

Michael Turvey Oral History

CAF: OK so this is January 26, 2016 and present; Carol Fowler, Donald Shanweiler and Michael Turvey. We are taking an oral history from Michael Turvey. Go ahead, Donald.

DPS: OK Michael. We want you to tell us about your childhood, what might be...have prepared you for your life as a science researcher
[laughter]

MTT: Good question. My father was a gambler, my mother was a factory worker. My brother received a medical degree at Royal College of Surgeons, University of Edinburgh. My sister was one of the first people ever to do computers. They were born...they were 13 and 12 years older than I was. I was, as it were, created during the so-called London's longest night when 1,750 German bombers bombed for 48 hours

DPS: The Blitz.

MTT: No, this was more than the Blitz. This was now to stop the collapse of the German empire as it were. And it's clear that my parents decided that this was the end of their time, since my neighborhood was basically destroyed. And so here I am
CAF: They needed more descendents.

MTT: So here I am. And I was brought up in school as it were, run by nuns, so there was very dedicated teachers, which are very important. In my school that I went to, only three of the children in my age group went on to the next level of school, which was grammar schools. Most kids just went on directions where they would get jobs very quickly.

CAF: What age would that be?

MTT: So eleven in the English system.

CAF: Eleven. Yeah.

MTT: Move on to grammar school. So I went to grammar school and two others from my class.

CAF: Isn't that awful.

DPS: I think I remember you saying that you went to a Jesuit grammar school.

MTT: Jesuit and Xaverian brothers. The teaching order of the Jesuits as it were, So that's where I went to grammar school. But the nearest grammar schools in neighborhood were about an hour and a half travel time away. So a little 11 year old kid...

DPS: On the tube or on a...

MTT: On buses and tubes. Two tubes and two buses.

DPS: Wow. But that was a high quality education.

MTT: Yeah, it was a good education, great education.

DPS: Very rigorous. Yeah.

MTT: And for some reason or other, I had always been well prepared to study, and I think that was partly...My father never read a book in his life, but he would always bring books into the house, whatever they were. Just pick them up when he was on his way back from the race track or the dog track or cards or pool, wherever he was earning his money in those days.

CAF: Have you ever read Angela's Ashes? I mean this is reminding me of Frank McCourt'...

MTT: Someone mentioned...I think Bob Shaw mentioned that to me that I should look at it.

CAF: He left school at 13. He was in Ireland But also his father was this alcoholic guy; he wasn't a gambler as far as I know, but just an alcoholic. But he taught his son to read. Just amazing.

MTT: Which is rather important., I guess.

CAF: Just amazing

DPS: Your parents...You must have been very special.. I mean, I met your mother. I remember her. Because all three of you were...

MTT: Pubbers

DPS: ...did things that were special.

MTT: I did leave...so I went on to this second school [grammar school] Clapham college as it was called. As I said, that was a long trip, every day it was about three hours' travelling, and I was always late. I was late from the time I entered that school until the time I left that school. I can still remember one of the main brothers would say: Turvey, late again. I would say simply: Yes, brother. And everyone, all my old buddies still say: Turvey, how you doing? Still late? I could never be otherwise. It was impossible. But I left school at 16 for a while, because we just couldn't survive, the family and I. So I started to look for jobs, maybe an apprenticeship in some engineering company. So I was doing some math and physics primarily. Although probably history was the subject I was best at. I in fact got the highest grade in the history exams, O level history exams, in the United Kingdom.

CAF: Wow.

MTT: And that meant I could go to Cambridge. But that meant nothing to me. Didn't seem to make...

CAF: Oh my gosh!

MTT: Yeah it didn't mean anything at all. I didn't quite understand it. But anyway, sport got in the way of many things I did I would say, but at the same time made me who I am.

CAF: Right.

MTT: So soccer I played a lot of. But track and field became the thing that I did most. And at Clapham College I was becoming one of the leading track and field athlete[s]. And that would be what determined the route that I took. And in fact some of my primary interests, like how can people do skilled behaviors, how can they do sport. I then went, not to a school where I would study math and physics primarily, but a school where I would study physical education. Turns out to be one of the greatest schools there is, and it had one tremendous quality: It taught you how to teach.

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CAF: And that's Loughborough.

MTT: Loughborough, yeah. Loughborough taught you how to take skills...I mean here's a typical thing. Here's a 14 year old. Teach the 14 year old the hammer throw. Hammer throw is a very complicated skill. Where do you begin? How do you take any skill that's tremendously complicated and outside the province of the individual but put it into that province. So those were skills which, I have to say, have been

tremendously important. This is the teaching class. My teaching class. It was based really upon the essence of learning how to teach skills at Loughborough. Great teachers. Great teachers *of* teachers. So that, I have to say,...

DPS: So the Clapham was still a secondary... a secondary school.

MTT: It was a grammar school. No, it was a grammar school, not secondary ...

DPS: You went to two grammar schools. The...Wait a minute.

CAF: So Clapham was the Jesuit school that you commuted to.

MTT: Yeah. That was Clapham school. Xavirian Brothers, Xavirian school.

DPS: What was...

MTT: Xavier

CAF: X-avier

DPS: Oh, gotcha, gotcha.

MTT: Then now we're going to college, Loughborough. And that's where I'm learning... I wouldn't do physical education at Clapham. did Latin, zoology...

CAF: History.

MTT: One of the teachers there always thought I should be a biologist. He was probably right. So I go to..How did I get to Ohio State. So as captain of the Loughborough track and field team, we would compete against Harvard and Yale and Princeton and Cornell. But this meet, this track and field meet, was organized by a professor of Chemistry at Birmingham University, an Irish guy. He was an Irish guy. And he and I became sort of buddies. So I had the best team in the nation. And then he would set up ...The best team in the nation competed with the visiting teams that normally just met Cambridge and Oxford. These were traditions. But he got them to meet us, compete with us.

CAF: And you killed them.

MTT: Well, no. They were good.

CAF: Were they!

MTT: They were really good, yeah.

CAF: Ivy League schools?

MTT: I think we won sometimes, they won sometimes. Yeah. But he became very important. to me. So when it was clear that..This story is a little entwined here. So my goal was to make the '64 Olympics. And I had got myself at the level of being representative of Great Britain. At least one time I made it. But I was still... plenty of time to do it. I was young, I was 18, 19 roundabout that. So I made the England team... the British team. And my goal, along with other fellow athletes at Loughborough who did go to the Tokyo Olympics. But I kept ripping a hamstring muscle and it was clearly was going to be the case that I would not go, would not make the Olympics. And I sort of wondered what I would do. Take a teaching job, not bad. But this Irish professor said; Why don't you go to America. Now here is the story as I tell it: We're beer—he was a good beer drinker---we're drinking beer in the Student Union at Birmingham University. And he's now telling me I should go to America. And I'm asking, why should I do that? He said: Be good for you. Get you out of the country during the Olympics. That was one thing, OK. But why should I do that? Two guinnesses had gone, three guinnesses, we're still debating. As I tell the story, and I'm sure his is worse than mine, after the tenth...at the tenth guinnesses:

OK, I'll go to America. I said; Where shall I go. He said: Apply to Ohio State and apply to University of California, Berkeley.

DPS: Now, let me get this straight. This Irish guy at Birmingham U...what was he?

MTT: He was a chemist. He was a professor of chemistry. But he was a man who just loved track and field. He's still alive. He still does track and field. He's at one of the great Irish universities now. Still teaching.

CAF: How old would he be?

MTT: 90s. He must be in his 90s.

CAF: 90s! Good man.

MTT: Got to be. Amazing man.

CAF: What's his name?

MTT: Jesus...As I get older, I'm getting less good at names

CAF: I know...

MTT: It will come back. I hope...He's actually an important person.

DPS: I'm amazed at that people from your early life that you've managed to have assembled sometimes

MTT: And still see. I still see a lot of these folks. Because I've brought him here. He's drunk in the pub. I invited him to come to America. He said; You're lucky you're in Connecticut. I don't go to red states.

CAF: Good man!

MTT: "I never visit a red state" He's a great guy.

But it turns...So I never figured out actually how things happened, because I never really sent Ohio State, who offered me a position, I never did hear from Berkeley. I never remember actually sending any forms.

CAF: You think he got in touch with people?

MTT: Well, this is what I came to learn much later. I didn't realize his importance.

DPS: Now, wait. You applied...You had to apply.

MTT: Yeah, I applied, you had to apply. So I sent an application

DPS: You applied in Psychology?

MTT: No, in Physical Education. Because my degree was in Physical Education. So I applied in Phys. Ed. and they offered me a position where I taught soccer and swimming, track and field. And studied. Because this was great. Courses, exercise physiology courses, motor skills courses. And so I'm doing pretty good. I like the first year. That first year, I had one year to do a masters degree. And, it was a quarter system. So three quarters, and you know, there's a lot of work in a quarter in a quarter system, but I'm trained to work. All the damned Catholic nuns and priests trained me really well. So I did well in the classes, and I realized that, in the United States, people didn't much care if you had prerequisites, and the lesson came to me as I often tell people. In those days you would sign up for a course and there'd be a little old lady sitting there and you'd say something like: Can I sign up for these courses. And, of course, you paid your money. So yeah, yeah as it were. So I remember identifying like a course in neurophysiology and a course in psychology. And I'd say: Could I take those courses? And she'd look at me and say; As long as you pay your money. And I'd say; America: what a country, what a country! So now I start taking some courses outside of Phys. Ed. That's part of the Phys Ed anyway. They always take courses in other disciplines. And one of them was

Psychology of Learning, which looked like a course I should take. With Delos D. Wickens. And I take the course. I have no idea what's going on in the course.

CAF: So you didn't take the prerequisite for that course, which probably was Intro to Psych.

MTT: I had no prerequisites. Went right into the graduate school. There's...It's Ohio State. They had hundreds and hundreds of graduate students.

There were 120 people in the class, graduate students.

CAF: Wow!

