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Thomas G. Barnes

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INTERVIEWEE: Thomas Barnes

INTERVIEWER: Rebecca Craver

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BIOGRAPHICAL SYNOPSIS OF INTERVIEWEE:

Physics Professor at the College of Mines and Metallurgy (U.T. El Paso), 1938-1981.

SUMMARY OF INTERVIEW:

Coming to the Physics Department in 1938; faculty members; working with the Civilian Pilot Training program and war research between 1942-1945; how he wrote Foundations of Electricity and Magnetism; course load; scheduling classes; the name change to Texas Western College; the Schellenger Research Laboratories.

Length of interview: 50 minutes Length of transcript: 29 pages

Thomas Barnes
by Rebecca Craver
November 15, 1983

C: Okay, Dr. Barnes, tell me when your career at UTEP began.

B: I came here in September of 1938, and of course it was a very small college, the College of Mines and Metallurgy. And I joined the Department of Mathematics and Physics, headed by Dr. E.J. Knapp, and the other professor there was Prof. Durkee. And it was a real wholesome relationship. We had some other Math teachers, but I started out teaching Math first, even though I was a physicist. The intent was that I'd be worked into the Physics Department, soon worked into the Physics Department. But I had the privilege of teaching Mathematics and Physics as well through the years, and taught almost every course in both departments. We had only an undergraduate school at that time, but Dr. Knapp and Prof. Durkee had very high standards and were top-flight teachers and physicists. Prof. Durkee had worked, had studied, under four Nobel prize winners. And although he didn't have a Ph.D., he really had a lot of experience. Dr. Knapp was a real wonderful teacher. Then I worked in more and more into the Physics courses until I finally became totally teaching Physics. But it was a real nice relationship in a small college to be able to teach a combination of Math and Physics, because you knew in the Physics class what math they'd had, and then in addition we tried to make the mathematics Applied Mathematics. And that I still prefer. So it was a wholesome experience.

/ At / that time we had a wonderful faculty and a wholesome relationship. Dr. Dossie Wiggins had been my teacher in Hardin-Simmons years before, and I'd gone off then to Brown University and gotten another degree, and he called me to come here. I had been teaching in Abilene High School. So it was a pleasure to work under him. He was a very excellent president and really did a lot for this / school /. We had a very wholesome relationship with fine people like Dr. Tony Berkman and Bill Lake and Howard Quinn, Mary Quinn, and of course our own group there. But it was a friendly atmosphere and a very concerned college for students. This went on just for about four years before I had to leave for, I did leave to go into war research.

But to illustrate how friendly and nice it was in those days, we were invited to Fort Bliss by Gen. Lear. Gen. Lear is a famous general, and we were so small that he invited the entire faculty out for dinner. And we went with him to everything and he had us come out to the parade ground where the Cavalry Division gave us a parade, which was quite impressive. But it also impressed upon me the tragic unpreparedness of America at that time.

C: Now this was 1938?

B: That was 1938. That's this first year. And they had their trucks, actually had solid tires. They were old World War I trucks. They had practically no radios except one or two

carried hand-crank type radios, carried by Army Cavalry. I mentioned that the general was showing us these things, and one sergeant, he was to show us this beautiful hand-cranked radio. (Chuckles) The sergeant had left something in his tent, so the general just stood there and said, "You go get it!" We waited. (Laughter) But at any rate, that happened to be the general that was called the "Yoo Hoo" General. You don't go back to those days, but he was greatly reprimanded later, although he was a great general, for disciplining some of his soldiers who, as they were going by some pretty girls, said, "Yoo hoo!" And so Gen. Lear is most noted for /~that~/, although he was a great general. But those were pleasant days.

