

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION  
VOICES ORAL HISTORY ARCHIVES  
IN PARTNERSHIP WITH NOAA HERITAGE AND THE NATIONAL WEATHER  
SERVICE

AN INTERVIEW WITH ALBERT “SKIP” THEBERGE  
FOR THE  
NOAA 50<sup>TH</sup> ORAL HISTORY PROJECT

INTERVIEW CONDUCTED BY  
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GAINESVILLE, VIRGINIA  
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MG: This begins an oral history interview with Skip Theberge for the NOAA 50th Anniversary Oral History Project. The interviewer is Molly Graham. The interview is taking place on April 21, 2020. Due to the coronavirus pandemic, this is a remote interview with Skip at home in Gainesville, Virginia. And I am in Scarborough, Maine. So today, I just wanted to wrap some things up. I had some follow up questions about a couple of things you brought up, and then I wanted to ask you about some of the people you mentioned in the materials you sent me. First, I wanted to hear a little bit more about the genesis of all of your NOAA research. You mentioned that when you were at Scripps, you were giving a talk and fielding these questions. So I wanted to know, what were the questions you were being asked about the history of NOAA?

AT: Actually, the guys were super-techies. Some of the pictures I had, they pointed out, “Yeah, yeah, I saw that. Blah, blah. That’s one flatbed plotter on the ship *Whiting*.” Well, when I was on the *Whiting*, it was ’73 to ’76. We had a big flatbed plotter that was mounted vertically and had an arm that would go back and forth, and a pin that would be driven that would be writing numbers in various colors, and whatever. So I had a picture of that, and one of the guys said, “That’s got to be the oldest one of those that was ever built.” [laughter] I was somewhat surprised to hear that. I mean, this was still – it was about eight, nine years after I had gotten off the *Whiting*, so I mean it wasn’t like it was stuff that we were doing just yesterday. Then other guys started talking about – I probably knew about a navigation system called Radio Acoustic Ranging at that time. That was the first offshore navigation system that was ever devised that you could navigate without having something – I won’t say it was the first – but it was certainly the first that was survey-quality that you could navigate without having to see something visually on land, or see astronomically stars and planets or whatever, to position your vessel. This involved throwing TNT [trinitrotoluene] bombs over the side that would explode. They had hydrophones – listening devices – on the ship. And then at a location that they knew – well, at a point where they knew the location of, they would have other hydrophones, maybe fifty, sixty miles away. The sound wave would travel through the water, and it would activate a radio transmitter at the other end that would transmit back to the ship. So basically, you were measuring the time that it took for the sound wave to travel from the explosion to these hydrophones that sometimes maybe they were maybe a mile or two offshore. Sometimes they were boats that were anchored far offshore. But you’d get two or three of these distances, to these hydrophones, and then you would know the position of your vessel. So one of the geophysical methods of determining the structure of the Earth is seismic reflection profiling, or seismic refraction. They are two different techniques, but they are very similar. They also use TNT. And they were saying, “Oh, we were doing this or that, and we were the first ones,” and all that kind of stuff. Some of it – “We were the first ones to use TNT in the water, and blah, blah, blah.” I really had no answer to that at the time. Like I say, I’m not sure if I brought it up, or if they just happened to bring this up themselves, knowing that I had no idea where they got their ideas from initially. But these were guys that had actually started their work in the late 1930s and 1940s, some of the grand old men of oceanography on the West Coast. George Shore was one of them. He was probably the most prominent guy that was giving me his line of history. I just had no answer when he was saying he was number one and first and all this kind of stuff. So, at that point, and having been embarrassed with a few other questions – I can’t really recall the nature of them –that I couldn’t answer properly, or just had no answer, I hemmed and hawed a little bit, and I just decided at that point that I would

never let that happen again. That's when I got interested in learning about our history, as well as – I wasn't ever really a – I wouldn't call myself a techie, per se. I was never a guy chasing electrons around. I wasn't an electronics engineer or anything of that order, but I guess I both learned and was able to generate ideas of how to use this equipment. The learning how to use a system and understand that these integrative parts – the navigation, the sounding – you have to know the tides, any number of parameters that you have to be able to measure and have a feeling for, to be able to come up with a fairly accurate offshore survey for hydrographic surveying purposes. Well, at Scripps, with the knowledge that I gained there, the systems that I saw there, their Scripps Deep Tow system, and the multi-beam sounding system they'd had installed on their ship, the *Thomas Washington*. Also, I was introduced to GPS [global positioning system], used a GPS system on that ship, although it was only four hours a day that we had availability at the time. But regardless, we understood that all of these things could be used to survey our offshore areas, and far offshore. You could survey anywhere in the world with this stuff, particularly with the global positioning system. You didn't have to worry about putting in navigation stations. You didn't have to worry about having correctors for them, monitoring them. So with that, besides the history – I mean, like I said, I went [inaudible] technology also. I actually wrote a letter – I may have mentioned this before – off to headquarters after Ronald Reagan declared the Exclusive Economic Zone out to two-hundred miles in 1983, suggesting that we map the Exclusive Economic Zone. I don't know if I was the first to suggest this at the time or not, but I actually put together a little concept of how it could be done. That, at least, got the discussion going. Then, like I said, the next year, 1984, is when John Byrne, who was then the head of NOAA, declared 1984 the Year of the Ocean. I think I went through all this before, regardless. I didn't have access to it at Scripps, but when I was on the *Peirce* the next year, and actually thereafter for the rest of my NOAA Corps career, I always managed to get somebody to send me an annual report of the old Coast and Geodetic Survey. These were publications that were put together in the nineteenth-century, and I had them send them to me. I'd pore through them looking for quotations and concepts and trying to grasp what the old Coast and Geodetic Survey was actually like, and who did what, and what were the contributions they made to society at the time, what sort of scientific advances they'd made, and started just trying to file all of this stuff away. I guess that culminated with [writing a history of NOAA Corps] – I was at NOAA Corps, as you know, but I proudly considered myself more of a Coast Surveyor than even a NOAA Corps officer. To be blunt, it really wouldn't have mattered to me whether I was a civilian or an officer. I liked the work. It was enjoyable to me, and it was interesting to me. But I was in NOAA Corps, so NOAA Corps agreed when I was on staff to Admiral [Sigmund] Petersen, '92 to '95, that I began writing a book then, the *Coast Survey 1807 to 1867*, which really covered the formative years of the Coast Survey, and to some degree, also the formative years of American science. The Coast Survey was sort of like the NASA of the nineteenth-century. That was the organization that had, at least up until the late 1870s, and from thereon, it had all of the – I'll call them the smart guys, at least in the physical sciences. Then you started getting the USGS [United States Geological Survey]. You had the Army Corps of Engineers, but their mission was different. So the Coast Survey was a major element in the formation of American science at that point. Anyway, it just sort of grew, and I just kept reading about it and trying to absorb what I could, took a lot of notes, that sort of thing.

MG: You mentioned sort of the good old guys of the Coast Survey. Did you connect with someone named Floyd Risvold as part of this work? Was he one of those guys?

AT: Risvold?

MG: Yes.

AT: Risvold got a hold of me. I think it was Floyd. I don't remember their names exactly. They were civilian geodesists. They worked in the field for most of their career. Actually, the Risvold that I got ahold of – I think Oscar was a fellow who had made his whole career in the Coast and Geodetic Survey as it was called by that time. But one of his brothers had worked during the Depression years, and maybe a little bit after the Second World War. I forget the exact years. But he contacted me, and he provided me with probably a couple hundred photos that are now in the – you could probably look in the NOAA Photo Library and just search “Risvold,” and you'll find numerous pictures that were taken by – once again, I think it was Floyd Risvold. I might be wrong in the name.

MG: No, you are right. I have that written down. I think his name came up in an article you wrote about the early crews. I was curious about what that work looked like.

