

**Oral History Interview of  
Llewellyn Densmore**

**Interviewed by: David Marshall  
May 5, 2016  
Lubbock, Texas**

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## Transcript Overview:

This interview features Texas Tech professor Dr. Llewellyn Densmore. Densmore discusses evolutionary biology and his interest in crocodiles in particular. Densmore also talks about his research projects and his time at Texas Tech.

**Length of Interview:** 01:14:08

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### Keywords

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**David Marshall (DM):**

The date is May 5, 2016. This is David Marshall interviewing Lew Densmore at the Southwest Collection, Texas Tech, Lubbock, Texas, and let's just start with your date of birth and full name, if you don't mind.

**Llewellyn Densmore (LD):**

My date of birth was July 5, 1952. My full name is Llewellyn Denison Densmore III.

DM:

That's a good Irish first name, isn't it?

LD:

Welsh.

DM:

Welsh, Welsh. Okay, yeah. All right, where were you born?

LD:

I was born on an air force base—

DM:

Oh, really? Okay.

LD:

Probably Samson Air Force Base, and the closest town would have been Ithaca, New York?

DM:

Yeah, yeah.

LD:

The closest big town there, Geneva, also. The base has been long closed.

DM:

Yeah, okay. So, you were an air force child?

LD:

Yep, I was an air force brat.

DM:

Where all did you live?

LD:

A lot of places. I spent a little bit of time in Massachusetts, Ohio, then Washington, D.C. at both Andrews and Bowling, then Ramstein, Germany for four years, ended up in South Texas around Port Lavaca—

DM:

Yeah.

LD:

—and went to high school in Port Lavaca.

DM:

Really? Okay.

LD:

Yeah, and then ended up, I went out with my folks to Brandenburg and stayed there for a year—

DM:

Okay.

LD:

—after high school, and then I came back and started into college.

DM:

Well, you know, that's a broad background compared to most people like me. You know, I grew up around Fort Worth through high school. So, how did it affect you, I mean—?

LD:

Almost nothing but positives.

DM:

Yeah, yeah.

LD:

I think what really probably molded me the most was the idea that you really don't understand other cultures until you live there and then you don't really, I think, understand your own until you live in another culture and then come back and see, okay. Even subtle things like smells, you know. Germany smelled different than the U.S., okay, and not bad, just different. I also, I think, it's made me look for the good in almost every place I go because when you move twenty-one times before you're twenty, you really figure it out that any place that you're at, it can be

wonderful, but there are still going to be things that are—you just don't like. And you know, I mean, I always laugh at people when they dis Lubbock talking about the wind and I say, "Yeah, well we have wind probably six to eight times a year that might be you know, a little bit problematic but, other than that we have 277 days of sunshine a year."

DM:

Like this day.

LD:

Like today, it's beautiful, I mean you couldn't ask for more.

DM:

That's exactly right.

DM:

Right.

LD:

And I mean I respect people that want to go live in Seattle and on areas of the West Coast and the Northwest, but as far as I'm concerned—

DM:

It sounds like a global perspective, that's what I would call this. I don't know, how would you characterize it?

LD:

I think that because of my travels and because of our research now being in so many other countries. Again, you look for the good and appreciate it and appreciate people for what they are because we're all the same, you know. Probably the most semi-comfortable I was—I won't even say uncomfortable, but semi-comfortable that I was—was before I went to Cuba for the first time, and I didn't know if everybody at the airport was going to be in green fatigues and had a beard, you know. We got to the airport and we landed, and the people were wonderful and the Cuban people were just—they're really amazing. I've never been treated better in any place I've ever been.

DM:

So, that's been your—what you've seen, anywhere that you've done research or travel that people are basically good? Is that what you're saying, or—?

LD:

Most people are basically good and they all want the same thing. You know, sometimes they get it in different ways and it's a little bit hard sometimes even in academia for us to appreciate exactly where they're coming from in a slightly different academic background, but you know, you do see things that I think are incredibly valuable. I mean, in Panama and in most of Central America, they absolutely value education in their politicians. In other words, the president of Panama has a PhD from Georgia Tech in engineering, okay. And they don't have nearly as many professional politicians as we do.

DM:

Right, so we could look—

LD:

For me that's not a bad thing. (both laugh)

DM:

Yeah, yeah. We can look back at Woodrow Wilson and a few others to see these types.

LD:

And actually, I think probably the reason is is that these countries have not been truly democratic for nearly as long as we have.

DM:

Okay.

LD:

And I think they will evolve into having, you know, professional politicians, and there's probably some down there anyway. But I think, you know, I think if you look at the founding fathers they probably were certainly they were the upper crust as far as not only money but certainly education. And I think they had a different perspective, you know, than (laughing) whatever's going today. I have no idea; I have absolutely no idea what's going on today in especially presidential politics. (laughing) It's just the most bizarre thing I have ever seen—

DM:

(laughing) It is, isn't it? That's right. Well, in the course of all these travels as a child can you pinpoint a time when you became interested in biology specifically, or the natural world, or anything related directly to your field, your career?

LD:

I think that probably between four and six, I got really fired up about dinosaurs.

DM:

At a very formative age.

LD:

Yeah, yep. And once I got fired up, I just started reading and you know, my mom tells me that when we would go to the doctor, you know, for a checkup or something he'd say, "Well, what do you want to do when you grow up?" And here I was five years old saying I want to be a herpetologist. (both laugh) And so, I think that they found it a little bit amusing. And the truth is is that if I had more patience I would have gone into paleontology or Egyptology, I love both of those as well. I don't have the patience to be at a dig for three years and find, you know, half a stele or one bone.

DM:

At least in biology you're going to find something out there.

LD:

Well, especially when you're working with crocks. (laughs)

DM:

Right. (laughs)

LD:

You will find crocks.

DM:

In a sense, you've stayed with dinosaurs then. I mean, how much closer can you get to get to dinosaurs than crocks?