But then in 1940 and '41, in there, the war was begining to encroach on America and we had the lend-lease program. And so the United States started what was called Civilian Pilot Training programs. And Dr. Knapp and Gene Thomas, who was the Dean of Engineering, and I taught Civilian Pilot Training programs. It would have helped a great deal if we'd have had any training ourselves in it. But at any rate, the country was so poorly prepared that people like us were thrown into that. And we'd go out to the airport, and there was a man named Haas out there who was an old bush pilot that was going to teach the flying. It was very rough in these biplanes, these _____planes, and we'd go out and study them and come back and teach

the aerodynamics and meteorology, navigation, power plants, and a few other things. (Chuckles) But during those days this was a wonderful association with the El Paso townspeople. A number of the leading men in El Paso, some of them still here, came and joined and volunteered for that, paying their own way, and took those courses. Scott Wilkie, Roy Champman, and a number of the others, real fine local businessmen, came out and took those courses under us.

After about two years of that I had realized that that was really not my profession and was called by my professor, Robert Bruce Lindsay, whom I'd studied under at Brown University, to go to Duke University to engage in war research and development for the military, although we were civilians. But this was a wonderful plan set up by the Office of Scientific Research and Development, and _____ Bush was the one who really was the brain trust of this and he was very close to Roosevelt. So he set up this gathering at various places of people who had certain specializations. And at Duke University he put the acoustic people from the Bell Laboratories and my professor, Lindsay, who had quite a reputation in that at Duke University. So those of us who had specialization in that area went there, and those of course who were developing radar went to M.I.T. And of course you know about the Oakridge Atomic and Los Alamos Atomic program.

But during that time this was a very wholesome period, and our country was certainly very patriotic. We could go into any industry or any other university where we had a need to get assistance or supplies or something. So at Duke University I was able, for example, to go to Bell Laboratories, to West _____ Instrument to build the best meters for me, and to RCA to do that. And I was able to invent a locator of guns and artillery pieces, mortars and that sort of thing, for the military. And so I had this wonderul experience with my invention, coinvention, Lodar. And I went through the first initial stages of the development and then the production and the writing of the manual and helping train the troops, as a matter of fact, in that.

Then I came back. That was in 1942, came back early in 1945 shortly after the war was over, and resumed my duties here and taught for Physics, and introduced as a matter of fact electronics with some of my specialization after having been in the electronics practical side of it. So I introduced that both for the Electrical Engineering and the Physics group, and had a wholesome experience here teaching electronics a few years. And then in 1952 I was given a real fine Ford Foundation fellowship to go anywhere I wanted to and spend a year without even giving a report back. Just, this was somewhat a competitive type of thing. I told them I wanted to be like a doctor with certain

specializations and certain generalizations. They bought it. So I was able to go back to my alma mater and work as a visiting fellow in physics and wrote my first textbook, Foundations of Electricity and Magnetism, and came back then and began teaching some of that work here. And so I've been at the institution up till I retired in 1981.

C: Is this the time to ask you about your course load?

B: Oh, yes! My course load, we had quite a course load but we didn't know it in those days. We taught. . .the very minimum would be 15 hours plus laboratories, sometimes even 18 hours of courses, and we would teach all the way till one o'clock on Saturday afternoon. Then, in addition, we were expected to do all sorts of other things. Among other things, I made out the schedule for the college, class schedule, and we were drafted to take up tickets at the ball games and so forth. Nobody thought of getting paid for anything like that. And, well, all through the years I've been very fortunate. I cannot recall actually taking off a day of sick leave, but we didn't have any such thing as sick leave then. If one person was sick, why, somebody else would teach for them.

I want to say one more thing in general about the college and the athletic program. We had one of the finest coaches, Marshall Pennington. And you talk about doubling in brass, he was the business manager and the basketball coach. And incidentally, he had winning teams,

and they were just local boys. And Mike Izquierdo, my Physics _____, was also a top-flight basketball player. And so these people that complain and say you have to have a lot of money to produce, ask Marshall Pennington about it. He was mighty fine, and we had a very wholesome attitude.

Dr. Wiggins had a very high sense of integrity and was an excellent administrator, so we appreciated very much those days. He was like all the administrators. Sometime he would make up his mind and you couldn't change it afterwards. And when I had this scheduling job, making out the schedules, I inherited /it/ from Dr. Bill Lake, a head of the Chemistry Department, a wonderful guy, and he showed me all the techniques he had and was quite helpful.