AT: Well, by early crews – he was in the 1930s and 1940s. This was in the era before helicopters. They did have trucks. I guess going back a little bit further, up until about 1912, 1913, that's when I think the Coast Survey got its first automobile trucks, if you will. That was sort of a – the automobile is one of the great enabling technologies of the Coast Survey. Before that, they would take trains. Wherever the train went, they went to, but then they would have to get horses and buggies and wagons, a lot of backpacking, whatever it took to get to one of the points that they had to conduct survey operations at. The automobile really sped that up, as far as how much they could accomplish in a given timeframe, be it a couple of months, a year, on a particular project. Risvold's survey work was done in the era of automobiles. However, if memory serves correctly, I know that he was on surveys on the Big Sur coastline. There were no automobile roads. In fact, if you look through the pictures, you'll probably find that they actually had a prison camp that was on what is now Highway One in California, the Coast Highway. They had prisoners that were working on the road, and they had a picture of one of those camps that they could see, but the rest of what they had to do was a lot of horsebacking and a lot of backpacking to get to the various stations that they were going to. It was tough work. I mean, these guys were – they would have anywhere from fifty to a little over a hundred-pound packs on their back and be climbing places that even without packs were pretty dangerous to go on occasion. In many places, they hired wranglers, basically were the guys who took care of the meals and the pack horses that would go with them. They generally would have a camp cook. Sometimes they would be out in the field for weeks at a time on various stations. Guys like Floyd would generally start as what was called a lightkeeper. The lightkeepers would have to pack in batteries and basically the equivalent of an automobile headlight that they would set up on a mountain. They would pack in. They would have all their own gear, in places – well, in Alaska, they would end up – of course, being concerned with bears and other wildlife that were in the area, they always had their rifles with them. A lot of times, they actually hunted off the land to keep eating when they were in an area for a long

time. It was very rugged. It was a very much pioneer existence and, in some respects, they were sort of the last of the [gypsies]— other than the people that go in and live on the margins of society. I mean, they were doing this to accomplish scientific work. So lightkeepers, their job at night, they would have their light set up on a stand. If they were in flat country – on these big towers that they would have to climb, and they would point it to a location where they knew an observer, a fellow with a theodolite was turning angles between these various lights and towers. Sometimes, they would be on station for weeks at a time if the weather didn't clear up, particularly in mountainous areas. They would have to be on their station all night, hoping it would clear up, and sometimes climb down a mountain in the dark. At least one or two of them fell off cliffs doing this. It was a rugged existence. It would start snowing, and they would have to get out in the snow, walking. They would get caught in the mountains, sometimes two, three feet of snow. They would have to break trail to get back out. Most of them survived it. Most of the guys had to have been tough as nails. So they were sort of the [the last of the mountain men]— there are a few things, and there are a few publications. *Point of Beginning*, POB, I believe that is a survey magazine. I wrote a number of articles for *American Surveyor*, which is concerning some of this sort of work. When I actually started into my two years in geodesy, '71 to '73, I met some of the fellows who were actually involved in this sort of work at various times. [They] still had the pack horses going in. The first crew I was on, the guy's name was Bob Price, and he'd done a survey of Yellowstone, where it was all packing and packhorses getting into the various stations. Vern Burns, another fellow I worked with, did a lot of packing work. Yeah, some of these guys, the builders that were on Transcontinental Traverse – well, even at that, we occasionally had to pack. One thing that we would have had to pack to, we did go into a station, Goldstone Lake, which is a – I don't know if it's a [Department of] Defense site or a NASA site. I think it's a secret facility out in the desert. They had radio telescopes, and we had to do some survey work on some of the surrounding mountains. We had helicopters to get there. The helicopters would fly us in during the day, and then we would do our observations at night, and then actually walk back down the mountain to get to vehicles down at the base of the mountain, and get back to our motels or wherever we were staying. I don't remember where we were staying at that point in time – somewhere out in the Mojave Desert. Anyway, it was much more rugged. I think the worst I had it with another fellow – we had to carry a Wild T-4 theodolite in its carrying case, probably about eighty to a hundred pounds. One of us each with carrying handle, we had to take it maybe a quarter-mile or half-mile to a station where our truck couldn't get into in the desert because it was too sandy and the truck couldn't make it in. We would have gotten stuck in the sand dunes. But that was about the worst I ever had it. Another time, I guess we were in Montana. Walking up a hill, I had about an eighty-pound sack with some cement on my back and came eyeball-to-eyeball with a rattlesnake. I didn't like that too much. [laughter] That was somewhere northeast of Billings on a Transcontinental Traverse line. From the standpoint of what these other guys did, walking miles with hundred-pound sacks, some of those pictures, it was just pure perseverance and guts that – then when they got up there, they had to do, for the times, some of the most refined scientific observations with the geodetic theodolites measuring angles, keeping their instruments in calibration, making sure that they didn't bang them around so that nothing was out of order with them. So yes, they were tough. The other thing – jack of all trades, master of none. I have pictures of them. The old trucks would be breaking down, and they would be using their baling wire and chewing gum to fix stuff, basically, to keep the

truck going. So they were really something. They were the real field guys, if you will. So it was tough.

MG: You bring up prisoners. When I interviewed John Bossler a number of months ago, he said during his time, they outsourced some of their work to prisoners in a local prison, and also some folks who were learning disabled living in an institution. Did you know about that?

AT: I'm not sure what he was outsourcing.

MG: It was more sort of monotonous, straightforward work, measuring tide levels, I think.

AT: It's possible. I don't know a thing about that. If he said it, that's what it is. I don't know anything about that.

MG: You also did a lot of research on Ferdinand Hassler. Could you tell me a little bit more about who he was?

AT: Well, Ferdinand Hassler. A couple of things with Ferdinand Hassler. Hassler had a biography of him written by a fellow named Florian Cajori in the 1920s, I believe it was, called *The Chequered Career of Ferdinand [Rudolph] Hassler*. I read that, but I also did a lot of other research, and I found some Hassler letters, and I looked through every reference I could find to him. He trained a lot of people. There were a lot of old newspapers that I came across, old documents that gave some idea of what he went through when he came here. He was what's called a polymath in today's world. By that, he was actually an assistant Attorney General in Switzerland at one point of his career. He was a scientist in Switzerland as well. He was a geodesist, him and another fellow. I don't know how to pronounce it – Tralles, T-R-A-L-L-E-S, I believe, was his mentor. They did a geodetic survey of Switzerland before he left. Napoleon came – I believe it was Napoleon – and the French soldiers came marching in, in the early 1800s. I don't know quite, and I can't give you all the particulars of everything going on. I don't think he was in any particular danger, but I think he saw the handwriting on the wall, and he decided it was time to emigrate out of there. He came to the United States in 1805. All kinds of myths and legends that can't be [proven] – well, I don't want to say all kinds – but one of the myths that I could find nothing that validated it was that the captain of the ship he was on coming across the Atlantic died halfway between, and Hassler navigated the ship to Philadelphia. I never found another thing that said this, other than a few books written in the twentieth-century that had this story. There is another story about him when he was the superintendent of the Coast Survey during Andrew Jackson's time in the presidency. Andrew Jackson was big on the spoils system – very democratic, everybody has a chance for a federal job, no matter what the qualifications are. He got in it with Hassler about what Hassler was getting paid. Hassler was getting paid the equivalent of six thousand dollars a year then. Andrew Jackson asking him about that, and Hassler's response was something to the effect that he was making as much as the Secretary of the Treasury – the guy's name was Woodbury at the time. Hassler would say, "Woodbury, Woodbury, there are hundreds of Woodburys. There is only one Hassler." Now, whether that's true or not, who knows, but he had this reputation as being fairly arrogant, but very intelligent. I came across one other situation where he was camped on a fellow's land in Connecticut. The guy came down and asked him what he was

doing, and he asked him to move his camp because he was on his property. Hassler, in this story, got very authoritarian with the guy, and said, "I'm standing here. I'm under the federal government. I am Hassler." [laughter] Now, one of the things that affected Hassler's ability to function in the United States was - he did seem to speak with a very heavy accent. He could speak French, German, and English, and he could write well in every one of them. But there was - just like today - there is this xenophobia. I think this morning, the President cut off all immigration to the United States and just - what can I say? Every plague that there has ever been in humankind always came from somebody else, and this card is being played now. Well, there were people in the United States that hated Hassler because of the way he spoke. He did dress in an old-fashioned European manner, according to most accounts that I've read. But when he came to America, he came to Philadelphia, which was really the seat of intellectualism. Well, [there] and Boston. But Philadelphia was where the American Philosophical Society had been - Benjamin Franklin, Thomas Jefferson the President of the United States - this will never happen again, at least not in our lifetimes, I'm sure - was also the President of the American Philosophical Society, considered maybe not a scientist, but a man of science in his own right. He came there, and he hooked up with a number of people in Philadelphia with the Philosophical Society, and I think they actually - when they met him, they knew they had their man. So Thomas Jefferson and Albert Gallatin, who was Secretary of Treasury, in 1807, advertised for somebody to develop a plan for a survey of the coast of the United States. Twelve people applied, and Hassler ended up being accepted. In 1807, Congress then appropriated fifty-thousand dollars for the survey to occur. This was to be used to buy instruments, books, whatever. So in 1811, Hassler ended up going to Europe. Well, in 1812, the war breaks out with Britain. Well, a couple of things happen. In 1807, we almost went to war with Great Britain. Thomas Jefferson enacted an embargo, basically shut down American merchant marine at the time. This, in turn, put a damper on surveying the coast. I mean, who cares [was the attitude]? But regardless, in 1811, I guess James Madison is in [office]. Off goes Hassler to Europe, he starts buying instruments, and he's going to London. The War of 1812 breaks out, and Hassler is considered a foreign enemy, whatever. He was never put in jail as far as I know, but he was watched carefully and the stuff he was buying, he couldn't get a hold of for a long time. Ultimately, he didn't make it back to the United States until 1815. He gets back to the United States, gets his stuff. Actually, he ended up spending some of his own money to get back, because he had run out of it between buying stuff and whatever. I'm not sure he ever got reimbursed for that. In 1816, he starts work in New York. He's actually got five employees, one of them being his son, a couple of Army officers. He starts to survey around New York, rightfully so - one of the great commercial centers. He starts with the triangulation. The way hydrographic surveys work, you have to determine a geographic grid, if you will, to place all of your soundings in, and the coastline in, ultimately. So the order of business is the triangulation of the geodetic points that you put in the ground. Then you refer to the coastline, things like lighthouses and other landmarks, and prominent points of the coastline to the geodetic network. Then the soundings offshore, you navigate your ship relative to these points on the beach, so that everything is in the same coherent geodetic framework. Well, he's got five guys working. In late 1817, Congress starts getting antsy. Where are the charts? And he's just making a start of New York. He doesn't have a ship that they've given him. In 1818, Congress enacts a law that only Naval officers and Army officers can work on the survey. So there is a little bit of survey work done. The Army wanted the triangulation, the Navy the hydrography. There is some work done. By 1828, the Secretary