MTT: Huge. And I'm sitting in the back with two other jocks. I have no idea what's going on. At some point, to everyone's humor, I once raised my hand and asked the professor, Wickens, I asked him: So you're running these experiments on discrimination learning experiments with hooded rats. How can they see? You know, and like all these students looking at the jocks in the back of the room.

DPS: Spence preferred hooded rats too. They were used in Iowa; they were de rigeur there.

MTT: They were the rats everyone used. Because they just were black; you know their heads were black on their heads.

CAF: Oh! That's why they were called hooded.

MTT: So no one hooded them.

CAF: Right.

MTT: Everyone just called them hooded rats and everyone...

CAF: Cute little hoods.

DPS: They were meaner than albinos too.

MTT: See! He knows. But I knew how to do things. I really knew...And I knew how to write. The English system in that respect. was so good. You'd been taught this précis writing. Précis writing is where, you know, you take a book and you read it and then you write several pages. The next week it has to be a page less. The next week. much fewer ...and eventually it has to be a paragraph. And this is just going..the teachers are just sending it back to you, showing you...you keep shortening, shortening. So eventually, as Kelso and I often say: we can write an abstract in minutes. 'Cause the précis writing was an amazing thing.

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So now I'm taking these exams in the Psychology Department, and, of course, I can...my skills have taught me how to take something in many words and make it in few words. Which is, [usually in] these exams, there's only so much space to write in. OK so I guess I started to pass the course...Many years later...Oh now I shouldn't tell that bit now. So this is how now I'm in Psychology. And I took some philosophy. I took Ryle, our favorite.

CAF: mmhmm

MTT: Working on...Ryle was for me very important, and I liked the course on Ryle.

DPS: But it was Wickens who got you in it.

MTT: Well, Wickens who...No Wickens at that point was just a teacher.

DPS: Yeah.

MTT: He was just a teacher.

DPS: He wasn't a...

MTT: Nothing

DPS: big influence in your life.

MTT: Nothing. He was...He will become a big influence, but he was just one of the classes I took.

DPS: At that point.

MTT: So my stipend is up, and I'm returning back to the United Kingdom, and I go around to some of the teachers I enjoyed. And Wickens had not been there for the third...for the fourth quarter. He was at Berkeley. So I'm saying good bye to him. Because I'd got the four quarters including the summer one. I'm saying good bye to him. He says—and he'd just gotten back from Berkeley—and he says; "Where you going?" I said; "I'm going to England, I'm going back to England. " He says; "Why?" I say: "Oh, I've got to go back, see family, and my stipend is finished and so on and so forth." He says; "Oh, sit there for a minute". So I sit down. Wickens comes back. He said; "OK, you're teaching Psychology. "And I say to him: "But I don't know any psychology." He says; "You will." America, what a country! So they give me Intro Psych. And so now...so I start up.

CAF: As a way of becoming a graduate student?

MTT: No. I'm already a graduate student. Right? I've been in Phys Ed as a grad student.

CAF: Right.

MTT: And I got a masters degree in Physical Education.

CAF: But I mean, were you a T... was he making you a TA as a graduate student? [teaching assistant]

MTT: A TA...yeah as part of a stipend to...in the PhD program [in Psychology].

CAF: OK

MTT: So he sticks me in the PhD program. Marvelous. I'm still pretty naïve in matters of Psychology, since I'd only had a learning course.

DPS: He was obviously very impressed with you.

MTT: Well the long story there is that it turns out I had got the highest grade in that learning class. And he had given...Laird Cermak was his... a guy...Laird Cermak who a..he died young, was a very smart..

DPS: I've met him. He was at the Boston VA.

MTT: Yeah. That's right, Exactly, he was at the Boston VA.

DPS: in Cognitive Neuroscience.

MTT: in Cognitive Neuroscience, Cognitive Neuropsychology. Yeah. That's Laird. So Laird..

DPS: I talked with him, you know, and stuff, but not in...

MTT: Amazing...he died young, yeah.

DPS: I spent part of...most of a sabbatical there.

CAF: I didn't realize that. That he'd died.

MTT: But Laird told me some years later. "So, Mike...when people did that...remember that learning course?", he says, Wick gave me your exam; he said "Use that." As a benchmark."

CAF: As the answer key.

MTT: Yeah, that;s the answer key. So that's why when I went to see him...I always wondered why he just said: "Sit there" and came back: "You've got a job." Without me having a degree in psychology. So that was great. And now you come to question

3: How did you come here [UConn]. So to cut that long story short. Jules Rotter phones up Wickens and says; "We need a teacher of Introductory Psychology, you got anybody?" And he says something like: "Do I have somebody for you!" But now I'm looking at...I'm now looking at University of Connecticut on the back of me asking people questions like: What's Connecticut?"

19:11

CAF: Right.

MTT: I've never even heard of the name of Connecticut. Completely... that's a state in America?

But anyway...And at that point, I was also being looked at by Oxford.

CAF: Hah!

MTT: And so Vernon was the department head....*She*. It was a woman

DPS: Magdalen Vernon. I met her too.

MTT: So she was the department head. She writes me a very lovely letter. She says: "You know we are looking at you", she says, " but if I was you, if I was a young person..." I still have this letter somewhere; "If I was a young person like you, I'd stay in America. You'd have your own laboratory."

DPS: Because in those days, they didn't have much money for research.

MTT: Oh yeah. They didn't. Yeah. And so I thought about that, but then the thing that was really was the decider was that Oxford was offering me one thousand four hundred and fifty a year and UConn, nine thousand a year. That was when the salaries in the US were huge compared to Europe. In anything. Now everything's changed now because if you want to keep your people, you better...But anyway. And I came to UConn.

CAF: Was your dissertation on visual masking?

MTT: It was on iconic memory.

CAF: Iconic memory, oh.

MTT: So I published some things on iconic memory and short term memory.

CAF: Now when was your dissertation...what year would that be?

MTT: 1967. I graduated in '67.

CAF: So George Sperling *had* done his...

MTT: '60. 1960, yeah.

DPS: Was Wickens your advisor?

MTT: Yeah., my advisor. But there's a point, a thing here that is crucial, I guess. So remember my real background is really as a person who worries about sport. And movement. And one of the things that was compelling to me working in psychology when I was taking courses--- with great teachers I have to say. I really enjoyed my psychology courses---is that I could never make sense of it with regard to problems of motor control and movement. So I would ask questions; How could a fullback in soccer hit a 40 yard pass so it goes to the guy here. And this guy here takes the ball down in his chest, rolls it down to his right foot and with the outside of his right foot curves it into the goal, where another guy comes and puts it into the net. Those are the things I wanted to understand. I didn't see anything in psychology that does that. And I'm sitting in....This probably like 1960-what year am I?--1965-ish, 6-ish...I'm sitting in one of the cubicles in the Ohio State library. And I've been working through the Koch volumes for one of the courses, I think. And the Koch volumes, there's quite

a number. They're actually wonderful books with all of psychology. And they're written by prominent people. And one of the book's like on perception. And I pull it out. this perception book. Because I got a little bit bored---I rarely get bored---I got a little bit bored and I thought I'd take a break and look at something else. While I was studying for an exam. So I turn the pages and I come across this name Gibson. Now, in one of the courses in comparative psychology, which was a great course, I heard two words that I began to think were important. And both were of like kind. One was the word "invariant." Conditions of stimulation could be invariant, they could be higher order. And that was just part of...you know, passing through a bunch of material. The other was...damn! It will come to me. It came from the ethologists. So there's something about the way they were talking about conditions of stimulation. Because I'm trying...I'm looking at all this theory of S-R, and Ss were so boringly bad. CAF: No wonder you were bored.

MTT: I could never see...So, I'm just naïve...I'm just treating myself as a naïve person. I don't see how you can ever get that thing I just talked about.

CAF: Right.

MTT: That skill. How you can ever get...These....I wish I could remember the other word...But so here's one thing I'd seen, this word "higher order variable" and I remember the name, oh Gibson. So here's this thing on Gibson, which was the, .in the Koch volumes, is "Perception as a function of stimulation" I think is the title.

CAF: Yeah, right, yeah, there is one...

DPS: A chapter by Gibson?

MTT: By Gibson. In the Koch volume. And that night, as I'm sitting there reading, I simply said to myself: "That's it. There are higher order variables and we've got to be as tuned to..." That was it. So now, 1966, I'm at Ohio State. I'm doing Gibson. But I'm not doing Gibson in my experiments, because I have no idea what that means. But I already see what it is I need to do. That's the case. And I wrote my doctoral exams from a highly Gibson perspective at Ohio State.

DPS: Who taught that course on comparative?

MTT: Uh...Miles. a guy called Miles.

DPS: Miles

MTT: What's his first name? Ralph Miles? He went to ...he moved to.

DPS: Was it T. R. Miles?

MTT: No

DPS: A different Miles,yeah.

MTT: But he was a comparative psychologist, a great course. But he went to Boulder. Last time I saw him was in Boulder, Colorado when he left Ohio State. [Probably R. C. Miles]

DPS: Did you know Don Meyer?

MTT: Don Meyer...You know as you mention these names, see now Don Meyer, for me, that's where I did my neuroscience, was with Don. But Don's a Lashleyan. Perfect! Lashleyan. I mean... And he taught...The research was Lashleyan. I did research. I did surgery, I did occipital lobe and I did hippocampus and I did some amygdaloid complex.

CAF: On whom?

MTT: On rats. That's what you did them on, not humans!

CAF: No, I know it wasn't humans. Just want to know who the victims were.

MTT: So I did the surgery and [...] experiments. But Don Meyer, he was not a pleasant human being. But he was damned bright, and who cares? Right?

DPS: He was really focused on...

MTT: Yeah, very focused and he was Lashleyan. He was Lashleyan scholar.

DPS: I knew him because, when I was an undergraduate at Oberlin, he came and gave a three-day workshop or something.

MTT: Oh, because he wouldn't have been that far away, of course. Yeah, Yeah.

DPS: Right.

MTT: And he was a tall man, he was about 6 foot four. Very Germanic in his....

DPS: I was very young, but he made a huge impression on me.

MTT: Yeah, yeah.

DPS: Partly by his intensity.