But in those days we had a general assembly, almost a chapel, (chuckles) once a week.

C: And where would it be held?

B: That was held over in Holliday Hall. And it was not compulsory, but Dr. Wiggins had come up. I had been his student at Hardin-Simmons University. But at any rate, he had his general assembly and it really was not very effective. But in scheduling, we didn't have anything like enough classes and a classroom, and so we had a terrible time of scheduling classes. And I was talking with Bill Lake, who was very sharp, and he laid out a plan to get us more space, classroom space, for nothing; but he had to get it through

Dr. Wiggins, who _____this general assembly. And so here was Bill Lake's strategy. He said, "We just go in to Dr. Wiggins and tell him that we just do not have enough classrooms to schedule all those courses."

Now Dr. Wiggins was very much interested in building up the enrollment, and we knew this. So Bill was the spokesman and he went in, and Dr. Wiggins always made a quick decision, you know. But this time he jumped a little too soon and he said, "Well, we've got to put those classes in. Dr. Lake said we just do not have enough classrooms." And, oh, Dr. Wiggins would just jump to the conclusion. "All right, what'll do we do?" And after Bill Lake let him sweat a little while, he said, "But we have an answer to this." (Chuckles) Wiggins said, "What is it?" He said, "If we just cut out that general assembly program, that will give us a period and we can use all these classrooms." Dr. Wiggins said, "All right, we'll do it." And so I will always be grateful to Bill Lake for helping me through that administrative problem. But that was about the extent of our administrative problems, you know. It was simply a matter of really a gentlemen's job. A very wholesome school. We had a wonderful group.

And then of course the war went on. We lost of course /~some people~/. Many of us went off on more difficult /~tasks~/, many of the students and faculty went in the service. When

they came back, we had a wonderful group of returning servicemen and women, and they were very very earnest and very fine students. So through the years I remember those very vividly as delightful growth years at the College of Mines and Metallurgy. Of course about that time when very soon the name was changed to Texas Western College.

C: Do you remember any people complaining about the name change?

B: Oh, my. (Laughs) I was in the middle of this because basically I was in the Physics Department, and most of my students were engineers and physicists. As a matter of fact, I had more engineers, even taught the electronics in the Engineering /¯Department¯/. So I was, of course, sympathetic with the engineering, and here it was the College of Mines and Metallurgy. And it was a tremendous battle over losing that name that had distinguished this institution for so many years. And I was sympathetic with it, but was not an activist. (Chuckles) But many of them were very much activists about that type of thing, and I could certainly understand because it had made a real reputation that was unique. And as a matter of fact today I'm very disappointed that we have even given up the mining, for example, and it had played a good role. But progress marches on and we have many other things that have been added. But I was somewhat

caught in the middle of that, but I always leaned toward the engineers because that's where my loyalty was.

C: Now, can we talk about Schellenger?

B: Well, the Schellenger was started through a court decision to give the Texas Western College funds from the Schellenger estate. I had forgotten the exact amount, but it's of the order of $200,000 dollars, left as a fund for a research in electricity primarily. And Thornton Hardy, who was one of the chairmen of the Board or Regents at the University of Texas and a prominent attorney here with the El Paso Natural Gas, was the attorney that was instrumental in steering us toward the college. And Dr. Wilson Elkins, our president then, was the one who made the proposal, and those two were instrumental in getting the funding for the Schellenger Research Laboratories. And I was at that time away at Duke University on this faculty fellowship, and Dr. Elkins called me and wanted to know if I would be the director and the chairman of the board of this Schellenger Research Laboratories. He said that there would be $60,000 dollars allotted toward the building of the Engineering Building (which is the old Engineering building), and that it would give us four rooms, and they would be $40,000 dollars to outfit it with equipment. And no salaries, but we could start that as a research laboratory. And he allowed me to appoint my own board. And at that particular time I chose Robert L. Schumaker and Oscar McMahan and

Floyd Decker, and originally Bill Raymond. Bill Raymond was with the Engineering Department then. Turns out that he left a little later and did not participate in a great deal of it. But at any rate he was one of the original board members. And then later Floyd O'Neal, Dr. Floyd O'Neal, with the Chemistry Department, a real tough chemist and teacher, was on the board, and still later Dr. Tony Berkman in the Biology Department. This was a wonderful board and gave me a great deal of freedom to direct that. I was teaching five classes and this on the side.