of the Navy, a fellow by the name of Southard, says that what charts have been produced by the Navy are useless and pernicious. In other words, more dangerous to use them than to not use them. Still, things are starting to move in Hassler's direction. He also had published – he had actually written this earlier about 1820 or so – but American Philosophical Society, because of funding, did not – they didn't have the money to keep publishing their transactions, so it wasn't until 1825 that Hassler had published – I don't remember the exact title – [*Papers on Various Subjects Concerned with the Survey of the Coast of the United States*], about two hundred pages or so in which Hassler outlined what he really wanted to do with the Survey of the Coast of the United States and how he planned on doing it. A lot of people had read this and said, "Yes, this is the way that we have to do this." I call that his magnum opus, his great work. He had the words like "accuracy," "standards," and "precision," just peppered throughout the whole thing. Although most coast surveyors today or even in the 1930s have never seen it, that is what he ultimately imbued the Coast and Geodetic Survey with - and even the NOAA Corps of today, and other elements that have descended from the old Coast Survey - I won't call it worship, but certainly very deep respect for all the work we do. You do it as accurately as you can, and there is a distinction between accuracy and precision. You do it as precisely as you can. Scientific integrity, so that if you do screw something up, you don't try to brush it off. You let somebody know, "I screwed up. Hey, we've got to do this again. We've got to get it right. Or as right as we can make it, given the technologies that we have." So that view has endured, if you will, for two hundred years. It's also incorporated into other scientific entities within NOAA. I mean, certainly, I think that's the primary thing. I mean, occasionally you get – I hate to say it – some politicians will attack one way or the other on various matters, but I think that one thing that they've never been able to attack or change, is this abiding respect, I'd say almost deep love with some people, for these three concepts of accuracy, precision, and scientific integrity. I think that's what Ferdinand Hassler by his work around New York – he was trying to do this right. Well, anyway, getting back. This all stemmed from his philosophy that he put into this document. In 1832, finally, he is reinstated as head of the Coast Survey. He is also instated at the same time, or just a little bit before, as head of Weights and Measures, which became the Bureau of Standards of the United States. Now it's NIST, National Institutes for Standards and Technology. But in 1832, he really starts to work. He gets a couple of ships. He starts getting a few employees. The United States, a very primitive country still at the time, scientifically-speaking. He has to train people to do the survey work. He has to find engravers that are sufficiently qualified to engrave charts to his view of what is the proper way to do it. Well, he doesn't get too many charts out over the next eleven years, but he is building the framework for them. He did have most of the survey work done in New York Harbor area, and actually, the charts were almost engraved by the time he died in 1843. The whole time, there is still a whole bunch of political attacks on him – "He's going too slow. He's doing this." There was a big – I think it was 1842, the year before he died, a big political inquiry, and a board of Army officers and scientists basically validated what he was doing. But in 1843, they changed the way things were done. It didn't really change a thing. It was Hassler's plan and Hassler's vision that really the old Coast Survey was built on. Well, I always say that Hassler built the foundation. Then the next fellow that came along, Alexander Dallas Bache, he built the house. Well, getting back to Hassler, the next couple of years were pretty good. He wasn't just authoritarian. A lot of guys that worked with him actually did love the old man. One of the things that sort of preceded Darwin, if you will – he was at a station in New Jersey. I guess there are some fairly high hills in New Jersey, and supposedly over a



precipice. He had – I think it was a young Frenchman that was visiting to observe the methods of the Coast Survey, Hassler’s methods. The Frenchman looked down off this precipice, and he looked out, and he said, “Oh, we’re at least as high as the angels here.” Hassler looked at him and said something like, “Maybe not as high as the angels, but at least as high as the monkeys.” [laughter] The guy had a sense of humor. Another time, working in the office in D.C., he had a group of Congressmen that wanted to visit. Hassler was working with his shirtsleeves rolled up and whatever, and there were a couple of young naval officers who were working – Navy officers were assigned to the Coast Survey, as were Army officers prior to the Civil War. They came and said, “We have Congressmen coming. You need to get dressed better.” Hassler looked at them, [and said], “Have they come to see the work, or have they come to see my clothes? [laughter] He was sometimes, according to some, very hard to get along with, but if you wanted to do the work, if he felt you were dedicated, not one fellow that – at least that I came across in any of the writing – ever didn’t like him that worked with him in the field. On the other hand, guys that he didn’t get along with, and this was generally a lot of Congressmen and sometimes the press, he had no problem fighting with the press. He was a worthy enemy, if you will. He’d give as good as he got. So he just had this very rigid view of what was right. He persevered, and I think the United States owes him a debt of gratitude accordingly. He is one of the unsung great people of the United States or at least immigrants who came to the U.S. Anyway, I am a fan of Hassler.

MG: Yes, it sounds like it. You also wrote a comprehensive report, “150 Years of Tides on the Western Coast: The Longest Series of Tidal Observations in the Americas NOAA.” I was curious about why this was a topic you tackled.

AT: Well, for a couple of reasons. Part of this was – well, I tackled it because I was asked to by our tides people. But the other part of “150 Years of Tides” – I came across, and I tracked the evolution of at least nineteenth-century technology the best I could, the best I could understand what they were doing. But in the early 1850s, the Coast Survey developed a self-recording tide gauge. Prior to that time, the way that tides were observed – you’d have a guy sitting on the dock, and depending on how often you wanted the tides read, or at least the water level read versus a staff, he would either come every hour or every half hour, maybe you would have two guys so they could do it twenty-four hours a day, to get a full set of readings. But when they developed the self-recording, it was like a chronograph drum, a drum that rotated. It was synched with a clock. It had a pencil, and the drum would go around and around. It would know the time, and the pencil would trace. You would have it set up so that it was attached to a float in what they called a well, which was in the water. The float would go up and down with the tide, and this, in turn, through a system of gears, would drive the pencil, which would have a sort of a sinusoidal curve on the paper. They’d be able to track the highs and lows of the tides and the in-between. The self-recording technology came into being in the early 1850s. In 1854, they installed – I think it was 1854, or it could have been 1853 – they installed one of these in San Francisco Bay. Well, and also one in San Diego and one in Astoria, Oregon. I think that’s the entrance to the Columbia River. So in December of 1854, actually December 23<sup>rd</sup>, there was a great earthquake in Japan, the Shimoda earthquake. This generated tsunamis that propagated across the Pacific Ocean. In Japan, there were like thirty-foot waves, and by the time it got to San Francisco and San Diego, these were only a couple inches to maybe a foot difference in the tides. But regardless, there were a series of squiggles that were

put on these things; they come and go about every twenty minutes or so and leave a distinctive trail, if you will, on the tide record. The fellow that was observing tides for the Coast Survey then on the West Coast was actually an Army officer, whose name was William Trowbridge, who became a fairly well-known academic after he resigned from the Army. He observed this, and then he sent this record off to Alexander Dallas Bache. Bache, in turn, said this was probably caused by an earthquake. But he hadn't heard. The news came slowly in those days, particularly all the way across the ocean from Japan. Bache also looked at it. They had come up – I can't give you the exact formula. I could find it. But recently, a British scientist had come up with a means of determining the wave length, the period of a wave, and that you could relate all of this to the depth of water, and the velocity of the wave. Well, they figured out the time that the earthquake had occurred within about fifteen minutes. Timekeeping wasn't that good worldwide then. But they knew the time, so they knew the speed of propagation of these waves across the ocean. They knew pretty well the wavelength and the period. So from that, they were able to derive an average depth of the Pacific Ocean. This was in 1854. [laughter] I mean, these were smart guys, no two ways about it. I was aware of that story, and I had brought that up. Having done a lot of deep ocean survey work, as well as hydrographic survey work, little tidbits like that really interested me. Regardless, I was aware of this and had written about it. Once again, the way that this came in with "150 Years of Tides on the West Coast," was that in 2004, the Center for Operational Oceanographic Products and Services, COOPS, which used to ~~the~~ be Tides and Currents Division of the Coast and Geodetic Survey, asked me to write an article for them about the early tides and how they went about it and this sort of thing. That's how that particular article came about. I do confess, and I asked them to put their name on it – I will state this. Really the ending of it, they were talking about the new technologies and whatever, and frankly, I wasn't that familiar with it. The historical aspects, I certainly was the source for that, and that was because of the other research I'd done on the history of the Coast Survey. I thought that had been a significant scientific discovery they'd made and a significant technological advance, the self-reporting gauges, and that was the reason I had included it in *The Coast Survey 1807 to 1867*. I don't know if I answered your question or not.