LD:

You can't get much closer unless I was a strict ornithologist. But the fact is is that yes, it's been—that was—and I can remember going at about six years old to a demonstration and it must've really absolutely destroyed my mom because she was petrified of snakes, always has been petrified. I think part of what intrigued me was I didn't think they could be as bad as she was making them out to be. But, we went to a—she took me—there was a guy named Larry Tetzlaff and I think he called himself Jungle Larry, and it was in Ohio and I—

DM:

Do you know that spelling by the way? I'd like to see more—

LD:

I can see if I can find it.

DM:

Yeah, yeah, I'd like to have that—

LD:

I can see if I can find it, but he gave some demonstrations and he had some tiger snakes and some of the Australian elapids which are deadly. He also had a coral snake and he was—that was the first time I ever heard somebody say, “You know, if you're some place and you have a large enough coral snake so it can bite you, what you really should do is—if it's on—because it's going to me on a finger—is lop that off.”

DM:

Wow.

LD:

Cut it off.

DM:

Wow.

LD:

And he said, “I was handling a coral, and it bit me and I already had my knife out, and I realized that it had bit me on the top of my thumb nail.”

DM:

Oh.

LD:

And so—and the heads are very small—

DM:

Yeah, yeah.

LD:

You know, and the fangs aren't big, either.

DM:

They kind of chew in, don't they?

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LD:

They have to chew in, the elapids, yeah. But it was, I mean, it's a very deadly snake. Speaking of which, there was a bite yesterday or the day before—

DM:

Really?

LD:

—from a graduate of UNC, living in North Carolina still by about a fourteen-foot king cobra—

DM:

Good grief!

LD:

—that he had as a pet.

DM:

Wow.

LD:

And he ended up trying to drive himself and then finally had to pull over because he was starting to feel the effects because they inject, I mean they can inject half a gram of protein.

DM:

My goodness.

LD:

(laughing) You know, and that's just—but anyway, he's in ICU but he'll probably survive.

DM:

Yeah, okay. So, there was a fascination with snakes?

LD:

Early on fascination with snakes, and—

DM:

Always herps—solid through—

LD:

—and reptiles. Yeah, always herps.

DM:

—from age four until the present.

LD:

Yeah, always herps. I mean, I appreciate other “ologies.” I’m an amateur birdwatcher because where we live we see an awful lot of really cool birds, and I love talking to Dr. Bradley and Dr. Baker and—

DM:

You’re surrounded by mammologists.

LD:

I am. I have no chance, so—and I want my students to be broadly enough trained that they appreciate exactly, you know, the whole world out there. And yet, the kinds of questions we ask, I needed a totally different type of education because I’ve always been interested in the evolution of reptiles, amphibians, vertebrates. And so, the kinds of questions that I was trying to ask I couldn’t really answer to my satisfaction looking at morphological characters.

DM:

Right, right.

LD:

And so, hence, I you know, it was—in hindsight it was a very wise decision, but at the time, you know, I really didn’t have much background because my undergraduate and master’s are more or less in organismal and population genetic biology, okay, so—

DM:

Okay. And where was this by the way?

LD:

It was at U of H, University of Houston.

DM:

Okay.

LD:

And so, when I started to look at where I wanted to go do my PhD, I decided that I probably needed to go someplace where I could learn biochemical or molecular techniques, and at the time there really wasn't molecular biology per se, it was very much in its infancy. I mean, it was, you know, twenty-two, twenty-three years after Watson and Crick, but I mean, the field today is still the very tip of the iceberg, you know. But then, I mean, the Titanic would have run right over it, I mean, (both laugh) it wouldn't have been any contest. I went—and I still give this advice to my students today—when you want to do—when you're thinking about a PhD, the first thing you want to do is find somebody, somebody that's doing the kinds of things that you're interested in. You contact them, and then if you can, you go visit them. And so, at the time there were two people that I was really interested in, one was John Avise who's one of the most prolific writers in evolutionary biology and is now a member of the National Academy, and Herbert Desuer [?]. And Desuer was at the LSU medical school, and I didn't know that, I really thought he was at Tulane because I couldn't imagine that the kind of work that he did was being done with reptiles—

DM:

At a medical school.

LD:

—at a medical school. And so, I went over there to look at the place after I wrote to him, and it was love at first sight.

DM:

Yeah.

LD:

I couldn't think more of him or my postdoctoral advisor if they were my family. And he literally had a party at his house for me, a visiting graduate student.

DM:

Oh really?

LD:

In which there were other graduate students and the faculty from across the department.

DM:

Wow.

LD:

And I didn't have the kind of credentials that would, you know, require that.

DM:

But this must've told you, "Hey, I'll be a good mentor for you." I mean, it sounds like he took you—

LD:

Well, what it told me was that he really cared—

MD:

Yeah, yeah.

LD:

—about his students, and that's absolutely something that he has infused into me and that I hope that I've infused into my students because it's very much like a marriage, all right. And it takes two to make it work, and you have to keep track of what's happening. For me, I've always admired Robert Baker's ability to multitask with so many students, I mean, if you look at the number of PhDs that he graduated, it was forty-nine in forty-seven years. I'm number two in the department, and I have seventeen PhDs that have graduated in thirty years.

DM:

And that's busy.

LD:

Oh, it's not being un-busy, but it means that I've got an awful lot to do if—I'm going to have several of those six-month PhDs. No, I just like to have a smaller group and I like to know as much as I can about what everybody is doing. And in truth, I think so did he, but he just had the ability—he has the ability to just multitask at that level like no one I've ever known, and I think that's, you know, that's a—if you look at where his students are now, my goodness. There's at least three endowed chairs, you know. I think there's one guy that's a CEO of a company, I mean, it just—

DM:

Yeah, yeah. It's pretty good placement, yeah.

LD:

And now he has two students that he had a big influence on directly that are in the academy, David Hillis and Jim Bowl. We found out yesterday a '71 graduate was elected to the academy yesterday, so—

DM:

Really? Wow. And this is all—the way I hear it—this is all—and of course, it makes sense, this is all really helpful to Texas Tech because these guys out in these positions as Tech grads, you know, the reputation.