But our first project was a rather unique one. I'd had a friend, Edgar Ingerson, a colleague of mine at Hardin-Simmons, and then a colleague at Yale when I was at Brown. He had gone with the Bell Telephone Laboratories and won the Outstanding Electronics Award for the development of the Nike Missiles the year before. And so when he heard that I had this place, and we were very close friends, he got together with a fine cardiologist at William Beaumont Army Hospital, and that was Dr. J.A. Abildskov, an M.D. from Tulane serving his duty there at William Beaumont Army Hospital. And so the three of us got together and decided that we would attempt to build a vector cardiograph. It turns out that my friend Edgar Ingerson had had a heart attack a couple of years before and had recovered from it, and he was very much interested in putting his expertise in electronics into developing

instrumentation for diagnosing heart problems. And Dr. Abildskov had been in research at Tulane, a very fine researcher and a very fine man. And William Beaumont Hospital was so fine in that they assigned Dr. Abildskov half-time to come down here to the Schellinger Research Lab, and two top-flight men called technicians, they were experts from the Western Electric and from Philco. So we were really top...here are three of the top electronic people in the country.

And so together with a $5,000 dollar grant from the El Paso Heart Association...we had some wonderful El Pasoans in that. I remember particularly Mrs. Ponder, a great civic person and one of the persons that helped us get that $5,000 dollars. And then Mr. Ingerson got gifts from the Nike program, from the Deville labs, from the Douglas aircraft. And we built at that time the world's first real elaborate vector cardiograph. Now, what this vector cardiograph was, was simply taking the input from these numerous electrods that they put on the body of the patient, and it was basically a computer. It would come out with a single vector in three dimensions, pointing in the direction of that electric vector in the heart with time.

So this was very sophisticated for that time, but you must place this in time. This was in the Nike Program when they had no transistors or had nothing like that. In fact, instead of vacuum tubes, even, they had little relays--I mean, not a coil of wire and a flipper. These points had to be polished and so forth, so it was a very cumbersome device, considering the progress since then. It was about

six feet tall and maybe eight feet wide, and had a lot of fans to dissipate the heat. But it was also used in. . . well, Dr. Abildskov took it out to William Beaumont, and they had their terminal patients out there in this Army Hospital. Of course they would already have the EKG, the electrocardiograph, records, but they would make these measurements on them and we would try to predict the flow of electrical impulses in the heart. And we'd come up with our mathematics and so forth. Dr. Abildskov then would, if after they would expire, would in the autopsy take out the heart and see what had really happened there. So it was a very wholesome, cooperative venture with El Paso, the Heart Association, with William Beaumont, a wonderful, a wonderful place and with these wonderful people. Well, that was our first project at Schellenger, and a very wonderful one.

I've got to give you one little commment here just for the record, but to show you the beautiful spirit of Dr. Abildskov. He was one of the finest, moral men and a wonderful doctor. But he said that one of these terminal patients, a very old fellow, saw that he was being strapped to all these electrical /~wires~/. He said, "That's all right. I'm ready." (Laughter) It just broke Dr. Abildskov's heart. He said he just couldn't get over it. (Laughter) But at any rate, we had a wonderful experience there.