MG: You did. As you were studying NOAA's history and writing about it, was your relationship with the agency changing?

AT: To be perfectly honest, I – Hassler was criticized a lot in his lifetime, but I'm not sure that all of that criticism was just. Alexander Dallas Bache, on the other hand, came from a well-connected family. At the time, he was an American scientist, as opposed to a foreign scientist heading this scientific bureau in the United States. That was also a point of contention that a foreigner was heading the Coast Survey during Hassler's tenure. Bache came in with a golden spoon in his mouth, so to speak. His uncle, George Mifflin [Dallas], was vice president of the United States. During part of his tenure in office, his brother-in-law was his immediate boss, the Secretary of the Treasury, and then it's just hard to – and Bache is always complimented for doing so well with Congress and all this sort of stuff, which he did; he was a pretty smooth operator. [Editor's Note: Alexander Dallas Bache was the grandson of Alexander Dallas, who served as Secretary of the Treasury under President James Madison from 1814 to 1816. George M. Dallas was the son of Alexander Dallas.] He was a great-grandson of Benjamin Franklin. He had inherited a lot of Franklin's political acumen but also had inherited his

scientific bent. So he was a scientist in his own right, as well as being a good bureaucrat, a good manager. He managed the funds well. He managed to squeeze more money out of Congress than certainly Hassler ever did. He was given credit for expanding the Coast Survey to virtually all states at the time and territories. Part of that, to me, was a function of improvements in transportation. The railroads were expanding, which made it easier to get around. The steamships were coming into play a lot more. He came in right after the – well, the Mexican War hadn't even occurred yet, so we didn't have Texas; we didn't have California. The Northwest Territories – by northwest, Washington and Oregon – were just sort of out there in dreamland still. There was really no way for Hassler to get people over there. So Hassler had a different set of constraints that he was working with, but Bache, in turn, was complimented for his ability to expand the Survey to all of these areas. Any rational person would have done that, as would have Hassler if he had the same resources. But it didn't happen. So there is always this comparison. However, Bache, he really did shepherd the Survey. Besides the classical stuff of hydrography, geodesy, topography, he also was a geophysicist. Actually, he started up the first geomagnetic observatory in the United States, at Philadelphia Central High School, where he had been principal for a while. It was also where he was – it was sort of like a college at the time. He recruited guys like George Davidson and James Lawson and Joseph Smith Harris. A number of Coast surveyors had come out of that school that he maintained contact with. He also started oceanography in the Coast Survey in 1845. Although Matthew Fontaine Maury gets a lot of credit for being the “Father of [Modern] Oceanography [and Naval Meteorology],” in truth, the Coast Survey in 1845 was the first organization to start doing systematic oceanographic observations, and that was of the Gulf Stream. A naval officer by the name of Charles Henry Davis was the first commanding officer to go out and run transects over the Gulf Stream. It was almost the concept of a modern oceanographic cruise, where they took depths, currents, water temperatures. They didn't do a lot of biology, but they said to look for the vegetation in the water, or the animal life in the water, take bottom samples if you could get it, find out what the bottom is like. So, like I say, for the times, it was far-seeing. It was really the first systematic oceanography that any nation had conducted. So Bache was a visionary. Also, he helped raise the stature of American science. He was an early President of the American Association for the Advancement of Science. Between him and Joseph Henry, Joseph Henry helped him become the – when Henry was still a professor at Princeton, but Henry orchestrated Bache becoming head of the Coast Survey. Bache, in turn, was instrumental in helping Henry become the head of the Smithsonian Institution. Those two, working in concert, then they had some allies – Benjamin Peirce, who became the third superintendent of the Coast Survey. This same Charles Henry Davis was a naval intellectual. They worked together to – some called them dictators of science, others called them visionaries, trying to bring American science to the forefront and make it certainly equivalent to, if not outreach, their European colleagues and counterparts. So this was Bache's dream, to make American science great, and the Coast Survey was his vehicle at the time.

MG: Were there any other figures you wanted to bring up from your research?

AT: Well, there are a lot of guys to bring up. George Davidson, certainly, the foremost West Coast scientist, who wrote as one of his great – I know one of his great books was his [*Coast Pilot of California, Oregon and Washington (1857–1887)*]. That both has information for the mariner, [and] it has a lot of history in it. Davidson was a historical scholar of West Coast

exploration, as well as being one of the best geodesists in the world, not just in the United States. Davidson helped devise California irrigation systems. He probably observed some of the most difficult areas of the United States when he was doing it, going up through the coast ranges of California. He observed when the Transcontinental Triangulation was run. This was across the United States. The first line is the backbone of American surveys. He did two of the most difficult survey stations. He did Round Top, and I forget the name of the next station to the south of it. There was Round Top and then Mount Conness. I don't know if I'm pronouncing that properly. That station was absolutely ludicrous to get to. One of these – I don't know if it's a twelve thousand foot peak, I think it was. Which isn't some of the higher ones, but it was one that gave them a view out into Western Nevada, gave them a view of the mountain peaks like a hundred miles away that allowed them to complete the triangulation of the 39<sup>th</sup> parallel from California into the Great Basin of California. So the guy was tough as nails. He did that when he was sixty-five – climbed the mountain himself. He was built like a – if you've seen pictures of the man, he looks like he should have been a linebacker. If he would have played college football, that's what he would have been. He was a tough guy. Another fellow that carried the triangulation across Nevada to Eastern Colorado, William Eimbeck, spent twenty years in the field doing that. They would get maybe one, two stations a year through Nevada and Utah. Just incredible – working in the desert in summer, getting caught in the mountains in winter, working across Nevada when it was still basically pioneer territory, going in and out of these sometimes mining towns that would last a year or two and then they would become ghost towns. In the twentieth-century, a fellow that I really liked was William Scaife, another of the mountaineering triangulation guys. During the Civil War, there were two Coast Survey officers who were topographers that I think more than – well, actually, three that I really liked – John Donn, Frederic Dorr, and Clarence Fendall. John Donn and Frederic Dorr, they were primarily on the East Coast. They served from the beginning of the Civil War as topographers. They were on the Peninsula campaign. They were in Chattanooga, and I couldn't tell you where else they went to. The Chattanooga map that they produced is considered one of the classic Civil War maps for accuracy and detail, and this was done basically under fire. Then you have Clarence Fendall, who was so valuable to the Admiral on the Mississippi River, David Dixon Porter at the time, that Porter had Fendall's quarters placed right next to his up on his flagship. So that when Fendall went out and did his work during the day, he would then come in, finish it up, finish working on his map, what he had accomplished at night on the table, right next to Porter's quarters, so Porter could see what was going on. The map that Fendall produced, his most famous, if you will, was called DeSoto Bend, which is just across the river from Vicksburg. He was doing his survey work during the Vicksburg campaign. So yes, those three guys really [did] what they called seeing the elephant, but there were others that were under fire. Charleston Harbor – a guy by the name of Robert Platt. There was a great – I don't know how much Civil War stuff you know. But April 7, 1863, the ironclads went in and attacked Charleston Harbor. Actually, the ironclad commander at the time knew that this wasn't going to work too good, but he was still told to do it. But the lead ship – Robert Platt was the pilot for it. Even though John Rodgers was the captain of the ship, Captain John Rodgers, he depended on Platt to be guiding the ship so it wouldn't run aground and become a stationary target, at least for the Confederate guns. A cannonball hit the outside of the – you had these turrets on the monitors – and it broke a bolt out that hit Platt in the head, knocked him out, fell on the deck. He was so valuable to Rogers that Rogers revived him, then held him up to the viewing port for the next two hours, to continue guiding the ship, piloting

the ship to get it in and out of the harbor. Actually, the Dorr and Donn stuff and the Platt stuff, I do have on the NOAA history website, as well. John Donn wrote his account of his Civil War experiences with Frederic Dorr. It's a classic in its way also, at least from the standpoint of what the mappers and the hydrographers did and went through. There are a whole bunch of unsung heroes. World War Two, there were – well, the ship *Pathfinder* as a whole, that was our most illustrious vessel in the Coast Survey. It was attached to the Navy, but basically a Coast Survey crew and Coast Survey officers that manned it. With the exception of the commanding officer, who was a naval reserve officer. But the technical work, the real work of the ship was done by [Coast and Geodetic Survey officers] – it came under bombing attacks at least fifty times. It shot down a couple of Japanese aircraft that were attacking at Guadalcanal. So yes, the *Pathfinder* basically went from Guadalcanal to Tokyo, and actually surveyed Tokyo Bay after the Armistice was signed. So the *Pathfinder* is one of our great ships.