MTT: Yeah his...Same with me. Same with me. It's great that you know...The course he taught was just terrific. Because it was all...It was Lashley. And the real hard problems.... And, if you've ever done any surgery, and if you remove areas of the brain and wait a few weeks, and the animals would be back doing what they were doing. I mean if you've ever done those experiments, you cannot accept a lot of the modern stuff, I have to tell you.

CAF: Good.

MTT: You cannot. You know at SEP [Society of Experimental Psychologists] guys will raise their hands when people are doing...when guys are giving their talks about this part of the brain doing this...They say, well, I remember when I was a graduate student, we would remove that. And a few weeks later...

DPS There is a parallel in human stuff. Because the results from surgical ablations in humans are very different from the results from traumatic injuries, the results from stroke and so forth.

MTT: You know you can lose half the hemisphere, half the brain and the other brain can take over.

DPS: The clean lesions that they made for epilepsy...very small deficits post operatively.

MTT: Yeah. I mean there's a lot going on which is completely forgotten nowadays as far as I can tell.

DPS: Yeah.

MTT: But that was, for me...Meyer, when he taught the course, this is the front piece you're now missing, when he taught the course it was a course on things like embryogenesis. It was a course on how things came to be! Wonderful!. So you can see now for me the pieces. I've got Gibson, I've got the Lashley piece over here. And then Meyer plugging into that. So how are you going to handle Lashley? By systems that can make themselves up.

CAF: Right.

MTT: Incredible courses. Wonderful. OK!

END OF FIRST FILE.

MTT...All these great questions! You shouldn't do this.

DPS: Well, you've got a lot to say.

MTT: Wow. Lord help us.

DPS: So what were your impressions of the Psychology Department.

MTT: I was shocked when I came here. Actually shocked.

CAF: By?

MTT: By the brilliance of the people. Al Liberman and Ignatius Mattingly. They were...so my first dinner was Al, Ignatius Mattingly, and the other new guy, Terry Halwes, who was also brilliant.

CAF: Who was also brilliant, yes.

MTT: Brilliant. I felt like an absolute twit. I mean they were so bright.

CAF: You could have gone to Oxford.

MTT: You know...

CAF: There were stupid people there.

MTT: They knew this stuff, this language stuff. Oh God, I knew nothing about language. So I remember that first night when Al had us over, the new guys. One of the new guys, Terry, knew everything they knew.

CAF: He came the same year you did?

MTT: Yeah, came the same year, yeah. And he's going to be important Terry Halwes will be very important in this little story. And I...so I thought...There were two things that made me think I wouldn't be here long. One was *that*. Those guys were just too scary. But more important than that, there was no pub anywhere. There was no beer. It was a dry town.

CAF: Was it! Literally or just...

MTT: I think when I interviewed there, it was winter and it was a snowstorm, so I never actually saw Storrs.

DPS: Wasn't anything to see!

CAF: Same as when there's no snowstorm!

MTT: When I say that, I mean. Yeah, I didn't know that. All I knew was that I didn't see Storrs because of the snowstorm. So when I take the job and I drive in, and I pull the car up, clearly I'm in Storrs, but I think; OK, but I'm missing something. And I get out of the car; it's been a long 10 hour drive from Ohio, stacked with everything I own. And I get out of the car, and there's a, I would say, a little old lady, probably forty. And I say: "Excuse me, could you tell me where the nearest pub is, please?" Because I'm an Englishman. I need a beer after the drive. She looked at me, smiled and walked away.

CAF: We don't like your kind!

MTT: Yeah. I realized in a short time, we were dry then. Not only is there no pub. There was no alcohol sold in Storrs.

CAF: That's not possible.

MTT: Ok, theres...Yeah, that was a bit weird; I was a bit surprised about that. But they found me this wonderful pub. At the...what's the wife of...What building are we in? This is?

CAF: Bousfield.

MTT: Bousfield's wife. She found me this cottage just walking distance from campus. And within one month of being in that cottage on this wonderful farm, it was better than any place I'd lived in my life. It was not a slum. Didn't have people above, below, in front, and behind, which is where I'd always lived. It was country. And the only things bothering you was the cows putting their head through the window.

Wonderful. Within a month, I was liking this place. Liked this place. And I liked the faculty, and I liked the people around. Didn't take long.

DPS: You started in January in the...?

MTT: No, I start in September.

DPS: You were interviewed in January.

MTT: I interviewed...Yeah, I interviewed during the winter semester. Yeah, so when...how did that work? Why would it work that way? Why was it bad, why was it snowing?

CAF: Well, that could happen that you interview in January and start in September.

DPS: Yeah sure. Because they try to...try to wrap things up before the start of the spring semester.

MTT: Yeah, yeah, yeah, that's right. Of course, it did work that way. That was probably it. Still, that...Yeah. That's right. That was it. I had Smith, Rotter and Al take me to eat. it was on campus. It was somewhere on campus like the Faculty Club after my talk. And the snow's coming down. And I say: "Where in fact is Storrs?" And Al says, "Oh, Storrs is over there." And Rotter says, "You're wrong Al, it's that way." And Smith says: "You're both wrong." Of course, they were dead wrong; it's nowhere. But I..So, I'm just OK. But that's all they said. So where...And being naive...where's Storrs? And they're.. Never to be forgiven those guys, I gotta tell you. So alright...Now you asked me about my impressions of the Psychology Department, I thought: Very bright people.

DPS: So I guess we're up to question 4: How and when did you start working at Haskins?

MTT: So this...Al had me come in and give a talk on information processing theory, that derivative of Neisser and the like. Because here's what I'm doing. This is what I know how to do, which is the emerging cognition, the Neisser type thing. And here's what I'm actually doing in my spare time, which is working on Gibson, working my way through Gibson, worrying about whether there is any type of movement theory, etc, etc. But bread and butter is over here. You've got to do experiments. And doing experiments is an apprenticeship. So I say to graduate students: "I don't care what the hell you do your experiments for in the first year. There are so many skills you have to learn, it makes no damned difference. Just get an experiment, do it, learn how to do experiments, learn how to analyze, and learn how to write them up. I don't care what you do. But after that, then I'll worry." But, so I was doing that. I was doing experiments. And I had a good team, and I had good undergraduates working with me. So Al knows about it; he knows about the work I'm doing. on information processing I was doing short term memory and iconic memory. And he brings me into Haskins to give a talk. So I give a talk, and Frank Cooper at some point later contacts me and invites me to join Haskins and introduce the new cognitive psychology to the Haskins Laboratories. And he buys me...you know, he gets me a Tscope.

CAF: Fabulous Tscope.

DPS: I knew he got you that, but...

MTT: He asked me what I wanted so I told him. And he bought this Tscope. And he had come by, being Frank, and I'm working on a T scope like this. Really old fashioned one. But they were...

DPS: Filled up a whole room.

MTT: No, eventually. See remember the one I had was this [indicating small size]. And then one day Cooper comes by and says: "Mike, I don't think that equipment is good enough. We can get you something else. " So he went from something that cost about \$300 to something that cost thousands. Six channels, fully automated.

DPS: Six channels, right.

CAF: Yeah, that's the one I remember.

DPS: So that was his...

MTT: That's what he got me, and he gave me a special room. And [Georgije] Lukatela joins me, because he's already... Lukatela's beginning to get very interested in this kind of of thinking. Lukatela joins me.

7:23

And works on those experiments with me. And he was good, because, being a signal engineer and so on, he had a lot of good ideas. And so this is Haskins.

DPS: You already knew Lukatela?

MTT: No, he was there, doing...He was working on some speech, acoustic problem.

CAF: Pitch extraction. It was something like that.

MTT: Yeah, pitch extraction. He was working on pitch extraction.

DPS: Yeah, I just didn't realize he...I knew he...He came first to Haskins before we moved from New York.

MTT: Yeah, exactly. He'd already been in New York.

DPS: Oh, he was back again. That's right. And then you met him.

MTT: Yeah, that's right. He came back again about 1970.

DPS: After we moved to Crown Street.

MTT: So we moved toI was only at Crown Street. I was never at New York.

So he became interested, and he was good to work with. So, you know, doing these experiments with George being very helpful in a number of places. And one other person being amazingly helpful. Port.

CAF: Bob Port?

MTT: No, not Bob Port. The wife.

CAF: Oh!

DPS: Diane.

CAF: Diane.

MTT: Diane Port was an engineer. Trained...

CAF: I forgot, yeah.

MTT: And she had taken one of the first ever courses in neural modeling, Ever. Offered. And so I would drive her to Haskins and drive her back. So I would pick her up and we'd go down to Haskins together. And as I'm working through the data of these 19-experiment collection I have, so I'm working through the data. So I've worked on this with a lot of input coming from Frank and a lot of input coming from Lukatela. So I'm now working on how to put all those data together. And one of the things I needed was to get an inroad into saying something that would be systematic. And I start talking to Diane, and we start thinking about how the data could be put into a neural model. I'm saying this because I've heard it said, In fact, McClelland came up to me and told me this directly. That's how they got started. From that paper.

CAF: But I don't even remember this paper. What is the paper?

MTT: My Psych Review article. [1973]

CAF: Oh, but I didn't see it as neural. It was mathematical

MTT: It has a neural...Yeah neural modeling.

CAF: Beautiful paper.

MTT: There are meant to be units acting as neurons. yeah.

CAF: No kidding!

MTT: And so it was a connectionist network.

CAF: I completely don't remember that aspect of it.

MTT: Connectist network.

CAF: I just remember the two mathematical descriptions of central and peripheral masking.

MTT: Yeah. Contingent and concurrent, which people then changed the name, which I was a bit disappointed.

CAF: Beautiful paper anyway.

DPS: Hang on. I missed that. What was that about changing the name?

MTT: So I used concurrent and contingent, So things are going on...the peripheral and central things are going on at the same time, but one is contingent on the other. I thought that was the...But later people, particularly Eriksen at Illinois, picked up on the same concept, but then he just changed the name. [...], I have to say I didn't like. The use of parallel and cen...They used something else. Parallel and sequential, I don't know, something like that. But anyway...And that body of research, of course, opened the door on many things. I was invited to give talks around...