LD:

Well, I think that's right. I think especially in certain areas, and certainly the areas of evolutionary biology for sure we've had a major stamp out there, and I think the brand has been very good, the students have been very good, and now, you know, it's interesting is that most of my students were all domestic students early on, and now it's a pretty good even split between domestic and Central American or South American Students. And I love that because it gives us a liaison to these other countries first and foremost for their work and for future work that somebody in the lab might want to do. But, more importantly, I think, we're beginning to impact people in other countries that are going to be the scientific leaders. And certainly it's not just me, I mean, Robert Bradley had done it, Baker has done it forever, you know, Jorge Salazar-Bravo. A lot of the people that work up on the sixth floor, and I know David Ray will do it as will Caleb Phillips. So, all those people that have been, even the recent hires, are going to have that same kind of impact.

DM:

This seems like it would—it'd allow for some real recruitment from those countries and students as well.

LD:

Oh it does, it does, it does. I mean, there's actually people that were here yesterday from Panama signing a major MOU with somebody in Engineering I believe is what it was. But we, I mean, Michael Johnson over at International is working with me, and we're going to get an MOU too set up with probably the Technological University of Panama.

DM:

That dovetails with this thing that's going on in engineering?

LD:

No, actually—

DM:

Okay, it's a separate—

LD:

It's totally separate. We have had a project for about six, six and a half, seven years now down in Panama that involves Coiba which is the largest island on the west coast of really Central America. It's the largest island out there, the whole length of it. It's a UNESCO World Heritage site.

DM:

Oh, okay.

LD:

Just unbelievable, unbelievable. Every time, you know when you go out there it's like going out on a National Geographic.

DM:

Wow.

LD:

You know, and I mean, the conditions are primitive, you know, but what we're studying there actually is—now we've sort of got into the trying to understand the overall ecology of American Crocodiles primarily because they're apex predators and what we want to find out is, what are the impacts that humans and crocodiles are having on each other and how can we minimize the negative and emphasize the positive, you know? In other words, ultimately maybe have crocodilians or American crocodiles, but crocodilians in general, that are raised in farms that can be used for skin and meat and that can be returned to a local sampling area, but what that means is you have to understand the genetics and the everything else of the wild populations because I concern—or I get concerned as much by outbreeding as I do by inbreeding. I mean, there have been a number of examples of mistakes due to outbreeding, I mean, the dusky seaside sparrow was essentially driven to extinction on the east coast simply because they brought in something that they thought looked like it, and they thought was similar, but it was genetically quite different. And in fact, the dusky seaside was swamped by just a larger population. So we want to avoid that. We also want to maintain the levels of genetic variability and maybe even, you know, depending upon what behaviors, we can get an understanding of that we're not bringing an animal from a place where the behaviors are totally different, just to make sure that there's not a serious genetic component to that, too. You know, so we want to keep the organisms that evolved in a certain area more local.

DM:

Yeah, yeah. Do you get plenty of support for projects like this because—and I ask this because of the public opinion toward alligators and crocodiles, you know, it's like, Oh, who cares, let's kill them. Do you get a lot of that?

LD:

It's interesting you know. Yeah. Most people are reasonably understanding, especially when you talk about it in a professional way, and the people that would see us, if they could see us collecting them, they realize that we don't go out there as a TV show. It's not a TV show, it is an endeavor. Now, I am insistent upon my students being able to capture animals, and the reason that I am is because I want them to have an appreciation for the people that are collecting the blood that we use for isolating DNA. I want them to understand that that didn't come growing on trees. Somebody had to get out there and catch that animal, and besides, it's a hoot. (both laugh) It is a blast; we have a great time, you know. I tell people that after we get back from collecting there, the beer never tastes better. (both laugh)

DM:

There's something about adrenaline and beer. (laughter)

LD:

There's something about an adrenaline rush, and it gives you an adrenaline rush, and—

DM:

Oh, I bet. What is the process? How do you do this?

LD:

Well, we—it's very similar to what other people have done. We have long poles with nooses on the end that are cable.

DM:

How long? That's an important question. (laughs)

LD:

Oh, probably six feet?

DM:

Oh, okay. Woah, that sounds short. (laughs)

LD:

Well it—what we do—the way that we do it, and the way that I learned, is that you do it from a canoe. And so, you get up on your knees at the front of the canoe and have the pole out, you have a headlight on, you also have a sealed beam in there that you can look around first and foremost, but once you see eyes, you turn that off and then you turn your headlight on, and then you don't move your head again because if you do, they'll recognize that there's a movement. If they just

see you coming as a light, they have more difficulty judging how far away and everything else you are.

DM:

Is this always in the dark?

LD:

Yes.

DM:

And it's in the—

LD:

Oh well, I'll say yes for the process I just described, it's always in the dark. There's another way that we catch them that might be considered by some to be cruel and unusual, but it's not actually. We use a very heavy fishing rod with a treble hook, and we cast it and then pull it back over and invariably it will hit the skin around the leg, and if it does then we can pull them in. And that works for animals up to about probably seven or eight feet long, larger than that, it's pretty dicey, and I'd rather have a noose because—well, and I've lived through every possible situation in those. The last time that I was down, I had an undergraduate that was—and we pair people up essentially sort of based on size—and he had gotten paired up with someone that really was not very strong a paddler, and so, he never had gone on an alligator. Well, my rule is everybody catches a gator or we just stay there until they do. So, we went out I guess on the second to the last night or the last night, and I said, "Look, I'll paddle you, I'll put you on a gator, I promise you." So, this guy was a little bit larger than me, he probably weighed about 255, 260. And so, he's at the front of the canoe, and he puts up three fingers which meant there were three gators there, and I looked and I could see—and you know, when you've done it as long as I have it looked to me like there was one that was probably about five and half and one that was about seven and a half and one that was about eight and half. Well, the pole he had, and what I insist on for people the first time they catch is that you catch the smaller ones. You need to feel how strong they are and everything else. And maybe the small one went down, I couldn't tell, but he noosed the seven and a half was what it was. It actually turned out to be seven foot four and three-quarter inches. And so, he's leaning out there like so, and then he starts to sit back to try to horse the animal a little bit because we were close enough to shore I would just paddle him over, we'd pull him up, and everybody would gather around, we'd all get him in safely and everything else. Well, what happened is, most of the time the gators will swim away from you when you noose them. This one broke right in front of the canoe, and as it did his hand was on it like this, and it crossed his arms over, and when it did it changed his center of gravity and we went woop. And so, one—

DM:

Did the boat tump?