MG: You mentioned the NOAA history site. When did that work begin?

AT: Oh, that work? That would have been probably about the same time that I started working with Janet Ward. It was either 1998 or 1999 that we began working on that. Well, she did this as a labor of love, and it wasn't really her primary thing, so she did what she could when she could. We have not added anything. I say, "we," but I'm not sure she would be – she's not in a position to even do it anymore. Not that she wouldn't want to, but just she doesn't have access to the – she's retired here for probably about five, six years or so now. Probably about 2006 or 2007 was the last stuff we put on there, but all of the graphics that are on that, the way that site is designed, that was all Janet. And she did that, once again, the same way with the photo library, none of that was anything that anybody told us to do. Probably if we would have said we wanted to do it, we would have had a committee of twenty telling us how to do it, and nobody agreeing and nothing would have happened. But we just did it, and it's still there.

MG: Well, it's been very useful in my work. Thank you.

AT: Well, I hope that it's useful. If not useful, at least some people accordingly learn a little bit more about their agency through these – both the photo library and the history website.

MG: Sure. And I can't remember whether we talked about the *Muskeget* the last time we chatted.

AT: A little bit. I mean, I didn't know a whole lot about the *Muskeget*, but I did find – I found the names of these four guys that were lost on a weather ship, and I think that's how it's worded. I'm not even sure it said weather ship at the time. I believe it was – it could have been 1942 or 1943, I forget the dates. I could look that up one way or the other. If the ship was torpedoed in 1943, they would have been reported as dead in 1944. I think that's the way it worked. If they didn't hear anything about a guy, I think it was a year later that they would at least call them missing in action. I think it could have been – well, I did know the Coast Guard historian, and I don't know if I asked them if they had records. I'm not sure how I figured out that it was the *Muskeget*, or whether it was working with the Coast Guard historian that ultimately we figured out these guys were on the *Muskeget* from the date that they were

reported missing in action. You go back a year and what ship was lost at that point in time. I think I found it through an internet search. But then, in talking to the Coast Guard, they couldn't find a record of these guys being part of the crew. The rest of the crew had gotten Purple Heart medals. Not that that's a good consolation, but I guess it helps the families that at least their loved ones were remembered. These four guys weren't on the Coast Guard rolls. Well, the Coast Guard really took the bull by the horns after this, and then there was once again a NOAA Corps officer – this was sort of fortunate the way this worked out. I don't know when they started having a NOAA Corps liaison officer to the Coast Guard. Maybe ten years ago. I don't know when it was exactly. But he was also quite interested in this. They were looking for all things that they could do to show our common heritage, and show areas where we had cooperated together, suffered together, worked together. And so there was a push at his end. There was a push at the Coast Guard historian's end. It turns out that when weather servicemen were attached to these Coast Guard cutters, they were generally considered petty officers, at least for the duration of the cruise. Accordingly, they then had the military rights to obtain a Purple Heart. That's what ultimately established the Purple Heart recommendation, the awarding of it, and the associated ceremony.

MG: And that was in 2015?

AT: Yes, I believe it was in 2015.

MG: Another project you worked on before you ultimately retired was relocating the physical library at NOAA. That sounds like an enormous endeavor.

AT: Well, I was part of that. It was the whole library that was involved. I'm trying to remember how this all worked out. Fortunately, actually, there is a good – we had a new library director at the time, Dr. Neal Kaske. He had been an industrial engineer of sorts for part of his career. He had a great ability to visualize in three dimensions, which I don't. [laughter] But from the standpoint of – I'm trying to remember exactly everything I did with this. I can't remember the exact order of business, but it involved counting books, how many shelves, how much space we were presently taking up. We did it as a proactive action, feeling that eventually the library would be downsized and that somebody was going to tell us to get a whole bunch of books out of there. What we didn't want to have happen is that they just go on a dump truck and go flying away. This would have been probably 2015 or 2014. General Services Administration, when they're renting a building, and the Silver Spring buildings are being rented – I think all of them. After twenty years, they can get modernized and refurbished. There was a fund that went into this. To do this required that – well, you had to come up with a plan and a suggestion, a proposal to what you wanted to do to help modernize the building, and what you could do to perhaps make it operate more efficiently. This is all sort of coming back to me right now. The facility engineer for NESDIS, National Environmental Satellite Data Information Service, which was our parent organization, came to the library and said, "Look, there is this pot of money that's out there that you can apply for if you have an idea for a proposal for a project that you'd like to see done." So the lightbulb I think initially went on with Neal – "Well, we can get some compact shelving units in here, and give up some of our space so that we can keep the library. We can keep all the books at the same time." I can't even remember how many meetings we went to, but John Gironda [NESDIS facilities

engineer] was very instrumental in that. I'm trying to remember – relative to some of the other stuff I did or was involved with – I didn't consider this – this was bureaucratic stuff. [laughter] I mean, you do what you've got to do to survive. It wasn't my preference to be working on this stuff, but all I remember is counting books, counting shelves, trying to figure out how much space we needed, how we could rob Peter to pay Paul so to speak, to squeeze a bunch of stuff into one place that was taking up a whole bunch of space somewhere else. It was just quite a project. Once we got the compact shelving units in – actually, it was sort of funny. The old compact shelving units were used by hand, and you had hand cranks, and these were electronically operated, and you had laser warning systems. If you broke the laser, you broke the electronic system, but nobody trusted those too much at first. If you were between two rows of books and the stuff starts closing up, is it going to close? So all of this stuff was involved, just moving stuff, making sure it was put back in order again. But in many respects, it was an all-library thing. In no way would I claim it was all me. The whole library was pretty much involved in that. But anyway, it was interesting. Certainly, by the time we were done, we felt like we had accomplished something, which was good. It was one of these things, whew, we're glad we're done. It wasn't anything that we particularly took great pride in or anything else. It was like every other poor slob in the government was being told he's going from an eight by ten cubicle to a four by six cubicle, and what do I do with all my books and all my personal stuff that's in the bigger cubicle, just on a much grander scale.

MG: Right. Well, and before you retired, you were awarded the Distinguished Career Award. What was that like for you?

AT: Well, this is egotism or something. I don't know what you call it. But that, to me, was probably the culmination of what would have been then about forty-six, forty-seven years of work. Although I was recognized, I would say that anything that somebody does during their career, or at least during my career, it was almost always with a team. And then there was always a group of people that I was working with. A few ideas were mine; a few ideas were other people's. Certainly, Treasures of NOAA's Ark got a bronze medal, but that was Cheryl Oliver, and some of the folks she worked with were the primary people. On the photo library and the NOAA history site, once again, I couldn't have done that without Janice Ward. When I was working on the Exclusive Economic Zone Mapping Project, I just had really good, dedicated, smart people that I was working with. Without them, it couldn't have happened – the same way you work on a ship. You've got this whole supporting cast of forty or fifty people that – at least in the old days those were the crews – from the lowest ordinary seaman to the chief engineer, to the chief survey techs to your officer cadre on the ship, it's that group of people that makes things work. So through most of my career, I was quite fortunate to work with a lot of, in my opinion, very outstanding people. They all wanted to work hard, they wanted to accomplish stuff, and I think in many respects, many of them like myself, feel quite fortunate to have worked for NOAA through the time that I did. I say ninety-five percent good, five percent bad, but everybody has their bad moments. Yes, it was semi – I hate to say it – emotional for me. I had gotten other awards before, but I guess this recognized that I was part of good teams through my whole career. [laughter] Lucky in that respect. Some of the stuff I dreamed up myself, but part of the time I was also working with people who had dreamed up stuff and then by absorbing some of their ideas or letting them have their heads made the organization all shine a little bit better. So yes, it was good. I really appreciated that. There

were two other things. I'll call them awards, but they weren't really awards. I think this is the way that I wanted to – if anyone wants to live a career – and it is “live a career,” it really is. When I was on the *Mount Mitchell*, I received a letter from the crew thanking me for sharing some of my knowledge of the history of the organization and tried to also let them understand better the sort of work the ship was doing, and the systems that we had on the ship. So I'd give little crew lectures and whatever, just anybody who wanted to show up, and so I had a letter signed by the whole crew, which I still have framed and keep. Then, at the other end of the spectrum, in 2007, the two-hundredth anniversary – I didn't receive the letter. It wasn't written specifically to me. It was written to all of NOAA, but I was thanked in that letter, by name, for spearheading the NOAA two hundredth anniversary. That was signed by the then Administrator of NOAA, Admiral Lautenbacher. So between those two things and the Distinguished Career Award and the folks that I worked with, all of them in between that. I was very fortunate. I was on the fringe of technology, there was the physical adventure that was involved with the working on the ships and the geodesy, and then being able to work on the fringe of the science. I call it the fringe. So I was never really doing scientific research per se, but the privilege of working with NOAA scientists through various projects, and also all of the various other folks that support what NOAA does. It was just good. A lot of dedicated people, a lot of very good people. That's how I would word it.