Then our next project was one where we got a contract with White Sands Missile Range through the efforts of Dr. Willis Webb, who was active in a program out there called Sotin, in which their mission was to try to find the experimental rockets--where did they land? You know, this is a huge missle range and it may be 50 miles up here or so. And so he had already worked on an acoustic method called Sotin, Sonic Observation of Trajectory and Impact point, in which as the rockets come back, they would be coming back faster then the speed of sound and sent this shock wave out, this sonic boom. And they had microphones, arrays of microphones, around the missile range to pick up those sounds. And then we would use the theoretical and computational methods of working backwards and find out the trajectory of the rocket and obviously find out where it lands, and they'd go out and try to find the important payload. So he gave us a contract for $12,000 dollars. I'd already been engaged in this kind of sound ranging, except that at a different level. But any rate, we were to reduce the data. And Robert L. Shumaker was the one /who was/ really in charge of that. And we were working on that for a few days.

But about that time the Russians fired their Sputnik, and this of course was a shock to America that the Russians were far ahead of us in the rocketry. And the United States was going to go all out to try to detect these things and

compete with them in the development of rockets and so forth. So, Mr. Webb suggested that maybe we might fly some microphones, a little bit different type of /‾mike_/, but very much like the type of microphone we developed before, we'd fly them on balloons in the tropopause. The tropopause is about the highest altitude that a normal commercial plane would fly, this is roughly. At least it's the coldest spot in the atmosphere. The temperature in the atmosphere decreases till you get to that point, the tropopause, then it starts increasing by the radiation _____. Well, it turns out that in the ocean there is a similar situation where there is a minimum sound speed channel.

/‾PAUSE_/

B: I had worked as a consultant to the Navy electronics lab in San Diego in the summers of 1950 and '51, and worked on a project called So Far. This was an underwater sound project where the sounds were channelled in this sound channel, where the minumum speed of sound is. And we could, for example, pick up explosive sounds from a _____explosion or something like that the other side of Japan in the ocean. In other words, it would propagate all the way to the coast of California. And so it definitely /‾was_/ very effective in underwater sound. We thought there might be a similar thing in the atmosphere because of this tropopause. It's a little more complicated in the atmosphere because of the

winds involved, in addition. It's not quite so bad in the ocean.

But any rate that was Willis Webb and his friend, Henry Thompson, who was I believe the director of that particular portion at that time, and both of these by the way had a course here at UTEP. But at any rate, they threw this contract toward us originally and then urged us to go ahead and try to develop microphones--infrasonic, below audible sound-type of microphones--and fly them on balloons at that altitude and see if we could detect this, rocket sounds from distances, greater distances, somewhat like you could in the ocean. We didn't expect to be quite as effective up there as it was in the ocean. But any rate, we risked a part of our $12,000 dollar contract to switch over to that because of the urgency. And I might say, just to speed this thing up, these two men we take through this experience and encouragement and their capabilities, turned out to be two of America's great engineers.

C: Tell me their names.

B: Donald McCarty. He is presently one of the senior scientists for Hughes Aircraft Company, and is the youngest man ever to reach that rank in this fine company. He also is in some of the pioneering work with the top man in lasers, so he did some original work in lasers with the most noted man in that area, in laser work. But since then he has been, I would say, the world's best designer of communication satellite antennas.

Now his antennas really are horns because of the microwave systems, but most of the communication satellites have the Hughes Aircraft Company's telemetry system, and he has the patents and so forth and is the chief designer of these horns. For example, he mentioned that in Canada, the Canadian government wanted this for educational and communication purposes, and he got the patents on how you could reduce the noise level in this instrumentation better than anybody else, and so he could pick more of Canada. And they said, "Oh, we forgot, there's a little island out here." So he squeezed that in. So he's an expert in that, and a wonderful person.

George Clark, I might mention, went on after his experience /to become/ one of NASA's top scientists in the electronic communication instrumentation and rose on up to where he became a key man in the latest development of NASA, just before he retired from there, a billion dollar contract to improve their communications with their spacecraft and satellites and so forth where they concentrated in one region. And he sold them on the El Paso-Las Cruces region, a billion dollar project, and they have around Las Cruces now this reception system that can pick up these signals from the spacecraft. So these two men have really served the country well.

They started out very humbly. And I must mention this: Don McCarty said that he was a B.B.A. major in my freshman Physics class, and he was so excited about it he switched to Physics. Well, in one year from that time he was in this development with George Clark.