LD:

Over, yeah.

DM:

Oh, wow.

LD:

It's the only time in thirty-five years plus that I've ever been in the water, and—

DM:

And you know there are two more in there.

LD:

Yeah, yeah. Well, so he's going, "Lew," or actually, I take that back, "Dr. Densmore, I am so sorry. I can't believe I did that!" I said, "No, calm down. You need to be calm. What we'll do is if we don't splash the water—" because, yes, we're talking about a place where there were probably at least 200 gators within the next half-mile of that canal. It's at the Rockefeller Wildlife Refuge, which as far as I know, it's near Grand Chenier, Louisiana, south of Lafayette, and it probably has the highest concentration of alligators of any place on the planet.

DM:

What a place for this to happen. (laughs)

LD:

Yeah, exactly. And of course, you know, they respond to splashing around and movement because they think it may be a wounded animal.

DM:

Right.

LD:

And so, that's why I was telling him, "You just—you stay calm. We'll, you know, we'll walk the canoe." The canoe had sort of floated, it was—we walked it back over to the shore, and so I called over and said, you know, "We're in the water, we need some help." And so, immediately two of my graduate students came out, and they came to get me and I said, "No, get him first, he's fine." And then it turns out that my wife and my son were there, and they were coming to get me, and neither one of them was an excellent canoeist in terms of the back. It looked very

much like you would see a convoy doing evasive maneuvers trying to keep away from a wolf pack of submarines. I was in hysteria, I was laughing so hard. I just finally told them that “What you need to do is try to get me before I die of exposure.” And, of course, it was about eighty-two degrees, you know, that evening. And I said, “You may never find me,” you know? And they’re cussing at each other which is so—(laughter) that’s what even made it funnier. And there’s one— (laughter)

DM:

Oh, golly. Everything kind of turned upside down?

LD:

It did, but there was no danger. We got everything back. The only thing we couldn’t get was the battery.

DM:

Really?

LD:

Yeah, the battery that was hooked to the sealed beam.

DM:

It went straight to the bottom?

LD:

It went straight to the bottom, and the water is so murky that we couldn’t see it. Now fortunately it was a totally sealed battery, so I, you know, it would take a long time for stuff to seep out. But even the light that was on it, the cord was stretched out and it—the light was trying to float and we could see the light. (both laugh)

DM:

Down below the surface. (laughter)

LD:

So we could reach down there and get it and—yeah.

DM:

Golly. (laughs)

LD:

So we didn’t lose much.

DM:

Well, when you noose these alligators does the noose lock down or could it come loose?

LD:

It's got a slip on it, a metal slip and so what you do is you—the best way to do is to either very gently push it over their heads so that the noose doesn't touch any part of them, and then when you get just about to the front leg you pull, and that will keep it right in this area between the—what would be their chest, the end of their shoulder, and the beginning of the head, so—

DM:

You're not getting it right on the muzzle?

LD:

No, we don't get it on the snout, no.

DM:

Oh, okay.

LD:

No, no, because it'll come off too easily. This way, they would have to work it over the jaw and the masseter muscle which is in crocodilians is huge.

DM:

Huge, yeah.

LD:

And then we just let them essentially wear there ATPs out. Just let them wear themselves out.

DM:

And then just boat them over to the shore and pull them up.

LD:

We drag them, you know, beside the boat, and it generally takes five or six minutes, and if it's a big animal, and especially if the person's not really familiar with what they're doing, you know, that first time you catch one you don't know, Okay, now what do I do? I've got a six foot gator right now, and I'm not sure—so, you know, we always try to keep people that know what they're doing in the boats with the people that don't so that they can give them guidance.

DM:

It sounds like the worst thing to do would be to kind of panic and drop the pole because you need to keep that space, that six-foot space—

LD:

Well, you certainly don't want to drop the pole inside. Now, if we catch a very large one, what we have is we have a large pole with a large noose, and the pole is tied to the cross tie on the canoe and we'll just throw the whole thing over. And so then it—I mean, I've actually been on sort of a Nantucket sleigh ride (laughter) many years ago getting pulled down a canal by one that was about ten and a half feet.

DM:

Golly.

LD:

And that is invigorating, too.

DM:

Is there a size at which you say, "Nah, let's not even try to noose it."

LD:

Well, it would depend on who I was with.

DM:

Yeah.

LD:

For my students that are down there with very little experience in this I would feel very uncomfortable going for an animal that was over eight and a half to nine feet with anybody. Now the people that I learned with, the largest gator that I was ever involved catching with directly was probably about eleven six.

DM:

Wow, okay. That's got to be a lot of strength. Are there two people on the pole, or—?

LD:

Well, again, we threw it over. You let them wear themselves out.

DM:

Yeah, right.

LD:

And that's really the key. Once they go into oxygen debt because they're at least primarily cold blooded, that kind of argument because they almost—they almost have a full four-chambered heart which is sort of the correlate with being warm blooded.

DM:

Right.

LD:

But in truth that, you know, we just let them wear themselves out, and it takes them generally—if you can get them so that you could drag them without much resistance, it's going to take them between fifteen and twenty hours to come back. Now we generally just turn them back loose and let them go after we take measurements. What we do is routinely we would take measurements, we would take—check gender, we would take blood from the tail, and that's it.

DM:

Okay.

LD:

Turn them loose.

DM:

Any tissue samples at all?

LD:

Blood's the only tissue we use because they have nucleated red blood cells which, unlike us, means that they will have a full set of genetic information in their red blood cells, and so, we don't have that because we kick the nucleus out.