MG: Good. Well, before I ask you about your life outside of NOAA, you had sent me a long list of memorable people. I think we mentioned most of them, but did you want to say anything more about the folks who have been influential to you?

AT: Well, another fellow, and I probably mentioned this before – Charlie Kears. Charlie Kears – I think I mentioned him – he was the head of the mechanical and electronic engineering [office]. I'm not sure what the exact title of the division was in the Office of Fleet Operations, Office of Marine Operations, whatever the name of it is these days. But I worked with him – partnership during the EEZ work. Actually, a liaison – there was a young officer at the time who actually became an operations officer and executive officer to me a few years later, Tim Rulon. His technical knowledge facilitated communication between my shop, which was the EEZ Mapping Project and the Office of Fleet Operations, which was responsible for keeping all of the electronics going on the ships that we were dependent upon for the data that came to us. So this developed a very good partnership between the two organizations. So Tim was dedicated fifty percent to one office and fifty percent to the other. I'm not sure which one he – it didn't matter how it worked out; it was beneficial to both offices. Going back, Janice Beattie – actually, she was the head of reference division at the NOAA Central Library when I first came to it in 1997. I think it was through her intercession that I ended up getting hired there. She knew I knew a lot about the library from the research I had done with the Coast Survey, and so she invited me to come to the library at that point. She developed [projects?] for the NOAA two-hundredth [anniversary]; she was also a big advocate of that. She pushed me to be part of the Smithsonian Ocean Hall, to be part of the NOAA science team for that. But part of that was pragmatic. It was to keep the library showing that we were part of the NOAA life, if you will, and that we were an active part of it. We didn't just sit and wait for people to come to check out books. We were an intrinsic part of NOAA's life, if you will. Well, Rear Admiral Sig Petersen gave me time to write the *Coast Survey 1807 to 1867*. I mentioned he was very ill, but he came to see me. What year was that? That would have been



2017. He flew out from Seattle for the one-hundredth anniversary of NOAA Corps, but he made it a point to – he had his daughter with him who was helping him at the time – come visit me. He is the only NOAA Corps officer that I have ever hugged. [laughter] So I really appreciated Admiral Petersen. Other people? I have mentioned Harris B. Stewart, who I never worked with, but I did meet him when he was a professor at Old Dominion University and gave a talk for him, and he and I talked quite a bit. [I'm] very impressed by him. Bill Hooke, who I mentioned – I guess I told you this story about going down – and I'm not sure this should be told, but it doesn't matter. [laughter]

MG: Let me know if I should turn off the recorder.

AT: No, no. I was invited down to, through the then Director of NOAA Corps, to give a talk on history to Bill Hooke, who was the Deputy Chief Scientist and the Chief Scientist of NOAA at the time, and so I'm giving this talk. It was an old slide projector that I was working with, not the slicker PowerPoint. About halfway through the talk, the Chief Scientist got up and walked out, never said a word. [laughter] But Bill Hooke liked the talk, so that was good. I have no idea what that person thought, [or] if he/she was busy. Yes, that was bizarre. Thinking back –

MG: Who was Ron Smith?

AT: That's what I was just going to bring up. Ron Smith was a contractor at the National Geophysical Data Center [NGDC].

MG: In Colorado?

AT: Yes, in Boulder, Colorado. He was with the Geothermal Mapping Project when I got there. When I got there, we were basically parallels. He was working on the Idaho map, and I was assigned the California map. Paul Grimm, who was a geophysicist, was the head of the team. He was the senior guy on the team. Well, when Paul Grimm left, that's when I became head of the Geothermal Mapping Project. Then Ron became my right-hand man. He had the most technical knowledge, the most cartographic knowledge of anybody in the group, and he was also sort of an early expert in – I'll call it early GIS [geographic information system]. Much of the work he did – he understood how to – well, like these hot springs, we would have geographic positions for them, how to get that into a computer format, how to get them to plot out on various projections. When the first time I went to see a map printed, I had never been part of this, Ron came with me. There is this place in Bergen, New Jersey. I forget the name of the printing company. Anyway, a lot of stuff was out of registration, but I didn't know what to do about it or even to complain. I just thought, "Man, this looks crummy." [laughter] But Ron took the bull by the horns, and he saved my bacon on that to some degree, because he knew how to communicate with the guy. So I learned a tremendous amount from him while we were doing this. Ron and I, for the three years I was there – well, two and a half years that I was the head of the group, we always went to – our best thinking we would do at Perkins Cake and Steak, which was about two blocks away from the National Geophysical Data Center facility. We would go over there for coffee and a piece of pie or something at like ten, eleven o'clock in the morning, and talk over the day's problems and solutions to various things. So

did a lot of talking with him, probably shared a lot of personal information, too, at the time. He ended up going to somewhere down [near] Huntsville, Alabama, working for some DOD [Department of Defense] contractor or something down there. Unfortunately, this is sort of the story of life in NOAA Corps, or I guess any service organization; a lot of these folks, you just never see again. But Ron was a good guy, and I was better for having known him and learned a lot from him. I told you about old Vern Burns. I liked Vern. Vern was probably the guy even more so – I had spent two years on a ship before going to geodesy, but I think the pride in work that at least the field personnel of the Coast and Geodetic Survey had, he helped imbue me with that. To some degree, I wanted to do it right before, but I think in many respects, he showed me how to do it.

MG: Dr. Mike Loughridge was on that list.

AT: Yes. Mike Loughridge, once again at NGDC, was not in my chain of command, so to speak. But when I was getting ready to leave there – I think I mentioned this – I thought it would be good for NOAA to have somebody who knew something about offshore drilling, at least so they could discuss it with various people, those that are doing the work. So I volunteered, or I was trying to see if I could get assigned to the Deepsea Drilling Project. These guys work all over the world. I think then it was the *Glomar Challenger*, and I'm sure I don't know what the names of the various ships have been since then. So Mike was the head of Marine Geology and Geophysics. So I went to him, and I said, "Hey, do you think this is possible? He said, "Really, I don't think you'd be a good fit for that. The berths on these ships are pretty tight, and generally, it's various specialists. They don't have much room for an observer or learner, so to speak. I think where you might be better to go would be the Scripps Institute of Oceanography and see if you can work with Dr. Fred Spiess's Deep Tow Group." So Mike started writing. He wrote letters to Scripps and got me an official invitation. In the meantime, he was somewhat pulling strings with folks in Washington, DC, about this. Because of all of this, I ended up being assigned to the Office of Ocean Minerals and Energy, which I think was then under NOS [National Ocean Service], and they were also the same group that was responsible for NOAA Law of the Sea, which I don't believe the U.S has ever signed. The guy's name was Dr. James Lawless, who was a lawyer, which was sort of interesting; he was the head of that. But Dr. Bob Dill was my immediate superior, and he was the guy that I did all of my communications with. He had been hired for NOAA to study or at least keep up with what was going on in the exploration and discovery of polymetallic sulfites, these ore deposits that are being formed at hydrothermal vent areas, where there is zinc, copper, sometimes even gold, silver, whatever. I don't know if they ever found any gold or silver coming out of these things, but various metallic minerals that are basically leached out of the surrounding rock by the hot hydrothermal fluids on mid-ocean spreading centers. So he was a polymetallic sulfate guy. So, working with Scripps Deep Tow, they did a lot of work on mid-ocean ridges, and so that was sort of a natural fit in a way. Anyway, I ended up going to Scripps because of Dr. Mike Loughridge. In many respects, he probably influenced the last thirty-five of my career with NOAA, because going to Scripps and working with, once again, Dr. Fred Speiss's group – he is one of the grand people of twentieth-century oceanography – it introduced me to really the excitement of discovery and people who are so mesmerized by their work, and so fascinated by it and interested and trying to expand the realm of knowledge of humanity, if you will, that it was like opening up a new world to me. I was introduced to new types of

equipment, new types of systems, and even new concepts for me. I remember one conversation – this wasn't with a Deep Tow guy, but it was Dr. Robert Kessler, who was one of the great twentieth-century marine biologists. I had been on a cruise with him. He was one of the scientists on it. For some reason, we got off on the discussion of why rat tail fish have rat tails instead of fins at their back – or what we think of as fins at their back end – and why they evolve that way. I don't remember all that was said, but I do remember that it was just so interesting to me at the time that people even thought about these things. I had never been a fish guy or a biologist, so never – but in a way, he was just as excited about this as the guys were about discovering the configuration of the various ridge systems and what was driving the formation of these features on the surface of the Earth, and how it was all fitting together. Anyway, it was because of Loughridge – and that was L-O-U-G-H-R-I-D-G-E. It was because of Loughridge that I ended up at Scripps and, to some degree, why I even remained curious enough and knew enough to be part of the NESDIS science team or part of the NOAA Central Library reference staff almost twenty fifteen to twenty years later.