DPS: Yeah, that paper made your reputation.

MTT: Made my reputation. And it got me the..

CAF: The [APA] Early Career Award.

MTT; The first Early Career Award and the first award ever given in cognition.

CAF: Is that right?

MTT: It was the first APA Early Career Award. And it was in Cognition. And the people who gave it to me were Bill Estes, Arthur Melton, and Ben Underwood.

CAF, DPS: Wow.

MTT: They were my sponsors [...news].

CAF: They must have been very disappointed when you went over to the Gibson side.

MTT: I don't think...Estes followed me very closely. Estes is not like those who followed him, I have to say. He saw what was happening, and he invited me to put in this Psych Review paper ,my second Psych Review paper, which was an attack upon...

CAF: That was "Contrasting orientations..."

MTT: Contrasting orientations, yeah. It was Bill who put that in.

CAF: No kidding. He read my dissertation.

MTT: Bill made the decision.

DPS: So it was Estes, Underwood, and the third person was?

MTT: Melton, Arthur Melton.

DPS: Melton.

MTT: So Bill had become a great fan, and Melton was a friend of Wickens. So I'd known him for a while, and he had become a fan of mine. And had tried to get me to Michigan at one point. So he was a lovely man. He would show up when I would be giving a lecture somewhere, and I'd look in the back of the room and Arthur would show up.

CAF: Like a groupie.

12:27

DPS: You know, Spence was a very competitive guy, and I think he regarded Arthur Melton as his most...

MTT: Most threatening.

DPS: Most threatening.

MTT: Arthur was so sort of laid back and wrote beautiful papers. So you know I was blessed by those guys.

DPS: Crowder was a student of his.

MTT: Yeah, Crowder was a student, yeah. Crowder was a student. And we got invited to this special gathering of all the big scientists, just Crowder and I when we were young. Cause we were about the same age. He was just at Yale, and I was just at UConn. And we got invited to this thing up in the mountains in California. Where all the big guys showed up. And that's where I presented for the first time the all of the masking experiments. And that's what got me the award. 'Cause those guys were in the audience. Anyway, so there we go. This is Haskins. Frank Cooper was very important.

DPS: All right. So now this asks you to think more about Haskins connection. What was valuable to you about having that connection. Did being at Haskins change or shape your research program.

MTT: Well enormously in fact with regard to the

CAF: Yugoslavian...

MTT: information processing. And then picking up those ideas and putting them into language, into the word recognition.

DPS: But also, how did your being there influence the research program of Haskins Laboratories.

MTT: Well I think it controversially influenced the research program, because at the same time I was working, exploiting the ideas that came from the large masking paper as techniques for looking at visual word processing. I've always thought Lukatela and I did close to the best work in the field. We had much better control much more rigorous manipulation of the ways of contracting the time available. So we had data in major journals, like *Psych Bulletin*, *JEP*, etc., etc., showing that the amount of time must be terribly small, milliseconds, 10 ms, to do visual word recognition. As opposed to the literature, it's got like: 200 [ms], or 100. And we were showing, No. You set up the design right; this is going on a scale that was way, way faster than that. And so all those masking experiments, I have to say, I'm very proud of those. And they were built from what I learned through that apparatus that had been bought for me by Frank Cooper. Yeah.

DPS: So it made another arm to the reading research that was already in progress at Haskins.

MTT: Yeah. Which was already in progress, yeah.

DPS: And I don't know if you thought about it that way initially.

MTT: Well, see, the sabbatic leave that I had was the big move. My first sabbatic leave. So I got a Guggenheim, and that sabbatic leave took me to...The Guggenheim based a lot upon this work that Frank Cooper had got me to do, you see. And so I went to Sussex, 'cause you could be close to home, see my parents, , and so on and so forth. And at Sussex, what I turned my attention to wasNow, I'm getting serious about things that had been lingering a bit. Let's do Gibson, and let's do Bernstein. So let's do this thing on...And it was mainly the action thing first. Let's get....I was already convinced as to how I was thinking about perception. So I got: Gibson's there. But I got to get action down, and our best bet was Bernstein. Now, the important thing there: Who introduced me to Bernstein? Terry Halwes.

CAF: No kidding! Now, how did he...

MTT: Now Terry, remember, was a tremendous reader. He read a lot of stuff. He hung out with a lot of people who sort of were, not always in the mainstream, but were bright, intelligent, intellectually aggressive. And he had come across Bernstein. And so when we were...We had a small group meeting trying to put together ways of rethinking, say, the motor theory. And we were just young folks. And what we were looking for is...It was clear to me that the sort of serial story was a bit inadequate, and the basic units weren't at all clear as to what they were. And I'm sort of pressing, what I'm looking for. And I can't remember who...It was mainly Terry, probably some graduate students. It was a small group, about four or five, and we met every week. But havnig Terry around was terribly important. He said: "I think we should look at this guy Bernstein." So we began to look at Bernstein. And so now I'm beginning to see that this guy is where I'm going to get my theory of action from. And when I take my sabbatic leave, then...So my sabbatic leave is...My plan is now to mainly to solve this problem, the action problem. So this actually turns out to be a major paper.

CAF: So what year did you take...have your

MTT: Seventy three to seventy four. Because I came to Haskins..I came to UConn in '67 and then seven years later was my sabbatical. '73 to'74.

CAF: Because I remember you coming back, and you'd read all these Russian biophysics things, and...

MTT: Yeah, exactly.

CAF: It was a very stimulating time. I just didn't remember it was that late in my graduate career.

MTT: Yeah so that year, I just sat basically, for the first...certainly for the first half, in the library at Sussex working my way through *Biophysica*, which they had, the journal, *Biophysics* journal.

DPS: Was there anybody there who

MTT: No

DPS: This was..

MTT: No,no one. Being there was hanging out with Brits who do pub every day after...

CAF: Was Chris Darwin there?

MTT: Chris Darwin...

DPS: Wasn't there yet

MTT: Wasn't there yet. That was after he left here. That was his position; he got a position there. Because he came here as a doctoral student.

DPS: Was Sutherland there?

MTT: Sutherland was there yeah. So for me, Sutherland was the guy I took to the pub and got out of the pub.

DPS: Was Tony Marcel there?

MTT: Tony Marcel was there and Tony I liked talking to a lot. We're still good buddies. Yeah. We chat a bit every now and again, and, if I'm in Cambridge, we get together. So he was there. So he knew about this. And he was quite excited about this evolving action stuff. But there...that's where I wrote that paper. And I finished it in seventy...in the end of '73, or early '74. It didn't get published til '77, because the book took a long time coming out. It was a bit annoying.

DPS: Books are...

MTT: Books are terribly slow. So you sign up for the book and the chapter, but the other people haven't written their chapters. It's one of those annoying things. But I now had the coordinative structure concept down. I picked that up from a guy called...

CAF: Easton.

MTT: Eaton?

CAF: Easton.

MTT: Easton. And I had been put into contact with Greene also. By Terry Halwes, also Terry Halwes.

CAF: No kidding!

MTT: So Greene was this roboticist who had read all the Russian literature and was looking at robots through the Bernstein school.

DPS: What was his first name?

MTT: Peter Greene. Peter Greene. And..

DPS: And he was in England?

MTT: No. Peter Greene was...I'm in England, but Peter Greene was..is an American. He's at University of Chicago, Illinois. And a roboticist, a very interesting roboticist. And he brought a lot of the Russian stuff into America. So he put together a volume, which was these Russian dudes thinking about thises and that's of movements and self-organization. So I became quite familiar with the great Russian school, a lot of it.

DPS: This is fascinating. I just want to interrupt...

MTT: Yeah, sure.

DPS: to interrupt and back up, because I meant to ask you something that is now past. What did Frank Cooper contribute to the early stages?

MTT: Well, for me

DPS: I mean, I know he contributed enthusiasm and...

MTT: Yeah, I think...

DPS: What...Did he contribute to the ideas at all or the...

MTT: Well, I think that when we were doing the modeling with...what's her name?

CAF: Diane, Diane Port.

MTT: Diane Port. Frank of course was a person you could go to to ask his thoughts about such things. And I think he liked that a lot. I think he liked seeing the fact that we had this very rich body of data that we were now putting systematically into a

quasi-neural model. The mathematics being laid out minimally, but sufficiently. So I think...And he would inject things every now and again. He would come by and give us an insight. Confirmation.

DPS: He was a very insightful guy.

MTT: Amazing guy.

DPS: But I didn't know what his interactions with you had been.

MTT: They were always very good as you can imagine from, you know, buying me that equipment and reinforcing thises and thats. Yeah he was always very important. I found him a great leader. Great leader of a great Laboratories.

5:20

DPS: I think he was too. He was an underappreciated man.

MTT: He was such a gentle soul. Went about his work beautifully. Very important. He was very important to me I have to say that man. You know, invited me, after Al mentioned that I should come to give a talk, and when I gave the talk then he asked me to join and introduce that way of thinking to Haskins. Course, trying now to introduce the next way of thinking. I think the action stuff does get across. I mean. that became a prominent part of the Haskins work. But the perception part, no.

DPS: But you encountered some resistance there.

MTT: Some resistance, yeah, resistance there as well. Yeah, because we now... .. So we got... Kelso comes, right. So Kelso...So I'm giving a talk somewhere in Iowa, there was some gathering in Iowa of main people in the field of movement. And, the top five, and I was one of them, and we were meeting at Iowa, and Kelso brought these people together. And Kelso's slowly realizing that this, what we 're doing at Haskins, is way better than what's going on anywhere elsewhere. You know he had a huge laboratory, great graduate students, he had a professorship, assistant professor. He gave it up, came to Haskins.

CAF: For soft money, because...

MTT: It was a big decision. I mean what a decision he made.

DPS: But you were the person who brokered that.

MTT: Yeah. So...No, I didn't broker it, no. All I did was to...

DPS: I mean you said: "You should come, or..."

MTT: No, no. I did none of that. I just lectured and wrote. That's what I did. But, you know, he's there. He's at these things. He's seeing this. And it's so different from the field of movement research, which was, you know, still built off of S-R theory and so on and so forth. And now we're building out of Bernstein, self-ordering processes, concept of coordinative structures.