DM:

Yeah, well do you ever harvest one for dissecting or anything like that, or for putting up a species, I mean, a specimen?

LD:

Actually, with the permission of the person that runs the Rockefeller Wildlife Refuge research program, her name is Ruth Elsey, and I've known her forever, and she's actually an MD, she's actually an MD and it's probably—if I've ever had an accomplishment that I didn't know about, when Ruth heard me give my dissertation defense, she had just graduated from medical school, and she decided right then that she wanted to do research.

DM:  
Good.

LD:  
And so she has been—she went to the Rockefeller working with the Louisiana Parks and Wildlife, and she's now the research director there.

DM:  
Wow.

LD:  
So she's been there for probably, oh, probably about thirty-four years, thirty-three years. But she said, "Yeah, when I heard your talk, you can either take the blame or take the credit." (both laugh) But—

DM:  
That's outstanding.

LD:  
Because it was a lot of fun, I mean, you know, and I think the world of her. But in question about the tissues, she will sometimes give us permission or maybe another group has needed, say brain tissue, and she's given permission for that. Well, one of my students now is actually looking at how can we get DNA from bone that has been not preserved but where the loss of tissue around it been done in different ways? And what it ultimately is going to lead to we hope is the ability to identify in certain parts of the world, especially Africa, bush meat with sort of a DNA bar code where we have a minimal amount because some of that meat is partially cooked, certainly some of it would not be in good shape. As far as most people know, they would have no idea about what species it came from and some of them are incredibly endangered. And so, that's what we want to be able to do is say, "Ah-hah, this is a dwarf African crocodile or this is a Congo dwarf or this is an African Slender-Snout," just from looking at the meat.

DM:  
Oh, well that's really exciting if that comes together.

LD:  
Yeah, it's pretty cool.

DM:  
How about fresh skeletal remains or fresh remains?

LD:

Fresh remains would be pretty easy to get DNA from or even RNA from. We probably would only be able to get DNA from bone. And so, what we're trying to do is see—he actually buried a number of them—

DM:

Oh, really? Yeah.

LD:

—a number of the carcasses and left them there for like eight months.

DM:

Yeah.

LD:

And then he had beetles, you know, working on one set. And so, essentially what he's doing is trying to compare and then I think once he still has in the freezer but he'll end up cooking or par-cooking, you know, and just see what happens.

DM:

Huh, gosh that's interesting.

LD:

Which, it could be very—have a lot of applications.

DM:

Yeah, yeah. Well, that's really neat. The blood samples and what little tissue you do collect, does it live over at the NSRL, or—?

LD:

We actually have our own collection. A long time ago, actually when I first got here, Baker made a deal with the University of Texas Museum in which all of the herpetological samples essentially went down to UT and we got all their mammal samples.

DM:

Right, I remember now.

LD:

And that's fine because I'm not a curator, you know, I was not trained as a curator. In fact I wasn't hired to be a curator, I'm still teaching the molecular biology course although it's gone

through at least twenty iterations that I was hired to teach, you know, because it is such an important area. At the time, you know, Tech was the first public school in the state to come up with a cell and molecular biology program. And we've had ours for well over twenty-five years. So that degree has been in place, and it attracts scary good undergraduates, scary good. Almost without a doubt, when we award each year the Earl Camp Award, which is given to the best biology undergraduate and is named for Earl who was our chair and who was also president of Texas Tech, we they're almost always a CMB major, a cell and molecular.

DM:

Wow, wow.

LD:

And we've sent people off that were just incredible.

DM:

Well, that's a great compliment to the program if you get that kind of student attracted.

LD:

Well, it's just been, you know, we had one guy that we got about oh, probably about ten or eleven years ago that's when I first saw him, Mike Henne, and—

DM:

How do you spell that last name?

LD:

H-e-n-n-e.

DM:

Okay.

LD:

And Mike actually came through the Clark Scholars program that Michael San Francisco oversees, and his girlfriend came, now his wife and mother of his children now, but this guy was such an unbelievable student that Harvard and Cambridge were calling him weekly to offer him scholarships to come do a PhD there.

DM:

Wow, wow.

LD:

And he came up to me and said, "Lew, what should I do?" And I said, "Go to Cambridge." And he did and when Tm Cech was here a few years ago in 2009, who was the program director, he was the president of HHMI, but when he retired from that after a decade, the first place he came was Texas Tech, and so, when he was here, Henne gave the departmental seminar, and so, it must've been at least a little bit intimidating to have a Nobel laureate sitting on the front row listening to your seminar. When Mike finished Tom leaned over to me and said, "That kid has really got it." And he's now at Southwestern Medical School, he's a faculty member, so—yeah, we're proud of a number of our kids, and most of those go on to be physicians or research scientists in areas other than say evolutionary biology because what we have emphasized, many of us over there for a long time, is I think that people are most successful in terms of getting jobs out in the real world when they can straddle the junction of two areas. So if you look at evolutionary biology as one wing and you look at molecular biology as the other, some people will be more evolutionary than they are molecular, some people will be more molecular than they are evolutionary. But if you can speak both languages then you make yourself into a very sellable commodity.

DM:

Right, right, that makes sense.

LD:

And so we've had real good success with our students, you know, getting great jobs.

DM:

Okay, good. You mentioned dissertation defense a little while ago, can you tell me what your emphasis was, your research emphasis?

LD:

That's when I started working on crocodilians.

DM:

Okay.

LD:

And in fact, my study was the first treatment of using a number of biochemical techniques, hemoglobin fingerprinting—

DM:

Oh really?

LD:

—starch gel electrophoresis, micro-complement fixation, which is an immune test. It was the first one that looked at representatives from every species. And in fact it was the only one that did for a long time, and—

DM:

What year was this?

LD:

I finished my PhD in 1981, December of '81. And so, it—

DM:

That's early. I mean, that's early for that kind of study.