MG: Is there anybody else we're missing?

AT: There probably is. [laughter] A lot of people I appreciated working with – the Geothermal Mapping Team, others – Dave Clark, who went on to be a Deputy Director of NGDC. Joy Ikelman, who was on the team. The EEZ Mapping – Steve Matula, Alan Greenberg, (Dan Herlihy, and then a couple of junior officers, Bruce Hilliard, Patty Lynch. Paul Grimm, who had been my boss, I ended up hiring him on EEZ Mapping. He had tried to – he was twenty years ahead of his time with alternate resources. He tried to start a business mapping alternate resources – wind energy, solar energy, geothermal energy. He made all these maps, but in 1980 and '81, they ended up not selling after President Reagan became elected, and once again, we were back in the oil pipeline, so to speak. That group – I mentioned Janice Beattie – Anna Fiolek, who was the head cataloguer at the library. I always enjoyed Anna. I would bring her books and say this belongs in the rare book room, and she would always take my word for it, never argued with me about it. [laughter] But Anna was very dedicated to her work, very thorough. One other fellow that I enjoyed – I'm not sure we accomplished a whole bunch together, but it was the one year I was with the Office of Fleet Operations as the management information systems officer, and that was the year before I became head of EEZ. Dr. Ron New, I don't know what all he did for a living. He was an adjunct professor at Johns Hopkins while I was there, but he was semi-retired at that point in time, so I don't really know what all he had done previously. Maybe he had been a professor at Johns Hopkins or various schools his whole life. I don't know. But he absolutely loved talking about the nuances of management information systems, and we would talk for hours about this as we were trying to develop the Office of Fleet Operations equipment failure and reporting system. The Office of Fleet Operations ultimately used that as a model for not what to do with trying to introduce something to the whole fleet. [laughter] I don't know. But there were a number of mitigating factors with that. But he was really a great guy to talk with, and I became more informed, at least at that time, of the psychology of trying to introduce new systems to people, and how this comes about. In some degree, the EEZ Mapping, the Exclusive Economic Zone Mapping – I think I brought this one up before also – we were actually looked upon by the old hand cartographers as just something that wasn't going to last, collecting all of these digits and doing

everything without the old hand cartography, that everything could be done by computers and digitally. But that was pretty much – we were the, at least, NOS pioneers in that.

MG: Well, now I want to ask you about your life outside of NOAA and any family memories you want to share.

AT: Family memories. Well, I think it was New Year's Day, 1963. I lived on the coast, Wild Hook, as it was called, at the Pleasure Point area. It was breaking at the edge of the reef and had about twenty-foot swells. I had three rides that day and went all the way from the main break at the Hook to past Shark's Cove, which was about a half-mile ride. That's a silly memory. I was fortunate to grow up – from that standpoint on the north side of Monterey Bay and living in the Pleasure Point area, it was close to heaven for a person who liked the ocean and liked the water, grew up on the water.

MG: What about your family and the children you raised, and life outside of work?

AT: Well, each one of the children – at one point or another, I coached various teams. My daughter, I coached the soccer team until she was about twelve. The two boys, each of them, I coached various teams through when they were at least fifteen. I think it's like some of these comedy shows of little league baseball and pony league where I think [with] the coaches and the parents, the competition is almost as great between them as between the boys. I hate to say that. [laughter] Never did get in a fight with anybody. Actually, the only time I really got mad at somebody, I had a guy that was a lawyer who was the coach of another team, and there was a day that some violent thunderstorms came through. I saw them coming through on the radar, so I'd called my team. I told them just don't even go to the field because we're going to get caught. The other guy was stupid, brought his team, and they sat. He was yelling at me something about, "You're going to forfeit this game. Yeah, you'll forfeit. I'm glad you guys didn't show up, blah, blah, blah." I did get furious. I took a step toward him, but I stopped. [laughter] Regardless, ultimately all leagues in the county – afterward, he found out that all fields – I didn't know this either at the time because it was all happening so fast – that they had shut down all fields for safety reasons at that time so we didn't forfeit and we played a game later, and I believe we beat them. I usually beat that guy when we were playing them. I beat him. Not my kids, not the team. [laughter] Let's see. Life revolved around the kids. My wife's family, her parents, had retired in Northwest Arkansas, and a bunch of big lakes up there, manmade lakes on the White River that flows into the Mississippi ultimately – Bull Shoals Lake in the northwest corner of Arkansas. So we spent a lot of summers up there. The kids loved it. Well, turn this off.

MG: Okay, hold on one second.

[TAPE PAUSED]

AT: I really loved my wife's mother. She would always make – well, they ate catfish, and the catfish was really good because it was cold water; they would get it from deep down in the lake. This was a big lake, Bull Shoals Lake, so it was pretty firm and good, and I loved the catfish they cooked. She always made fudge for me when I got there, and I ate most of it

before I was gone, a big pan of it. So those are my memories of her. She passed away. I wrote our family's eulogy for her. It was good. It didn't matter where we were; we were always a thousand miles from them, sometimes two thousand. On the West Coast, we were two thousand miles away. On the East Coast, it was eleven hundred miles. From Colorado, it was about eight or nine hundred, when we lived in Boulder. Yeah, her father was retired Air Force, and actually, he just passed away this past year. He was a World War Two veteran, a bombardier navigator. We still haven't been able to get him buried at Arlington – well, he was cremated –because of the Coronavirus. We were going to do it [on] June 8th, but we've canceled that. Now we have it scheduled for September. We don't know how that will work out.

MG: That was one of the last things I wanted to ask you was about your experience during the coronavirus pandemic and how it has impacted you.

AT: Well, I think the main thing – we live pretty close – well, the furthest any of our grandchildren and children live is sixty miles from us. The closest is about ten miles right now, and then we've got another one at about forty miles. But what's most disconcerting – we do have people that go visit, but we would hate to be the ones that carry [the virus] to their house, or vice-versa. If we caught it, we would hate to have them feel that they were the ones that had inadvertently brought it to us. You are a lot more isolated up there, so I don't – so present company excepted, but we are still in a fairly urban area here, and you just don't know. I mean, even if we go walking, we are passing people. It's not like we can totally socially isolate. Between the two of us, them coming our way or us going theirs, I think each of us would feel quite bad if the other one caught it and then have this nagging feeling that yes, we were the one that caused this, or brought it on one or the other. So just staying physically away is really hard, and not being able to hug your grandkids, or sit down in a chair and read to them, or play silly little games with them. So that sort of thing is disconcerting. I guess the trade-off here, to be blunt – I'm seventy-three, and my wife is seventy, and we are each mortal. How much time do you have? And are you going to use up all your time sitting at home? [laughter] Who knows? You can't predict that. But from the standpoint of – yes, just this physically not seeing them. We see them all the time on FaceTime and this sort of stuff. In fact, if anything, to be blunt, our kids, loving us to death – by that, I'm sitting there watching a TV show I want to watch and ring, ring, ring, "Doing okay? Talk to the kids." I'd say, up until nine o'clock at night, I probably haven't watched a whole show for the last two months. But anyway, when we get on the phone, it's generally a half hour. Everybody stays about the same. It's just, "Yes, didn't do anything. Well, I sat and read, sat and watched TV, went for a walk, ate, took a nap, did something." What do you do?

MG: Yes. MG: Well, is there anything that I'm missing? Anything that we've forgotten to talk about?