So we developed this infrasonic microphone and radio system to send the signals back to standard meteorological reception equipment, and White Sands would launch the balloons. And so in our initial tests George Clark and Don McCarty and I went out in my old station wagon on White Sands and we had a little strip chart recorder. That's a little piece of paper that comes out like an adding machine with wiggles on it. And we were going to see if we could pick up a remote launch of a rocket. And we had this strip chart paper all over the wind-blown desert at White Sands waiting for quite a while. But just on schedule we came in with a fantastic signal. And right or wrong, that is really a sales point. (Chuckles)

C: What'd y'all do, start shouting?

B: Oh, we really did. We were in seventh heaven. And so the sponsors immediately became high-placed people, and I do mean high-placed people. And they rushed us into production of this. And if you've ever seen a couple of old school teachers without any real. . .much production experience, and a couple of--remember, these are just sophomores now--students

go into production on something to be flown in that kind of a climate and so forth. Well, we finished that production, the rush production. George Clark, bless his heart, knew how to solder aluminum and put things together, extremely a genius. And Don McCarty was very sharp and did a lot with electronics. But any rate, I might say Globemasters flew in to pick those instruments up. That's how it worked. And some of those seemed to be successful. I can't know all these things.

But any rate, we then had to go into real big time business and so we were geared, then, for going into plans, specification, going into production. And of course we were not capable of doing a real production. But by that time we had two real fine young students here who are presently on the faculty--Mike Izquierdo, whom I might have mentioned as a good basketball player and a tremendously ingenious person in electronics; and Carlos McDonald, now Dr. Carlos McDonald, who is on the faculty in the Electrical Engineering Department. They learned their techniques and their enthusiasm with this kind of project, and those two carried on a great deal. George Clark and Don McCarty were soon gone to other places, but these two men carried on a great deal through the years and must be given a great deal of credit for the development of Schellenger Laboratories.

But one of the unique thongs here is that we talked Mike Izquierdo into doing the production. He had an electronics company, Telectronix, and certainly was very ingenious, and so he set up a production line down in /the/ South El Paso business district. And people never knew that he turned out thousands of these _____. And so we were in the big time, and Schellenger got into more and more large contracts. And I mentioned this was very secret at the time.

But there's a side light here I think that the public should know. These balloons, these instruments, were flown all over the world, and we would get these reports in the paper about these unidentified objects and the most ridiculous things you can imagine. In Kansas one farmer would tell about apparently some aircraft from some place had spotted it and made a pass toward it or something, so he heard these sounds. And then it came down and landed in his farm. He went out with a pitchfork and all these /things/. Well, all of them had labeled on them, "This is not radioactive. You may put this in the mail and return it free." Well, some landed in Mexico, and you can imagine the mordidas that were asked to return those things. (Laughter)

But you can't imagine the enthusiasm of the students. Now, we were gaining many, many more students in a program like this, but you cannot imagine the enthusiasm of a student knowing that here we're doing things. And it got to the

state where this was, in secret circles, was well known. And we'd get the word back that on one occasion President Eisenhower said, "How is the Schellenger Lab doing?" And, you know, that naturally makes you feel pretty good when the President of the United States /asks/. So that's how special this was. After that of course, people would come to our door, here, this little place, El Paso. As a matter of fact, this I think can be stated now freely. This is all second-hand because some of these things were so secret I never knew about them, even though I was the director. But we didn't ask questions in those kind of things. But I was told that some people in the highest of places wanted to make the Texas Western College the nerve center for the intelligence system of America.. And this guy said, "Don't you dare do it!" And we didn't do it, we never got that close. But he said, "Don't you dare do it. This would be a fortress." (Chuckles) Well, we didn't. Maybe that's an old wives tale or an old man's tale, old husband's tale. But we had so much enthusiasm and we did turn out some great ones. We have turned out some really fine electronics people out of this place, and a part of it was just giving them the opportunity to go get it. I was the director, but I used the wonderful technique and let those guys do it without telling them how. And having a little government money behind didn't /hurt/.