LD:

Oh, it is, and for the—Herb used to say, he passed away about three years ago and it really was a loss to me but, he used to say that one of my foremost achievements in my dissertation was being able to get the samples because I—certainly we didn't have the funds. I did get an improvement dissertation grant from NSF, but we didn't have the funds to go and travel all over the world for these animals, so I had to go to zoos, okay. And you can't imagine getting a phone call from someone that says, "Hi, my name is Llew Densmore, I'm a PhD student in the laboratory of Herb Desuer, who I'm sure you know of, and I would like to come collect blood from your crocodylians." And I actually had laughter come one time, you know, but—

DM:

"No, really, who is this calling?" (DM laughs)

LD:

But I was persistent and eventually every publically owned facility came through for me that I called. There was one guy that had a—had one of these, sort of—it didn't have any really important animals to me, but he had better than just the side-of-the-road sort of sideshow. But it was essentially a private place like that. And so, it was outside of San Antonio, and I was, you know, going to try to go over there and collect blood. What had happened is some of the people from I think Texas State, but then it was Southwest Texas, had come and they had taken temperatures from some of his snakes with cloacal probes, and they ended up killing two snakes—

DM:

Oh, really?

LD:

—as a result of that. And so, he was very, very shy about working with scientists. But the rest of the people—and they became lifelong friends, you know, most of those zoo people.

DM:

How many facilities were you able to work with?

LD:

Let's see, it's at least, it's probably about fifteen.

DM:

Yeah, you needed quite a cross-section.

LD:

Yeah, I needed a cross-section, but you know, I got a lot from the Bronx, I got a lot from the National Zoo, I got a lot from the Miami Dade Zoo, and then I got some from Fort Worth and some from Houston, some from the—what is it? The Gladys Porter Zoo?

DM:

Gladys Porter is one down there, yeah.

LD:

Brownsville?

DM:

Brownsville, yeah.

LD:

Yeah, that's it, yeah, in Brownsville. And that was a really important collection because they specialize in threatened and endangered species, and so they had a lot of crocs and so I was able to go there. The Atlanta Zoo, the Memphis—just, you know, a lot of the zoos that—and then the St. Augustine Alligator Farm which is in St. Augustine, Florida. They have representatives from everything, but again, you know, for almost every one of those, I was the first person that got access to those samples.

DM:

Wow, okay.

LD:

And after a while, it was well enough known that I would actually—when I would call up, they would say, “Well, that’s great. We really need to catch these animals. We need to check their gender.” And for example, the true gharial, the long-snouted animal from India and Nepal, Tibet, the lowlands anyway, it’s very difficult to sex them. They get extremely large. They’ll get to be over five meters, but until they get to about three meters, they’re extremely difficult to sex because—which is about ten years—because the male’s penis is small and the female’s clitoris is large. And so, you know, I got so that with animals that were say, four to five feet, I was about 80 percent successful, but that was better than they were seeing. And when they would get a sample, you know, of animals in that were small, you know, two feet, eighteen inches, it’s virtually impossible then, even though they would be, the guys would send, “Okay, we’ve got two females and one male, here.” Okay, well, yeah. (both laugh) You don’t have a clue what you have, really. But that’s what they were told they had, so—

DM:

Well, that was a selling point for you, then it sounds like.

LD:

Yeah, yeah, after a while I actually was welcomed because I could do that. It was only because I had seen so many of the animals that were in the U.S., I mean, then, and so. It was a lot of fun; it was a real experience doing that, and I had phenomenal people on my graduate committee, phenomenal. And at least three of them worked on alligators, and all three of those were in medical school.

DM:

Okay.

LD:

Which is the guy named Roland Coulson who was Herb’s major professor.

DM:

Oh, really? Wow.

LD:

Yeah, Desuer got the first PhD that the LSU medical school awarded.

DM:

Okay, huh.

LD:

Okay, and his major professor was Coulson who was in the biochemistry department and was one of the most brilliant men I've ever known, just absolutely astoundingly brilliant.

DM:

That's nice you got a committee together like that.

LD:

I had seven people on my committee.

DM:

Wow.

LD:

Which was—and Herb wanted that, and he wanted that because I was talking about organisms and I was talking about biochemistry. So I had one guy on my committee that was an established investigator with American Heart. And then I had the director of the Louisiana Nature Center that was on there.

DM:

Some different perspectives, that's nice. Yeah.

LD:

Really different perspective. And then I had a guy that was a truly outstanding statistician. I mean, his name is Sam Rogers, and Roger's Coefficient of Similarity was one that he came up with and it was used for Alyzime starch gel electrophoresis generated data forever, forever. And it's still considered to be a valuable statistic.

DM:

Were you able to apply this in your own work, then? How nice.

LD:

Oh, yeah, yeah, I had to. I mean, I think he would have preferred me not to use one of the other measures (laughter) of similarity or diversions.

DM:

Right, right.

LD:

Which I did, but I also used his. And so—

DM:

Right, right. But how nice to have that different type of expertise in different areas.

LD:

Well, Herb was a very unique man. He was truly renaissance and what he believed was that the PhD should not be six inches wide, it should be eight feet wide. And so, he would ask people about clouds on their comps, or he would ask them who Baryshnikov was or I mean, things like that, and he didn't do it to embarrass them, he did it to drive home the point that this is a doctorate of philosophy, and you need to be a scholar and to be a scholar is not, like I said, six inches wide, it's a lot wider than that.

DM:

When you were getting into all this, what did your family think? I mean they were—had some question about herps but crocks?

LD:

Yeah, but the funniest thing is my dad, when I got my PhD he called me up and said, "Are you going to hand your shingle out?" I said, "Well, Dad, I could but it wouldn't work." (both laugh)

DM:

Were there some concerns about your safety?

LD:

I don't think so.

DM:

Okay.