DPS: So what I'm asking:

CAF: How did he get to...?

DPS: Was it his being impressed with you that made Haskins so attractive to him?

MTT: Yeah. Being..Because I was...Well, he saw that... knew I was there, and he-- actually, I think he imagined then the best he could do was get a post doc. So he applied to Haskins and got a post doc. So he gave up a big salary, gave up thises and thats, and took a post doc.

CAF: I never knew that! He was a post doc!

MTT: Yeah, came and...then I think that Haskins took care of him rather quickly. They put him on,...got onto the staff at Haskins. But he came with a huge drop of salary.

CAF: Wow!

MTT: Yeah. It was really a gamble on his part.

CAF: Well it paid off.

DPS: So this was your first real comrade in arms so to speak.

CAF: On the movement side.

MTT: Yeah, sort of. Sitting there more importantly was this other crazy bugger that was a person who was finishing his degree at Columbia.

CAF: Peter Kugler

MTT: But had read one of my papers and decided he would come to see what was going on at UConn. And we were holding this thing on Friday afternoons, which became the Friday afternoon club. We went pubbing afterwards. So he would come to that. Scotty was at that. And what's his name...famous movement guy.

CAF: David, David Rosenbaum

MTT: Thank god you're here. David Rosenbaum came to that from MIT. A couple of roboticists would come down. We were meeting and doing this new way of thinking. Off of the Bernstein stuff. It was quite something. I'm surprised what did happen. And...But Kugler comes. See so Kugler's a guy finishing...he's doing his PhD. He's doing the dissertation. He's been here a couple of times and he says: "I'd like to get my degree here." And Bob and I just, Bob Shaw and look at him and think: "You're nuts. Finish your degree there." He says: "No, I won't take...give myself a PhD until I understand this kind of thinking."

DPS: Where was there?

CAF: Columbia

DPS: Columbia

MTT: He was at Columbia, yeah.

CAF: And he was doing learning stuff wasn't he?

MTT: Yeah, he was doing learning, he was doing good stuff. So we tried to convince him not to. "No." And he's not an easy guy to convince. And it turns out that he's a bit of a genius. So once you got him on board, Peter Kugler, he's a real scholar. His grandfather competed with Marconi and Tesla for radio. There were three of them. His grandfather was an abstract mathematician. He comes from a seriously bright family.

CAF: Well, his brother is really...

MTT: Yeah the children are all...yeah, they're all bright people. And so he, you know, he works 12, 13 hours a day. So we got this powerhouse, all of a sudden, of a kid coming in and now doing. And finding new classes of references and so on. Kugler becomes a major figure. And there was...The first paper's on dynamics, on self-organizing theory were Kugler, Turvey....Kugler, Kelso and Turvey. I put the youngsters up front.

END OF SECOND FILE

MTT: And then you have people like Richard Schmidt engaged in...doing experiments. And Richard's also at Haskins, but he's at Haskins originally in...with respect to reading.

CAF: Was he?

MTT: And he shifts to movement.

DPS: How did Kugler discover you and this...

MTT: This paper I did at Sussex. So he had got to read that.

DPS: And he was a graduate student at Columbia.

MTT: It came out ...because Haskins published it in '75 [in the Haskins Status Reports]

DPS: Oh, OK

MTT: And somehow it got moved around the country.

DPS: I think our Status Report was an important...

MTT: The Status Report was amazing, yeah.

DPS: Was an important thing. It's

MTT: It got moved around the country fast so people knew about the paper ages before it was published.

DPS: Yeah. I don't think we'll ever get back to...

MTT: No. We'll never do that. Never happen again.

CAF: No. But now articles appear on line before they come out. So there's not the same kind of delay.

MTT: yeah [...]

CAF: So was it Peter who was the first...was the origin of the interest in dynamical systems?

MTT: He was the person who first made the move to inject into the concept of coordinative structure the idea that, if it's self-organizing, then we better look at people who worry about that. And one of those was Prigogine. So we started looking at Prigogine.

CAF: Yeah. wow. yeah.

MTT: And so...and the literature around that.

DPS: Say it again for me, because I'm not so familiar.

MTT: Yeah. So the central concept has been and still is--and Elliot [Saltzman] has recently published on it a recent *Ecological Psychology*, is how do these various bits and pieces gang together. So my favorite example these days is that, if you just look at any utterance in speech, about 70 muscles must coordinate in a way unique to the phoneme. So this is actually the easiest seller when I tell people at lectures. So I say: "Watch me now when I'm speaking; think of how many phonemes, how many utterances, phonemic utterances, am I making as I'm speaking like this?" And here sitting behind it is this machinery, running from here, through here, to here that has to [ch..ch..ch..ch ch]. That's the degrees of freedom problem.

DPS: Right.

MTT: So how are you going to solve that one? It's nothing...it's not a nervous system thing in the standard way. And so then we started looking at how can you take a lot of things and have them gang together to form an organization. And that was just starting, right? The Nobel Prize has not been given to Prigogine yet. So we were already doing that work, already looking at it. It comes very soon actually. Very soon after we started this.

DPS: He got the Nobel Prize for work on self-organizing...

MTT: Yeah, the first Nobel Prize in self-organizing systems. That was the first guy to get it.

CAF: And then was it Peter also who saw the connection to von Holst and therefore came up with the pendulum paradigm?

MTT: The von Holst thing was a...The von Holst thing was sort of a more natural thing to look at because the guy was worrying about rhythmic movement, which we were taking as a thing to look at. We were looking at locomotion. Because you already were doing ...You did that program.

CAF: Umnitsa on the treadmill.

MTT: You programmed locomotion.

CAF: Yes, I did.

MTT: So we were looking at quadrupedal things, and then we made a biped that we could manipulate. That was a...I think that was a great Peter move, but we were already...We were worrying about well maybe we wanted something where we could look at rhythm. So we began with one and then coupled and so on and so forth.

DPS: So Kugler brought you to Prigogine, or...

MTT: It was a sort of, yeah, so we knew what we were looking for, but Peter being...You know his basic background is really more mathematics and physics, but he's a dyslexic.

CAF: He is??

MTT: So he was at UConn as an undergraduate. Yeah. He's a dyslexic. He's a U...as an undergraduate he had a hard time at UConn. He went into Phys Ed as well, tennis and soccer.

CAF: Huh!

MTT: But he was always doing math and physics.

DPS: But was he a graduate student *in* at Columbia?

CAF: Psychology.

MTT: At Columbia, it was in...I think it was in Psychology.

CAF: I think it was in Experimental Psychology. I think it was in learning.

MTT: IT was Experimental Psychology at Columbia.

DPS: mmhmm.

CAF: But it was boring psychology.

MTT: Yeah, experimental psychology is what he was doing there. And so, he was very important, I have to say, Peter coming here. And then Scotty now leaving his place and coming to Haskins. So all of a sudden, we had a wonderful group of people. And then I lectured out at Minnesota and that grabbed Elliot [Saltzman]. Elliot's dissertation was written on this stuff. In fact, he had the truly first mathematical statement of some of these things in his dissertation.

DPS: So you were probably invited to the Center, right?

MTT: Yeah, so I lectured at the Center, and Elliot was there. And I was invited to do just this: To talk on the new action work. So all of those things are moving along quite nicely. So you want me to do...

5:08

So you can see the significance of Haskins to [question] 5. So you asked me question 5: How Haskins helped me and then how I think I was influencing Haskins.

DPS: So I guess we're up to 6 then: Tell us your impressions...

CAF: Well just...One thing that occurs to me that you didn't mention

DPS: Oh, I'm sorry...

CAF: Because of you and George Lukatela, I would say that was the origin of all the bilingual, cross language research.

MTT: Yeah. I was sitting running the masking experiments. The ones that got me the Cognition [APA Award], and so I say to him [George]: So, what's your writing system like?

CAF: Well, we have two.

MTT: And he starts telling me about it, and I'm thinking... It didn't take me very long to say: And you mean that some of them [letters] are shared...They don't...So within weeks I said; We could use that.

CAF: A dream for...yeah.

MTT: We could use that. And Frank Cooper...we collected some data and we ran some experiments and then Frank Cooper said: I think we can write a grant. And we wrote a grant and got funded.

DPS: So that was a kind of strand that was running along in parallel with the stuff that you've just been talking about.

MTT: Yeah, because I'm at Haskins and part of my job at Haskins was to...Frank Cooper had primarily brought me in to facilitate the language-by-eye project. And that's what I was doing.

CAF: Right.

MTT: Yeah. And my ability to do things like Gibson and Bernstein are taking...They're on a much slower trajectory. So I'm learning, just as I'd been doing at Ohio State. So I'm trying to learn about Gibson, while I was actually doing the basics of a degree. And now I'm learning Bernstein and I'm learning self-organizing physics. But you know I'm not going to publish on any of that quickly.

DPS: Right.

MTT: And so I'm doing...

DPS: To the extent that that was going on at Haskins, it was sort of sub voce.

MTT: Yeah exactly. Yeah.

CAF: But of course it did have an influence on research that..that Betty Tuller did, and Scott Kelso and that Goldstein and I did.

MTT: Yeah. The guys out in California now [Goldstein, Iskarous, Byrd]

DPS: And so by that time, Carol was at Haskins.

MTT: Well Carol...

CAF: I started in '71

MTT: Carol was actually very big in this, because she was already doing the modeling of the quadrupeds, quadruped locomotion.

CAF: That was me trying to make use of a course I took with Peter van Gelder on learning to program a computer, and I just needed a project.

MTT: Yeah, and we were worrying about the problem of coordination.

CAF: How did Umnitsa [dog in Russian publications] get her limbs back in coordination when she was perturbed.

MTT: Somehow we've missed the fact that one of the most important people all in this is Carol

DPS: Right. Well, now I'm assuming that that's true, but

CAF: We did my oral history so it's alright.

DPS: No but we need to bring you into this story, because

MTT: Because you know, this piece, when I returned from Sussex, right, that's when I decided I should start doing some of this, and there was Carol and...