And so those were wonderful years of training, and many of America's top scientists today came out of that particular program. We got up to at least 120 students, as you know, and we spread that out over the departments in the University--Engineering, Physics, Mathematics; we had them in Chemistry, of course, and all the disciplines, were spread out. Because we also had data reduction. We had the first purchase computer. We built the first. (Chuckles)

C: Oh, yes. Tell me about that.

B: Well, we had all the data to reduce, you see. When you have all this data coming in, you have to reduce. These were in the early days, of course, of computers, and so we had to go into that. So we purchased a Bendix G-15 computer--that was a very nice computer in those days--and set up a computing center in what I believe is the Tri Delta, one of the sorority houses over here that had been vacated. (Chuckles) And Bob Shumaker was the director of that data reduction center. So we put Texas Western College on the map by having the first computer and data analysis.

And then we got the contracts with NASA, in a somewhat related connection, to do acoustic work in which we would work backwards and interpret the temperature and winds at much higher altitudes than balloons could fly. Willis Webb and Henry Thompson both deserve a lot of credit

on this because they had many contacts with NASA and so forth. And they started the program of firing rockets that had grenades in them. The grenades would be ejected at various altitudes or at various times on the flight upwards and explode. And our sensors, our microphones, would pick them up, and there is what we call a rate tracing method using the acoustic theory of acoustics to trace back where that took place. And so from all this, the final point was to get the temperature and wind. And so this was a part of the initial meteorological rocket network system, which really, Willis Webb was the prime instigator of this world-wide. And we worked the data with them and so forth.

But then in addition, NASA had a similar program. See, they were very interested in what's the high altitude temperature and wind. And so we got a contract through Dr. Bill Nordberg of NASA, a _____ man in this. We could speak the same language in acoustics and so forth, though he was from Austin. We couldn't speak all the same language, but any rate, a very fine contract with NASA at Wallops Island. They would do a lot of experimental work there, and it would be our team that would go set up the sound system. And so they would fire the rockets, and we would do the instrumentation and the data reduction and tell them what the temperature and wind were. So they went from that and many other types of contracts then.

We were spreading out. We had seven different kinds of laboratories, all kinds, even the medical type as well as the electronic instrumentation, optical and mechanical and environmental lab and acoustic_____ chambers--which, by the way, was built by Bob Shumaker under the Kidd Statium.

But we were expanding tremendously, and we were tipped off by a rocket salesman who had been selling rockets to White Sands for this meteorological rocket program, that the National Science Foundation might be interested in our sending a group to Antarctica to measure the upper atmosphere's temperature and wind. By this time, by the way, we had a good bit of experience. thanks to the White Sands Missile Range contracts. We had stations in Fort Churchill, Canada--you know, that's way up north--and at Fort Greeley in Alaska, and at Point Barrow, the northernmost point, to measure these high altitude temperatures and the wind. These were very important from a meteorological standpoint. But we had teams there, and so we had experience in that. But then, as a result of that tip, I called to Washington on a wintery day, and Washington was snowed in. And I got in touch with a Dr. Jones who was the head of the Antarctic program for the United States, and had a station at Mc Murdo, Antarctica--and also at the South Pole, as a matter of fact, but the main station was Mc Murdo. And so it happened that he was

an old Physics teacher of my vintage, and we had a wonderful time together and he gave us a grant, a sizeable grant, to send a team to Antarctica to do that work. And White Sands was very cooperative and really was the cooperative partner in this, because they furnished the instrumentation, the ground radars and things like that. We were using a particular radar that had been used at Fort Bliss.