LD:

I think, you know, I've had concerns from my mom and my step dad and stuff over the years, primarily my mom when I would go out of country. But, the fact is, you know, and she was petrified when I went to Cuba for the first time. And truth is is that I was safer in Cuba than I would be probably in 95% of the U.S., just because. But I think that they understood that this was a driving part of my life, and that I really enjoyed it, and you know. I was able to give my boys an appreciation for nature, you know, that I don't think that a lot of people get and a perspective that certainly in much of Texas they have a perspective of nature which is much better than not having a perspective of nature, but it almost always involves hunting. And so, I

certainly hunted when I was a young man and would still do so for meat, you know, but the fact is that I appreciate nature much more in its extant form than I do having to gut them. (laughs)

DM:

When you started into this field did you have an easy explanation for people about what you did for a living? (DM laughs)

LD:

For a while it was difficult, it was difficult, simply because well, when I went, for example, to the American Museum of Natural History after I had just finished my PhD, and the dissertation was published as a monograph in *Evolutionary Biology* which is—it's a pretty important journal, and that was something else I learned from Herb. I told him I wanted to be an author on that, and he said, "No," he said, "They're publishing this whole thing, you be the author. We'll be authors on enough papers." And that actually was very important in my career.

DM:

I'll bet; I'll bet.

LD:

Very important. But, so, the American Museum asked me to come up and give a talk, and one of the old crocodylian morphologists heard the talk and he said, "That is really interesting, I'm just sorry that it's all just wrong." (both laugh) And that really—there's not much you can come back with that, you know. Yeah, I just said, "Well, I'm sorry you think that but—and it may not turn out to be right—" but I said, "I've done it as carefully as I can," and the irony is—at the crocodylian specialist group meetings of the International Union for the Convention for the Conservation of Nature, IUCN, we had meetings in—actually in Louisiana about 2014, and someone was giving a talk on the history of crocodylian research. And what he said was that that paper of mine was the seminal paper of the field, and it was the complete paradigm change for that particular area because it then meant that people could apply those kinds of techniques to asking these kinds of questions. And what's really been sort of fortunate is that all of the major suggestions that I made in terms of the affinities of the crocodylian species in terms of how the genera were related and how the species were related have essentially been supported—

DM:

Oh, good.

LD:

—by virtually everything, you know.

DM:

Well, when you're involved in something that creates a paradigm change, paradigm shift there are going to people who say, "Wait, wait, wait. No, no, no, no, no." You know, initially.

LD:

Well, and you know, I'm not sure I would call it a paradigm shift. I think that's a little—I mean, what Tom Chec did was a paradigm shift, figuring out that R and A could be catalytic. What I did was sort of open up an area of research with a group of animals that we really hadn't looked at before. It's sort of like you—we've looked at them in this way, why don't we look at them in this way, and we may find out something different and new?

DM:

When you got your PhD in what, '81, did you say?

LD:

Yes, sir.

DM:

Where did you go after that? Did you come out to Tech at that time?

LD:

No, I went to the University of Michigan, and I did my post-doc up there, and that was another incredibly fortuitous event because I went to the lab of probably the best organellar DNA evolutionary biologist in the world. His name is Wesley Brown, and Wes just—he was phenomenal, and he taught me how to work with DNA, which is what I needed to do, I could see that I couldn't get all the questions answered with proteins, but that I might be able to do it with DNA, and so what I did was learn about how to work with DNA there, especially mitochondrial DNA, and then I kept in my back pocket the project for my first NSF grant which was going to be looking at the crocodilian with mitochondrial DNA. And so, when I got here in '85 my post-doc lasted from I guess the Fall of '82 to just about end '84, I guess spring of '85. But anyway, when I got here, I was able to write an NSF proposal that got funded immediately.

DM:

Oh, wow.

LD:

So, that was—

DM:

That was after you got here, or was that—

LD:

Yeah, that was after I got here. But, I had—I talked to Wes and I said, “Would it be all right with you if I used this technology?” And he said, “Yes,” he said, “Absolutely. That’s what I would hope you would do, use the technology that you’ve learned here and then apply it to the group that you know best.”

DM:

Was that work in DNA a real selling point for you in coming to Tech?

LD:

Oh, yeah, yeah, yeah. It was a big selling—

DM:

Sounds like it would be.

LD:

It was at the time. I was probably one of maybe fifteen or twenty, you know, in the country that was actually doing things like that.

DM:

Right, who was instrumental here in getting you here?

LD:

Baker.

DM:

Baker.

LD:

Baker was instrumental, Joe Goodin was instrumental, Jerry Berlin, you know, welcomed me. Joe Goodin hired me, and by the time I got back here, Joe was now Dean. So, I got hired—

DM:

Hey, well that’s nice. Yeah.

LD:

I got hired in February and then by the time September rolled around, Jerry Berlin was the new chair, and Jerry and I got along famously. I loved to yank him a little bit, and Jerry, (laughs) Jerry told me one day, “I just can’t believe these guys are wearing earrings. I just can’t believe it.” So the next day I actually had a—not a true—

DM:

A clamp-on?

LD:

A clamp-on, (laughter) but it was a big ring, it was a big circle, and I walked in there, and I walked by with my coffee and looked in the chair's office and said, "How you doing, Jerry?" And he looks up and he says, "We need to have us a damn tenure vote right now." (both laugh) Too much fun, it's been too much fun.

DM:

When you first got here was it—did you have heavy classroom assignments or based on your background were you allowed more research time?

LD:

What I did at first was actually—I taught molecular biology in the spring, and then in the falls, I taught a molecular techniques course, a five-hour molecular techniques course. And at the time, it was still—the discipline was still small enough in terms of the available techniques that I could do that. But within about four years that course was meaningless because there was—and it's almost completely meaningless now because you can never cover even remotely the range of techniques that are being applied.

DM:

Well, you know, that's really interesting that you've been here through that span of the evolution of the course itself and the discipline itself.