CAF: Remez and Rubin

MTT: Remez and Rubin, at least those, and Cam Ellison, maybe, was he...or was he later?

CAF: No, he was there at the same time, yeah.

MTT: And so I sort of wanted to introduce some of the action stuff and some more of the Gibson stuff. So I put together a course, and you guys took it; it was very easy going.

CAF: So the course that I remember most was a course in which this one, this book, Ulric Neisser's book [*Cognitive Psychology*, 1967]

MTT: That's the one I was teaching from.

CAF: Yes, well. There were two books, right? There was this one and then there was Gibson's, 1966. And you took us through this one [Neisser's] and made us believe that constructive psychology was the way to go. And then we started reading Gibson, and we couldn't believe that you were starting to criticize it. We were so..It was so effective. Fabulous. A great course.

MTT: That was the idea. That was the idea.

DPS: Socratic teaching.

MTT: 'Cause you have to know that [Neisser's approach] inside out. Then you begin to see what's wrong with it. Then we did this kind of...as I remember it, when I came back from Sussex, I introduced a kind of reading group, and we began..and it was mainly you three [Fowler, Remez, Rubin] as I remember...

CAF: Yes, uhhuh.

MTT: And you being bold as you are you put together this quadruped program, which actually was very good. We discussed it with people at conferences and the like.

CAF: Yeah

DPS: So, let's tie it in with Haskins. What ...when did Browman and Goldstein arrive?

MTT: They all came a bit later, of course.

DPS: A little later?

MTT: And Elliot...Elliot came, and Elliot started to do the dynamics. 'Cause he had written that paper...I'm not sure...He had written his dissertation, and the publication was using a dynamical take on the problem of coordinative structures.

DPS: So Kelso was the first dynamicist.

MTT: He wasn't a dynamicist yet; he was just a guy.

CAF: He was a motor guy.

DPS: A motor guy...motor control guy. OK.

MTT: He was a motor guy...just movement. He wanted to come and learn..motor control guy. And when Elliot comes in

DPS: Then Elliot.

MTT: And he was closely allied with Kel...Scott's getting a grant of some kind.

CAF: Probably.

MTT: And so Elliot comes in and so now...Some of this is not as precisely clear to me. Because they're all coming all about in the same period, but...

CAF: Now Louis [Goldstein] came before Cathe [Browman], right. He got a job at Yale. And I don't know when that was. So I went to Dartmouth in '76, and it might have been after that when Louis came.

MTT: Yeah. Louis came after.

CAF: Yeah, Louis came after that.

DPS: You started at Haskins the same time you started at Dartmouth.

CAF: No, no, no. I started at Haskins...I got paid my second year of graduate school in '72.

DPS: I know you were a student, but..

CAF: Oh, I see. After my dissertation, so probably '76 is when I officially started as a Research Scientist or whatever the title was, yeah.

DPS: Yeah.

CAF: And I think Louis came a little after that. [Louis came to Yale/Haskins in 1980] I definitely remember the excitement that was caused by his talk, whatever he talked about. But then it was after that he brought Cathe in, initially as a programmer. And she got interested in...Because she was a linguist really. She got interested in how to think about phonology from the perspective of the Kelso, Turvey, Saltzman..

MTT: And given also that the Haskins Laboratories had been famous for a motor theory of speech. Something about that, you know the classic '65 paper that was being carried over...

CAF: '67 paper

MTT: '67 paper that was getting carried over into this new work...because this new work was showing how you could in fact bridge that gap between the production and the perception, right?

DPS: mmmmm

CAF: And of course there was ongoing research on coarticulation and stuff. Kathy Harris and her group.

MTT: Terribly important, yeah.

CAF: Yeah, right.

MTT: So Kathy was very excited by the coordinative structure theory. She was very excited. She saw it as providing insight into these coarticulation problems. And they remain pretty much the damn same problem.

DPS: Now, Alvin [Liberman] was not originally enthusiastic about it, was he?

MTT: Oh, I think Alvin was happy with action. I think it was when...

CAF: He wasn't happy with Gibson, right?

DPS: Yeah.

CAF: I think it was our talking...speaking in a Gibsonian way that he told me he thought Rubin, Remez and I sounded like crazy people, and he was probably right, because...

DPS: Alvin said it's crazy that all perception is direct. And that's what he said

CAF: Exactly. Because motor theory is not direct perception and he was so convinced...

MTT: Motor theory is far from direct.

DPS: So there was pushback.

MTT: Yeah, because [...] I had come in as a guy who could build the appropriate information processing theory.

CAF: Right.

DPS: Yeah.

MTT: But I'd already turned that corner a long time ago, as you now understand it, at Ohio State. I'd already made my path. I knew where I was heading. I knew what I needed.

DPS: That's so fascinating. I didn't...

MTT: I knew what I needed.

CAF: And I think Al, surprisingly, was not interested in speech production. I mean he should have been as a motor theorist. But he really never...it never really grabbed him. He was happy to let Kathy's group kind of deal with it. So I don't think he paid attention to the motor part.

DPS: He didn't pay a lot of attention to the details of that. I think..

CAF: He didn't

MTT: I think he relied on Frank to do more...It was more Frank's work.

DPS: Yeah, Frank was definitely involved in the production stuff. For a long time, wasn't he. Yeah.

MTT: And I think we then had two radical things going, which were both exciting for the Laboratories and at the same time a little painful. It was clearly the case that not everyone was happy. Scotty picks up another dimension, which is we get the synergetics group. Because, you know so he's sitting... Look how things happen for Scotty. He's listening in to all these talks. He's realizing that model you want is going to be a rhythmic model. That's that's where the physics sits the math sits. In rhythms, combined rhythms of the body. So that's why we...why Carol and I worried about quadruped locomotion. And she showed how you could use some reasonably simple strategies for modeling it, and getting some very reasonable predictions satisfied out of it. And so Scotty is beginning to realize that the standard things looked at in movement research, which are pointing movements and grasping things weren't as illuminating as were rhythmic movements. And so he begins to focus upon that, and in fact this thing [cycling motions of two forefingers] came from Kelso...

CAF: Right.

MTT:...came from Kugler

CAF: Oh, it did!

MTT: from Kugler, yeah.

CAF: Ph! You know, Kelso tells it that he was thinking about let your fingers do the walking through the Yellow Pages.

MTT: Yeah

15:07

But see the idea that that's what you wanted was: Peter in our Friday gatherings was saying: Well, notice that one of the things that's going on in this system, it's going through phase transitions. It goes from one kind of walk... it goes from a walk

CAF: to a trot...

MTT: to a trot to a run. And this is Prigogine. See? So that's what he's pointing out. So already people are beginning to see: Oh, so if you take the rhythm structures, coordinative structures, like the foundations of speech, etc., you can begin to lay hands...you put your hands on the dynamics of relevance and the empirical procedure. So this is now: Scotty's in there, and that's when Scotty's thinking about the....how would you ever run...how would you ever do these experiments? So these are quadrupeds, etc, etc. and humans. So humans, you know, walk and, [as fast they] walk, they break into a trot.

DPS: This is such a wonderful story. You've really got to get this out.

MTT: It isn't easy.

DPS: Let people...more people know about it

MTT: Now Scotty is giving a lecture. He's lecturing somewhere in Germany and he decides he'll go and see a guy who seems to work on these problems.

CAF: Haken

MTT: He goes to Haken and he shows Haken the experiment. Haken's not thinking experiments, Haken you know, he's just writing equations. And now you got a linkage between Scott and Haken, and that becomes huge.

DPS: Hak..? Who?

MTT: Hermann Haken

CAF: He's synergetics guy.

DPS: I don't know

MTT: Greg Schonner was his PhD.

DPS: Oh.

MTT: Gregor Schonner? Who came to Haskins; he was at Haskins for quite a while.

CAF: He worked with Scott.

MTT: You don't remember?

DPS: I don't know these people. No. I've forgotten

CAF: Well, there's a very famous...Kelso, Haken, Bunz, is that what it is? ...Oh,

HK...Haken, Kelso, Bunz.

MTT: HKB equation, which is...

CAF: Haken, Kelso, Bunz equation that everybody now uses.

MTT: And it's only on this. It's only...Here's Kugler doing one of these things...showing people: Look at this. This has to be Prigoginian. This has to be self-organizing principles. So you go from the walk to the trot to the gallop. And then notice the transition is instant. There's no progression to the transition.

CAF: Right.

MTT: At some speed (snap!)...It turns out that those transition points are the same for all creatures on the planet if you scale to body mass. Amazing! Just scale those to body mass, that point of transition, that time, that frequency is exactly the same. Phenomenal. So we chose the right kind of problem. We chose problems deep in the foundations of movement. And Scotty was smart enough to realize that link to one of the few guys writing the equations.

DPS: So I was just.. This is an aside. I don't know if this is relevant. When I was in Sweden, I met a neurophysiologist called Sten Grillner who was interested in this sort of thing. Did he contribute?

MTT: No, he argued with Carol.

CAF: He was fairly hostile. He argued more with Elliot [Saltzman]. So there was a conference that we had in Sweden, one of those event conferences.

MTT: In Uppsala. He was there.

CAF: Elliot gave Kelso's talk, because Betty [Tuller] was having their first child and Kelso kindly stayed home with her. And Grillner was extremely hostile to Elliot. I don't remember why.

MTT: But you defended...you defended the argument brilliantly.

CAF: Did I? Oh. Good for me.

MTT: Here's this. I always tell the story. Here's this very famous...

CAF: I remember that Elliot was stunned.

MTT: ...the most famous locomotion guy on the planet. And he's being a bit...what's the word...he was being a bit aggressive, intellectually aggressive I would say.

CAF: Yeah.

MTT: And Carol debates him.

DPS: Where was that encounter?

MTT: In Uppsala.

CAF: It was in Uppsala at this event conference.

DPS: Oh.

MTT: Sitting in a big...classic 500th anniversary of the university. That was the conference And there's this big table, and they're at the table, with a couple of Haskins people working on the problem, and the Swedes. And the debate breaks out, it's Carol...