And I had had a student in my class, Major Benjamin Smith, and he had had that experience. And so I invited him to join our team. And then I already had a student, Jim Betel, who was active in the Schellenger lab. As a matter of fact, he'd done a lot of work at Wallops Island and was already quite active. And Ray Briggs, who was quite active. And so the three of them and Bob Beaubeau, a wonderful guy, a football player and so forth, and our student, went to spend the Austral winter the whole year around at Antarctica. And this was really, this is pioneering stuff. And they had some very interesting experiences there. The winds, of course, were tremendous. They set up their rocket station to be fired from Ross Ice Shelf. Now this is a very barren ice shelf in Antarctica, far enough away from Mc Murdo camp that it was safe. /But/ terrible storms came up. They say those storms, they have a white out, it's really a white out. I mean, you just cannot do anything. At any

rate, fortunately they were not out there when it took place, they were back at Mc Murdo. But it scattered the equipment and everything five miles all over the Ross Ice Shelf. Well, these champions went out and put it back together before austral winter set in, and they accomplished their mission through that year and then through a second year.

So these were champions. And as I say, El Paso's not aware of the importance of these explorers because they thought enough of them, the National Science Foundation, to name a number of geographical locations a and features of Antarctica for our men. So, if you should look on a detailed map of Antarctica, you'd find the name of Betel and Briggs and Beaubean. You'll find many names of Smith, but there's a little strange situation because the assistant director, I believe, certainly a high-up man in the Antarctic program, a very fine man, was named Smith; and in addition to our Benjamin Smith, who is also a very fine man. But in high regard for Benjamin Smith they named Mount Benjamin, in the _____ Range, for Benjamin Smith. I wish I could remember the details. One of them had a ridge in the mountain and some of them had more than one name. But that shows some of the real great pioneers of Texas Western College.

C: Now, that was the heyday of Schellenger, too. When would you say was the high point?

B: Well, we continued on. I lose track of dates here, but this report that I have here was given to the. . .this is pretty a much the heyday and it did report in here up through this firing. And by the way, Texas Western College is the only college I know who flew a flag at the South Pole. And that, I believe Jim Betel was the one that flew in there and put it at the South Pole. You know, that's a very, very severe place and they didn't work out of there normally. But he did fly there. The aircraft just fly and never turn off the engines, you know, fly out. But here is the Texas Western Flag at the South Pole.

Well, that was just prior to this, I believe this was 1964, report to the Board of Regents. And so we were achieving at perhaps a peak then. I resigned from Schellenger Lab in '65, in January of '65, so I would say I was just about there at the peak. We had for the first time received a five-year contract. We've had contracts and grants. Most of them are contracts from White Sands. And we had really reached the most stable peak /at/ the time, and I thought that my time was over. In any administrative position you get to where you're not. . . like I had been throught most of the time actually a part of every experiment. But pretty soon you get into how many sheets of paper will you order next year and things of that type, and I wanted the thrill of the research and

the development. And so I left the Schellenger clean and in good shape with more of the foundation funds, the _____ funds which Dr. Rheinheimer, Bob Shumaker's father-in-law, had directed toward the Schellenger labs. We had over $380,000 dollars that had helped buy the G-15 computer. But we had built those funds up through the years, and I left them in excellent shape.

C: And you went back to full-time teaching?

B: I went back to full-time teaching and took on consulting work with Globe Universal Sciences. We had given them a contract. Their president, J. Miller, a wonderful guy, had been one of my students back in the days of the Civilian Pilot Training Program. And we had given him a contract to build some equipment for us, some very fine equipment, and they put in a research laboratory in the building that was El Paso Natural Gas Company's building right on the campus in the same style of architecture. And so he took me on and he was a part of the Shell Laboratories a part of that time. And I was a consultant to the Shell Laboratories and to that, just by walking over past Kidd Field to that office and back and forth. So I spent /‾a_/ fourth time consulting during my next 11 years there, and teaching full-time here. And that, too, worked as a feedback. You see, here is a real fine exploration industry, a part of

Shell Oil Company. And I had the great privilege of feeding some of that back into my Physics classes through the years.

C: And you retired in '81. They gave you a big dinner.

B: Gave me a wonderful dinner.

C: And a nice plaque.

B: Yes. It's been a very wholesome 43 years, and I'm very grateful to the University for making me Professor Emeritus in Physics. That's a privilege to be able to come back here and to give interviews like this and not have to grade papers.

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