LD:

Oh, well and the evolution of those—of molecular biology as a field. You know, just it's been a lot of fun. And, you know, I've stayed at Tech because I wanted to be here. I've always been treated well as a faculty member. I always enjoyed the people I worked with and probably most of my best friends are on the faculty, and when you have a situation like that it's, you know. You can go make more money sometimes someplace else, but when you take everything into consideration, Lubbock's a wonderful place. And we've seen this, I mean, David Ray got a PhD in my lab, went off to—and learned about transposable elements in Mark Bachelor's [?] lab at LSU, got his first job at West Virginia, and then moved to Mississippi State and got tenure, and I knew that he was interested if we had a job in comparative genomics which we had been talking about doing for some time to actually apply for that job. And so, it came up, he applied for it, he got it, he's been a wonderful faculty member, but he just said I love—he said, "We've lived in a lot of places, and at the time I would never have believed it, but coming back it's the best place that we've lived."

DM:

You know, a lot of people who have had long careers here who are from very different parts of the country retire here,.

LD:

Well, I probably will. You know, we live out in Yellow House Canyon out by Rustic Range, and when we got that place I told Erica that, you know, I think we'll probably be here for our whole—my whole career, and she goes, "Well, why do you think that? Then you know, not that I want to go anywhere but why would you—?" And I said, "Because we couldn't afford to live in a place like that virtually any place else in the country."

DM:

You actually have a canyon, so wow.

LD:

We have our own canyon—I mean we're the last house on a right-of-way. And so, we have fifteen acres that walks like fifty, but there's three little blind canyons at the back, and so no one will ever build behind us, and we bought it in '99 for less than \$200,000. And what I would do a number of times when we would have potential candidates come in is I would take them out there and say, "Look this is, you know, if you get lucky," I said, "it's not easy to find but—and we got lucky, we claimed we won the lottery actually when we got that place—you can really enjoy yourself and you can live in a place like this." Well, the one guy that I brought was from the West Coast, he was interviewing here. And so, I had since then put up a forty-by-twenty steel building, and we put up a hot tub with a gazebo, you know, just really nice. And just—I mean, it has made living out there wonderful. So, he looks at me, and he said, "What did you pay for this?" And I said, "Well, certainly not as much as you think." And he said, "Well, I would think it would be about 1.5" And I went—I said, "1.5 what?" I said, "Do you think that that building houses a meth lab?" I said, "I'm a college professor," (both laugh) I said, "I can't possibly—" And when I told him it was less than 200 he just—his teeth, yeah. I mean, even down in Austin if you lived in the West Lake area, it would approach a million dollars just because of the land, that's really what it—the house isn't – it's, you know, it's about 2100 square feet, and it was designed in part by the lady that we bought it from. And so, she really had her stamp on it. But to let you know, seven people saw the house, every one of them made an offer. We were the second people to make an offer. The first guy was a realtor, and he wanted—he kept telling her, "Well, I don't like this and I don't like that," and he kept trying to talk them down in price and everything and so—

DM:

Part of his business approach I guess, yeah.

LD:

He probably was going to subdivide it into, you know. You can't really out there. They don't want you to have smaller than five-acre things, but he might've tried to make three five-acre things or maybe two or whatever, doesn't matter. So, we went out a second time to look and just sort of double check because when we went out there the first time, we're walking around the canyon and a great horned owl flew over, and I said, "That's a great horned isn't it?" And she goes, "Yeah, there's a family that's lived back at the back of the canyon for forever." And I said, "Can we see the house?" And she goes, "Well, why would you want to see the house? You know, don't you want to see the rest of the canyon?" And I said, "Ma'am I've been a biologist for, you know, fifteen years. I know what this looks like in the canyon. I want to see the house." And certainly it had a lot of carpet, you know, that we would not have wanted and everything else, and we were able to make a lot of changes, but when we came out the second time, she showed us how at the back when it rains a lot that it creates a waterfall.

DM:

Oh, yeah.

LD:

And so, probably a dangerous one because it comes off the fields, you know, that are above us and God knows what's in that water, but still, so we were on our way back into Lubbock, and she calls and says, "Do you want it?" and I said, "Well, we would love to try to see, you know, if we can get it." Erica had just gotten out of optometry school at the time, and so she'd been out—she got out in '97, so she was just barely getting her practice going and everything else, and so money was tight. And so, but she said, I said, "God, we'd love to try," and I said, "But aren't we number two?" And she goes, "Yeah," but she said, "There was a difference. The look on your eyes, the face, you love this place for the same reason we love it, not because it looks like a money-making venture, and we want to sell it to someone that's going to appreciate it."

DM:

Really glad it wasn't just a money deal for her.

LD:

Well, and it could've been because she was going to her grandmother's funeral, all right? We had a verbal agreement. Well, we were the second people, and I told you seven people saw it. I think number five came up with his checkbook and said, "Well, I want this," and she said, "Well, I appreciate that, but you know, we've already got a verbal agreement with someone." And he goes, "Well, you just tell me how many zeros I have to add to make sure that that verbal agreement is no longer good." And she said, "I appreciate your willingness to pay, but we're not going to do it."

DM:

So she was a person of integrity, too.

LD:

She was a person of integrity.

DM:

How nice.

LD:

And I still think she knew how much it meant to us, and you know, I've probably saved, oh fifty rattle snakes in the subsequent years by, you know, taking them off the road or taking them, catching them and taking them someplace where there are no people, you know, out in one of these oil fields or something like that. And countless—we'll catch box turtles, and we just bring them to our property or we'll catch bull snakes and we bring them to our property. So it's been fantastic living out there.

DM:

This is a topic I want to get in to more later, but you know, you have close ties with South Plains/Wildlife Rehab.

LD:

Yeah.

DM:

Has your place ever been used as a release spot, or—?

LD:

Very close to it, yeah. We actually released a ring-tail.

DM:

Oh really?

LD:

Yeah.

DM:

Wow.

LD:

Yeah, on the other side of the canyon where we felt it probably would be least likely to run into people.

DM:

Right, right. Oh, that's good. Okay. How are we doing on time?

LD:

It's 2:15. I probably need to go.

DM:

I'll go ahead and shut this off. I'd like to talk more about your career and your research, students—

LD:

Oh, I'd be glad to.

DM:

—administrative responsibility, you've been chair of that department, and you know, other things, so we'll do that soon, I hope.

LD:

All right.

*End of Recording*