DPS: Did Ohman have anything to do with this? [...]

CAF: Ohman? I don't remember him being there.

MTT: Who?

CAF: Sven Ohman? He's a famous Swedish speech guy.

19:02

MTT: No, no. He didn't have anything to do with it, no.

CAF: I don't think he was there, no.

DPS: Sven Ohman was one of the...was a post doc who came to Haskins in the New York days.

MTT: And he used to visit.

DPS: He and Bjorn Lindblom were great...were buddies.

MTT: So those guys used to come. Remember you had the Swedish connection.

CAF: Oh, yeah.

MTT: So that's...So now that got us to...So that's Scotty and the linkages there. And Elliot...And Elliot of course. So Elliot, as I mentioned, I had given that lecture at Minnesota, and then Elliot took that topic up as his degree. And, of course, for him, any opening at Haskins was a natural place for him to come to. So this, I think, that gives us...The thing I missed I think was 6: right?

DPS: Did you meet... [Question: Did you meet and form any impression of Caryl Haskins?]

MTT: I think we've done 7. We've done 7 and we've done 8.

CAF: So let's do 6, your impressions of Al.

MTT: Well, Al, or me was always a person I looked up to greatly. Great brain, great writer. We became very good friends. There was...there were some original, early, not the earlier days, when I made these moves, there was some, I wouldn't say hostility, but coldness. Certainly some coldness.

DPS: Because Alvin didn't embrace...

MTT: He didn't embrace these ideas, and I was clearly, and I was very strongly Gibson.

DPS: He didn't embrace Gibson.

MTT: And most certainly am. So with all that...

DPS: I think he saw Gibson as a bit of a rival somehow.

MTT: Well it is...Direct perception is a very different story, and it requires a complete rethinking of most of the history of psychology, I have to say. I'm working on...I'm writing up all my lectures now. I'm down...There are three left. I should be done this year. This year. In the perception class.

CAF: Well if you think about how Al's research went, where that beautiful '67 paper in which he talks about encoding and how, for him, coarticulation meant that there could not be specification of phonetic properties in the acoustic signal.

MTT: Yeah.

CAF: And so here is Gibson. And when we tried to apply.. the thing that made him say that Remez and Rubin and I were talking like crazy people is: We couldn't show him that there was specifying acoustic information.

MTT: Yeah.

CAF: I mean you kind of have to be an engineer, I think, to be able to make that case, and so...

MTT: I think it's still not been done because...So we should show...we could begin to show that the..., as we talk now, the gesture. You can see the invariance of the gesture, right? But what's at issue for me, by the way, is the damn spectrogram. That is not...it cannot capture...

CAF: Oh, I know. Spatializing time is disastrous.

MTT: It cannot capture the acoustic structure.

CAF: Right.

MTT: And I've looked for the nonlinear acoustics of relevance to be brought into the Laboratories. I haven't seen it.

CAF: The problem is that the wrong...

DPS: Yeah.

CAF: You can't get people who have the skills to take on the problem, is the problem that I see.

MTT: Yeah.

DPS: Yeah. People have sort of uncritically accepted the spectrogram as THE acoustic basis of...

MTT: Yeah. It's wrong. It just points out the puzzles of using that as the..

CAF: Well, I think about Gunnar Johanssen's point light displays, and there's a Scientific American article in which they show the track of these point lights on the joints over time against a black background, and you have no clue what you're looking at, right?

MTT: No clue,. None at all.

CAF: And if people would realize that that's what they are doing with the speech signal; they're spatializing time and it just completely destroys...

MTT: Until we get the revolution [...], we're never going to solve it. I mean it's just,,So that was a real problem. I'm pretty convinced that, you know, speech perception is direct.

CAF: I'm sure it is too.

MTT: I don't think anything...

CAF: But I think it's pretty understandable why, for AI, we were just hand waving. Because we would say, well, it's [specification is] going to be found some day. And he would say, well look what I've shown. It's heavily encoded.

MTT: But again, it's the way science get's done and we find ways of taking just a small step forward. [...]

DPS: The notion of encodedness has always been a problem issue.

MTT: The what?

DPS: The notion of encodedness has always been a problem notion, I think.

MTT: And we would translate that to specification. So encodedness becomes specification for us. But that requires, then you've got to upgrade your math and your physics. Which is what we were trying to do.

CAF: So you know that Donald and Michael [Studdert-Kennedy] and I have written a Psych Review paper that revisits "Perception of the speech code"?

MTT: Yeah. Congratulations by the way.

CAF: There is a section on speech perception that tries to discuss how you deal with an encoded...not an encoded, but a coarticulated signal.

MTT: We just got one in Psych Review also.

CAF: Did you?

MTT: One of our graduate students is first author. Me second and Till Frank third. On the optic field and how you do braking.

CAF: Excellent

MTT: Yeah, he's very good, So he...

CAF: b-r-a-k-i-n-g, braking, stopping

MTT: Yeah.

CAF: Uhhuh, wow!

DPS: I want to meet this young man.

MTT: Sorry?

DPS: I want to meet this young man.

MTT: Yeah. Oh, he's a very smart guy, yeah. He worked with Bill Warren for a year. He was a Brown undergraduate, and he continued at ...He's very technical. Very smart.

DPS: What's his name?

MTT: Harrison, Henry Harrison. Very smart. So we applauded him last Friday at the Friday afternoon...

CAF: That's rather good. That's rather good.

MTT:Yeah, it's very good. OK so now...We did 7, how did George and I get connected.

DPS: We did 8.

MTT: We did 8, yes. So Scott...

DPS: We didn't do...

MTT: So, Caryl Haskins and I became very good friends I think. Claudia and I and Caryl Haskins and his wife would sit together when we could at gatherings. So they liked the two of us and we liked them.

CAF: You made them laugh.

MTT: And, yeah. We made them laugh. And I have certain social skills, which work very well and worked with them. So we really liked them.

DPS: I had the impression that Alvin Liberman wasn't particularly close to Caryl Haskins.

MTT: Uh huh.

DPS: Do you agree with that, or not?

MTT: I don't think that I ever saw enough of it.

DPS: I mean Isabelle [Liberman], I don't know, I was pretty close to her. She used to complain about boring dinner parties that they had. And bad food. Maybe I shouldn't say this but...You know Isabelle. She let it all hang out sometimes.

MTT: Yeah, oh yeah.

DPS: I don't know, and then we talked with somebody else who knew Edna Haskins and...

MTT: Yeah, so my time spent with Caryl and Emma?...

DPS, CAF: Edna

MTT: Edna, yeah, were always very pleasant.

DPS: Well, good.

MTT: And we did talk about the things going on in the Laboratories. I guess I never...Always thought about pressing him a bit more for more money. Given that, what, he gave stupid \$20 million to Yale?

CAF: I know!

MTT: It was so god damned ridiculous.

CAF: They don't need it. They don't need it.

MTT: They've got billions.

CAF: So, on what occasions would you see the Haskinses? Would it be Board meetings?

MTT: On these very special meetings. Yeah. Board meetings and special dinners.

Yeah. Claude and I got to...and we talked to them a lot I have to say. Yeah. Very nice.

DPS: Well, it was very disappointing to Carol and me when learned when talking to Alice Dadourian a few weeks before she died that his papers went into a dumpster, when...

CAF: When he died.

DPS: When he died and she had to... a short time table to empty out the house.

Because the house was being razed, you know, for the park that,, [Haskins Perseve, Aspetuck Land Trust, Westport, CT]...And Cooper's papers were also there at the Haskins' house and they also had the same fate.

MTT: So we lost them? Actually lost them?

CAF: Yeah. She said she filled 17 dumpsters with the stuff, so I think she just got rid of stuff. She didn't sort through it.

DPS: That was really awful.

CAF: You know he didn't have any kids to send stuff to, or other relatives, as far as I know.

DPS: I mean there are some things that are at Yale. I don't know...We haven't explored that. And there are some things at Columbia that ..

CAF: And possibly at Carnegie.

MTT: Sounds like you guys are doing some detective work?

CAF: We're trying. It's very discouraging, because the people that are no longer here are the ones that we have not much information on and don't know how to get it. You know his contemporaries have pretty much died, so it's a little hard.

DPS: Alright. Well, I guess we're down here: Tell us your impressions of Frank Cooper as President of Haskins.

MTT: Well you can tell I'm was a great fan of Frank. To me he was always wonderful and he helped... So anything I did, I have to say, he helped tremendously. He helped me with the movement research, when we...because we had a lab remember? We had to buy equipment that would allow us to record the move.ments, and that equipment was expensive and it was optical. And then eventually we bought an acoustical system as well. So we had an optical system and then Frank...And we would show Frank, of course, what the possibilities were, and then Frank made the choice. And he gave us a facility downstairs, you may remember, in the...Once we didn't have the millions of...didn't have the giant computer, we a nice space downstairs...

CAF: Big space.

MTT: ...for basic research on movement. And there was space for movement of the kind that was coordinative structure. And that was great and we published some great papers I would say.

29:25

Some good work came from there.

DPS: So did you feel that the...Did the Laboratories change in any notable way when Al took over as President from Frank?

MTT: I don't think I saw any dramatic change. They are two different people. That's most surely the case.

DPS: They were close and they...and Frank was around for a number of years to provide some continuity.

MTT: Yeah.

DPS: I think he retired in '86?

MTT: Yeah.

DPS: By that time., you? No, you came in...

CAF: No, Frank retired in '75, and Al retired in '86.

DPS: I mean Frank *left* in ...left New Haven in '86, I believe.

CAF: Did he? Could be.

MTT: I've always been happy with our presidents. I have to say still, the one thing I was not happy with is not picking up on the offer from UConn [to move Haskins to the campus]

CAF: Yeah, right.

MTT: I think...Now, of course, that building is now being building a center for Jeff Shaw, Kinsella-Shaw.

CAF: What? what?

MTT: He heads up the Rehabilitation Science program.

CAF: Yeah.

MTT: And...

CAF: He's going to be on Horse Barn Hill Road?