AT: Not that I can really think of. Once again, as a closing, NOAA was a great career for me. The two careers that I had, which were basically not quite divorced. A lot of the contacts I made in NOAA Corps, I maintained them during my time in NOAA Central Library, and so, in many respects, that helped me because if I got some obtuse question out of the blue, I would generally have an idea where to go looking for an answer or to push somebody towards some

additional expertise that might help them get the correct answer. So I built on NOAA Corps experience while working in the library. I guess the other thing I would say is that the NOAA Corps was more of a physical adventure, and by that, going a lot of places, doing a lot of things, and the library was a little bit more cerebral, if you will. I'd use that term. But even at that, there was still stuff I'd be learning every day. Even just wandering through the stacks, open up a book I hadn't seen or that looked interesting, and I'd just find stuff. So I always liked finding stuff, and so it was good. That's another thing. If you get the opportunity, I don't know if you've – in the photo library, there is a section called Treasures of the Library, some of the stuff found in the old books. That's one thing that I also was involved with that I forgot about, the establishment of the rare book room. I was very heavily involved with that. There was a woman who became ill, who retired early from the library. (Ruth Ann Harriot?) I believe was her name. I can't remember the last name exactly. But she loved the rare books, but they were still – I won't say they were in disarray, but there was no special place for them or anything else. We did establish during my tenure a rare book room that we dedicated. We dedicated it to a former librarian, actually one that around the early 1900s, Charles F. Talman, T-A-L-M-A-N. He was a combination meteorologist – he had been a meteorologist that somehow worked his way into the library and became the head of the library for about twenty-five years or so. He did a lot towards collecting a lot of the rare books that we had that we put in the rare book room. So we called it the Charles F. Talman Rare Book Room, or something on that order, collection. We had a nice dedication ceremony that the Deputy Assistant Administrator of NOAA spoke at, and numerous invited, a lot of the NOAA higher-ups, and a number of people came to it. So that was a nice thing. I got an "attaboy" from the library for that. So we still have that. It's still in the library. We preserved – I don't want to say "preserved" in the sense of paying twenty-five hundred bucks a book, but at least they are in a climate-controlled room that has limited access. We don't have people coming in and razor-blading out maps and graphics and whatever that sometimes you do in other libraries. We've done what we can to protect NOAA's heritage in that particular room. So that was a good thing with the library. That wasn't just strictly a bureaucratic thing.

MG: Good. Well, if you think of anything else you want to add to the record, we can always amend the transcript or schedule another call.

AT: Yes, okay.

MG: This has really been such a treat. Thank you for spending so much time with me.

AT: Okay, very good. Be careful. I hope your family, everything goes well with them. How is your two-year-old?

MG: She is doing great. She's been so much fun. I was thinking this morning that I want her to stay two forever.

AT: Well, talking about different ages that you wish them to stay forever, my wife and I, obviously not having a lot to do, [have] gone through a lot of pictures and stuff over the last month, month and a half. One of the things that I wish that somehow could have put into a time capsule and kept – this will sound – well, two things. My older boy, he was quite good

with baseball, and it ended up he didn't go real far in college ball, but he did get a scholarship with that and tore up his arm, so life was hard after that. But some of the high school baseball games, I would get so worked up at. Then the younger boy, he didn't compete completely with his brother. He did play baseball. He was actually a shortstop on his high school team. But the older boy is a big left-hander and then first baseman. The younger boy, he was better at football. He was a linebacker, a middle linebacker on his football team. He was an all-county linebacker, a little bit small. I'm glad he didn't break his neck. The thing that I loved the most – they wore black uniforms; sort of looked like the Oakland Raiders in a way, when they were in high school football. They had a hill that they would march down from the gym, and they played the Darth Vader theme song, or Star Wars theme song as they were coming out on the field all the time. Friday nights, I lived for Friday nights during football season. Once again, it's always sort of scary. I mean, very few kids do get hurt real bad, but still, the potential is there. But I absolutely loved the football on those nights. My daughter played soccer. I didn't get quite as – the soccer I got more involved with. The field hockey, I couldn't really get – field hockey is always such a low-scoring game that it's just hard to get real excited as they're in there swinging their sticks at each other. But field hockey – I did tell you what my daughter had as her initials on her hockey stick?

MG: I don't think so.

AT: Well, it was B-O-B, Back Off B-space-space-space-H. [laughter] And so she had the aggressiveness in her.

MG: Yes, good.

AT: Anyway, those were good times. The other thing – I did forget to mention this. The one thing I'm probably most proud of in my life is that – and this was not easy, mind you. My kids were not all great scholars. But all three of them got through college. That was something that amazed me when it was all said and done. That was *whew*, at the end of that. So I got them all through school. It wasn't easy, but that was probably my supreme lifetime accomplishment for me and my wife.

MG: Good.

AT: To keep cajoling, encouraging. Drop out for a while. “No, no, you've got to finish, you've got to finish.” Anyway, that's it.

MG: Well, that's wonderful to hear, and I hope we can stay in touch.

AT: Well, if you've got any questions about NOAA, I was a reference librarian that referred people all over. Oh, another guy – I'll send this to Cheryl. The two other people that I can really think of that I think should be interviewed, at least in my realm of acquaintances, one is a Dr. Bob Embley, E-M-B-L-E-Y. I don't know if you ever heard that name or not.

MG: No.

AT: He was with the NOAA Vents Program. He was a pure scientist. He didn't really get too much involved with the bureaucracy. But the NOAA Vents, these are the guys that go out looking for the undersea vents, a lot of studies of global tectonics. He worked out of Oregon, the Hatfield Marine Center; that's a laboratory they have in Newport, Oregon. I think he is retired now. But he spent his life working around the Ring of Fire in the Pacific. He didn't do much work in the Atlantic. So Dr. Bob Embley, and I'd call him a pure scientist. Bill Hooke, who I mentioned before, was on the edge between bureaucrat and scientist, involved with these big projects and these presidential panels and all-governmental panels and this sort of thing, guiding science. I think Bill Hooke more than anything else – but Embley was sort of a field scientist for almost his whole career. Then the other guy – actually, I think you should interview Cheryl Oliver's husband, John Oliver. John was an all-NOAA guy. He had the NOAA vision that most of us tend to get a little provincial. For myself, I would say, probably until even when I got out of NOAA Corps, I was pretty provincial. The library served all of NOAA. Did I ever tell you that story? I never told you that story.

MG: Well, it's not too late. I'm still recording.

AT: Okay. I went to a NOAA Corps function after I retired, and Admiral Lautenbacher was there. This was before I sort of got to know him as much as one gets to know the Administrator of NOAA from the position I was in. Actually, he had a guy that I had known and worked with a little bit, but I'll call him – they call them side boys in the Navy, these guys that are assistants and whatever, sort of an aide-de-camps. I knew this guy, so I said, "Yes, I'd like to meet Admiral Lautenbacher while he's there his first time." The Admiral had just gotten done giving a speech about NOAA Corps. He was making the point that NOAA Corps was the only organization that worked all through NOAA. So when I met him, I said, "Well, Admiral, only one thing about your speech. I really liked your speech, but it was wrong on one point." This guy that I was with was just aghast that I was telling this Admiral, the Administrator of NOAA, that he was wrong in something. I said, "There are two organizations at NOAA that work with all of NOAA, and that's NOAA Corps and the NOAA Central Library, and I've worked with both of them." Well, he gave me one of these fisheye looks at the time, but he actually became an advocate of the library. Actually, called it one of the "gems of NOAA" at one point in time. He actually invited me and the head of the library, then Janice Beattie, down – I gave him a demonstration of both the NOAA history website and the NOAA Photo Library. We spent an hour with him, which was big time for getting in there with him. But Admiral Lautenbacher became an advocate of the library, and he didn't hold it against me and didn't have me keelhailed or anything. But the guy who was with him was just absolutely aghast. He just avoided me for the next year or so. Anyway, it all worked out in the end. It was good. I guess that's about it.

MG: Again, this has been such a treat to talk to you. I wish I had interviewed you first.

AT: I don't know why.

MG: Because you've touched so much of NOAA, you know so much about its history, and it would have informed all my other interviews afterward.



AT: Well, I spent a lot of time in NOAA, I worked with a lot of people at NOAA. I still call myself a Coast Surveyor. If I have to call myself anything, I think that's still where my heart and soul remain. If I didn't have creaky knees and if they didn't boot me out at twenty-seven years, basically – boot out? Call it what you like. We were downsized. Somebody had to go, and I wasn't going to get promoted. I still liked being on the ships and working on the boats. It's still there, those memories. It was fun then, and I'm sure that I'd be exhausted trying to do it now, and I'm nowhere near as spry as I was. Regardless, those are the things that, looking back, I really liked, and a few mountaintops in geodesy that were fun. Okay. Have a good day. Like I say, Bill Hooke – if I were you, that's the guy I'd try to do next. He also has an overview of NOAA but from a loftier position than I did.

MG: Okay. I'll see if I can make that happen.

AT: Very good.

MG: Alright. Be well.

AT: Okay, the same to you.

MG: Bye-bye.

AT: Okay, bye-bye

-----END OF INTERVIEW-----

Reviewed by Molly Graham 6/11/2020

Reviewed by Albert "Skip" Theberge, Jr. 6/15/2020

Reviewed by Molly Graham 6/16/2020