to preside over some program at what is called NAYuma or NAU in Yuma. We used to call it NAYuma.

TM: And that was Dr. Hughes who moved him there?

SB: Yeah. Yeah. He's the one, I think, assigned Gus down there. But Gus just called me today. I hadn't heard from him for months. I wondered how he's doing. It turns out he's about the same age I am. We're both in our 90s, early 90, and— But he's still doing okay. He lives back in Virginia. But he was certainly helpful in building the geology department and where it was when it got to be that big.

TM: As we bring this oral history series to a close, what else would you like to add that I haven't been smart enough to ask you?

SB: I don't know. I think we've covered nearly everything. Just that I have been grateful for having spent most of my career on the geology of the Grand Canyon. I did have a couple of sabbaticals that took me far away from that. I took one to Wales in England— When we're going to go— I wanted to go over there somewhere and spend a year. They were going to give me a year.

TM: That's a long way to go.

SB: Yes, it is. But they were offering me— I had the opportunity to go and make it a year's sabbatical. Be gone for a whole year and be able to do research there somewhere. And normally a sabbatical's only six, only half a year. Then the connection was such that

they were willing to develop, and that's again, I guess, with the National Science Foundation help. That was a go for a whole year. When I asked my wife, I said, "Do you want to go to— Where do you want to go in Britain?" We're going to go there. We're going to take the whole family. All five of our kids had to go with us.

TM: Oh, great!

SB: I said, "Do you want to go to London? Do you want to go somewhere else?" Because we thought about going to London. That's where the big program is, of course, the biggest ones. She said, "My favorite grandmother was So and So, who came from Wales. I'd like to go to Wales." So, we picked Wales, Swansea University in Wales. I applied to them, and they accepted me and had a thing for me to do there, a research project to do there and—

TM: Do you remember what you did?

SB: Yes, I worked on some of the fossil record of the rocks that were exposed at the beach. The nice thing about the beaches there is that at least in that part of Wales, they're very soft fossiliferous rocks. And when the tide is out, you get to see some of the rocks that are exposed below the ocean most of the time, you know. And I got to collect some of those and I had to— I connected with another one of the faculty members there who was in town just south away of there. And the two of us together put down a publication of some of the fossils we got there. It was not— They were invertebrate, you know, seashells, as you think of them. They were invertebrate animals, but they're by far the most abundant fossils of almost everywhere. So, that was a great experience.

TM: Nice. Well, that's fun. And did your children go to school there?

SB: Yes. interesting experience. They went to fairly formal schools in Swansea. Swansea is a nice city. It's got about 2000 people in it, and it's a nice city on the coast. And we had those older three girls of ours, and they were all teenagers and, you know, so they all went to high school. We went to the first day of high school. It's an all-girls school. And what we didn't know was that the girls all had to wear uniforms. So, we marched in there with my three daughters in bright, red skirt and some kind of top, and here were all these girls in their uniforms, which was—

TM: [Laughs] Plaid?

SB: They had a white shirt but inside they had a black sweater, and then a black skirt and black socks. All very subtle, same color. And here come these Americans and they walked across the stage. Everybody looked at them They said, "We're not going back until we get in uniforms." [Laughter] They were so embarrassed to be made so conspicuous. And so, we did get uniforms. And they had a good experience. It was quite a bit different than our schools here in some ways. It was pretty formalized. The students all stood up at attention when the teacher came in at the beginning of the course and so on. And they had— By time they got into high school, they were already sorted into those

they thought were going to be able to go to college and those that were not. I didn't know— We'd never experienced that before. And so, my oldest daughter got acquainted with a good friend there, and they ended up in the one that was training them just to finish that high school, and that would be it. But it was a good experience for her anyway. But our twin daughters got into— They are just a year behind her, a year and a half behind her. I guess really two years in terms of the grade they were in. They got a more challenging experience because they were somehow headed for— They were preparing to go to college, anyway, considering that.

TM: And did all three of your girls go to college?

SB: Yep.

TM: OK. So, one of them messed up because they were in the wrong class. Yeah. That's funny.

SB: They did. In fact, the three girls all— Well, four. All four of my daughters ended up as teachers.

TM: Nice. Like their mom.

SB: One of them teaching deaf children.

TM: Oh, my.

SB: One of them learned how to work the deaf children and teach deaf children. She still teaching now. She's the only one still teaching. The others have all retired. That seems surprising when I think about I've got children that have retired already. But they have. But it was a great experience.

TM: They followed in their parents' footsteps then.

SB: Yeah. They did.

TM: To teach. Nice.

SB: They had both parents and grandparents who were teachers. My father and mother met when they were teachers in Idaho and teaching in high school many years ago.

TM: That's right.

SB: So, it's all been a wonderful experience. I really enjoyed almost all of my experiences in the school and then research and so on. I didn't do any really high-power research, but what I did was exciting because we were getting something new that hadn't been known before. It had always been there, but it had never been discovered because it was so hard to get to.

TM: Right. Right.

SB: I've got a picture of George Billingsley at one of our overnight camps we had right on the top of the Redwall Limestone, and then just look down and he's just down below and right below it is the bottom of the Canyon, you know, 3,000 feet below.

TM: My! My, oh my.

SB: The helicopter put us down on that shelf where we wanted to be, and there's where the outcrops were that we wanted to see. Otherwise, we have had a long tunnel to get into them.

TM: Yeah. That would be a long hike in from the North Rim.

SB: So, that was exciting. We always said if the helicopter ever crashes, how will they ever find us, you know.

TM: How you get out? Yeah. Gosh.

SB: Well, that didn't happen. The pilot knew where he had put us down and he could find us again. We learned to be prepared with a big, colorful sheet we could hang up, you know, when we heard it coming, and we'd hang it up so they could see right where we were. We were pretty small, but it worked out very well.

TM: That's a good idea. Well, Dr. Beus. Dr. Stanley Beus, thank you so very much for this wonderful interview series.

SB: Well, you're welcome. I've enjoyed doing it. It's been good for me to think about these things again, so—

TM: Oh, good. Yeah. No. It's been really wonderful. Thank you so much. This will conclude then Part 4 of Grand Canyon oral history with Stan Beus. Today is August 30, 2021. My name is Tom Martin. And Stan, thank you so very much.

SB: You're welcome. And thank you doing it. I appreciate it