MTT: So that's where they're building...yeah, so great facility, wonderful location.

CAF: Wow. Good for him!

MTT: And I think the folks who didn't want to move from Yale...yeah, they didn't want Haskins to move, because they wanted to be at Yale, was always the feeling I had.

CAF: I don't think so. I think it was was more the fear that...

MTT: "yale.edu"

CAF: I think there was a fear that we wouldn't have the influx of visitors that we had, because Has...

MTT: It's a little further away.

CAF: Yeah. It's a little...Yeah. It's just public transportation is a little trickier

MTT: Forty minutes from Hartford.

CAF: Yeah, and there's not the public transportation that there is into New Haven, so I think that was a big part of it.

MTT: Yeah. Pity, because I think...

CAF: Would have been convenient for many of us.

MTT: For many of us, it would have been much better, yeah. But the Laboratories, to my mind, were and are still a great place to work. I have to say I love Haskins Laboratories. For me, it has been, throughout, a wonderful place to have been working at.

CAF: Oh, yeah. It was.

MTT: Such a unique gathering. And there's always someone coming in. I mean I haven't been there since I sort of retired. Haven't been there except occasionally. But right up to the time I retired, there were always new people coming in who you could spend time with.

CAF: Yep.

MTT: And even set up experiments with.

CAF: Yeah. Great place for graduate students.

MTT: Great place, yeah.

DPS: So we asked you to think about: What are the most significant changes at Haskins. And in the way that it is situated in the scientific landscape over the long period of your association.

MTT: Well, I confess to a lot of disappointment over the current direction. I see that, in fact, it's almost inevitable given the way NIH works. I have a lot of concerns about the National Institute of Mental Health in particular. How it's directing all its energies to looking at regions of brain.

CAF: Do you mean NIH, not Mental Health, right? You mean NIH.

MTT: Aren't both of them...I thought NIMH was even worse than NIH.

CAF: Oh, it may be, yeah. But I don't think we get money from them at Haskins.

MTT: I think it's even worse. I remember being at some gatherings in Washington in the last several years where lots of things were coming up that I didn't like. And I have to say there were some officials who didn't like it either. But anyway...So the Laboratories I think, has become a little less vibrant with respect to the bigger

problems. I believe that the era that I was at Haskins, when I was truly working there, for the most part, big problems were always sitting there. What is the fundamental nature of reading? What is the fundamental nature of speaking? What is the fundamental nature of hearing? What do you need to do to get the next step. And I don't think fMRI offers anything of that capability.

CAF: Yeah, its still...

MTT: It doesn't allow you to get into the heart of the matter. It just tells you that one thing...

DPS: Well, we might disagree a bit about that. But I do agree with you that what's made Haskins great was the emphasis on the big questions.

MTT: Big questions.

DPS: Absolutely.

MTT: And that's why I think people like us loved it there. Because here we are... so how...worrying about how speech could be perceived and how it could be produced.

CAF: Yeah, fundamental questions.

MTT: And these are not questions coming up any more.

DPS: And the presidents did a lot to facilitate those things.

MTT: Yeah.

DPS: And Carol did when she was president.

END OF THIRD FILE

MTT: I've talked to Ken about this a lot over the years, and he knows that I've...He knows...when we chat he says: "Michael, I know you don't like this" And I say: "Yes, right." For me, the...We're much better off when we have people who are looking at the problem. I would much rather see more work done on the speech signal, more work done on the basic ways of creating gestures and transitioning among them. Those are hard problems.

DPS: Right.

MTT: And they take a lot of thinking, and they take a lot of new sciences, which is what, I think, Haskins has been great at.

CAF: Well, I think that one shift, that probably is been driven in part by funding is toward more applied issues. That is, I think in...I could be wrong, because I'm not at Haskins either, but it seems like there's a lot of emphasis on taking research findings and taking them into the classroom. The kind of thing that Margie Gillis and Susan Brady...So I think that Ken is really interested in that.

MTT: So that's what's happened. And that is an enterprise.

1:01

There's nothing wrong about it. But, to my mind, that's a different kind, and a lesser kind, of science.

CAF: I agree.

MTT: Which I thought was what Haskins was...had pioneered. It had pioneered sciences. And now it's just one of them.

CAF: Yeah, and I think it's completely fair to let the President remake the mission, and I think the reason why you were sor of not unhappy when Al replaced Frank and when Michael replaced Al and when I replaced Michael is because we all had kind of that same vision in mind, and we could, because the funding was good enough that we could keep it.

MTT: And that's why I was disappointed about Caryl not putting the 20 million into Haskins rather than Yale.

CAF: I know!

MTT: Then we could have continued the track...on the track that we were on, which I much preferred. So you know I find...

DPS: The loss of some of the top speech people is something that I keenly feel.

MTT: Yeah, it's too bad.

DPS: The talk about the Haskins west [Goldstein, Iskarous, etc at USC] and so forth. I don't know whether it's...is anything is really going to come of it.

MTT: Those people...see those are good people, Haskins west. Claudia and I were with them about a year ago and it was great. And losing Gafos is another loss for me.

CAF: Oh yeah, he was outstanding... *is* outstanding.

MTT: So those are the people...and Elliot now not being so available. Saltzman being up in Boston so we don't get him in the Labs. Scotty worried a lot about how articulation works. But you can't do that...it's a bit odd not to be able to do that stuff. Not to make that a focus. The rest seems to me to be...well, a second-level enterprise. So looking back on...What are your hopes and fears concerning the Laboratories...

DPS: You've..

MTT: I think I'm expressing them here.

DPS: Yeah, you've addressed them.

MTT: My hope would be that, the Laboratories could, at some time when maybe monetary matters get better could return to its original...get back on its original direction. Get back to the most fundamental questions of all. I think it should pioneer the nonlinear speech signal...It should pioneer; it should start that enterprise again. It should bring in people who have the nonlinear mathematics and acoustics, know nonlinear acoustics and have a charge. They have a definite job.

CAF: That would be so great.

MTT: They have a definite job; they have a goal. Everything is toward that goal. And bring in the people who can do the movement again. And let's get the gesture down. And then I think we'd be doing..that's Haskins. Where's that money coming from? Can we get donors? Are there people who really...

CAF: Do you know how is the development program proceeding at Haskins? Are they getting donations? I notice..

DPS: Nothing significant.

CAF: Yeah, it never has happened.

DPS: Nothing significant.

CAF: It never has happened.

MTT: I bet one of these things.. The...Our last grants have been from...The most recent one is from INSPIRE [Integrated NSF Support for Integrated Research and Education], National Science Foundation thing? You can only get it one time. It's quite a bit of money. So can you get agency from nonagency. That's the problem.

CAF: Oh! Good one.

MTT: And it looks like Templeton might pick up the next round of that by the way. That's what we're looking at. But this problem, getting back to Haskins and the

formant synthesizer. So that allowed us to make great breakthroughs and spawned a huge body of data and thinking.

CAF: Certainly did.

MTT: It's time to recognize that that way of representing speech is ancient. And somewhere there must be...and maybe INSPIRE, if they continue that program. It's a wonderful program, it's the National Science Foundation thing. You have to bring together more than one of its institutes. So we brought together Physics group, Structural Physics something, and over here...what were the two? Anyway, so the two quite different groups. I remember the physics group. And they support...they provide the money, the funding for it. And I don't see why Haskins can't think along those lines. Let's set up at least one strand of the ancient way of going about our business and focusing on getting the next spectrogram.

CAF: But I think it's the... the problem is people. Right?

MTT: Yeah, so you're going to have to get the right people.

CAF: I don't think the right people are there to initiate that.

MTT: Yeah, so there's the problem with my referring to something like the grant that I just mentioned because the people were here.

DPS: We made some....had some unfortunate losses

MTT: But we would need to bring in technical people. OK, 9: Looking back at your research, which of your many achievements are you most proud of.

CAF: All of them!

MTT: I'm very proud of having changed the landscape with respect to perception and action. I'm very proud of that.

CAF: Yeah.

MTT: I hope to move both of those forward even further. So I think I had a big impact on those two areas, and in large part, I have to say, Haskins has been important. [So...?] in the early days of the tremendous freedom that they gave me and support. And even when we were talking about like the action work.

DPS: Gibson didn't have much to say about action, did he?

MTT: He had a lot to say about action, but it's action in the sense of, tied, as it ought to be, in respect to affordances. So the...but the concern about how organisms behave...

DPS: The details...

MTT: So not the details. He didn't worry about coordination, but he did worry about action.

CAF: He knew that perception had to be an active system.

DPS: Yes, yes.

CAF: Exploration is absolutely required. But he didn't work on...he didn't have a compatible theory of action like he had a theory of perception.

MTT: Yeah.

7:41.

I think one of those is enough. One of those is enough I would say.

CAF: Yes, true. That's a career.

MTT: I guess I remain always proud of the masking work that got me, as I often say to people when I'm having a debate, I got the first award in cognition. First national award in cognition.

CAF: It was an absolutely gorgeous paper. Beautiful paper.

MTT: People think I don't do cognition much.

DPS: That was the work that attracted me first to you. Much admired. Long ago. And still do, of course.

MTT: I'm very proud of the doctoral students that I've engaged. I think a good number of them have gone on to make truly significant contributions to the field.

CAF: And all over the place. I mean I don't know if you've ever counted them up, but it must be a lot.

MTT: In many...All over the place and in sort of a nice distribution of problem areas I would say.

CAF: Yeah.

MTT: The...We have a couple of other institutions which are just like here. UConn-Haskins. One in Merced, University of California, Merced.

CAF: That is a remarkable place.

MTT: And the one in Cincinnati, which is getting bigger. The one in Cincinnati is getting bigger all the time. The one here is not getting any support.

CAF: Is that right?

MTT: Well, the Dean put all his money into the Cog-Sci program.

CAF: Oh sure, and the MRI facility.

MTT: And so he has not supported CESPA [Center for the Ecological Study of Perception and Action, UConn] at all.

CAF: Oh, that's very sad.

MTT: So we used to get...we had a large amount of money from the Dean's office that started about 25 years ago. He cut it off; he ended it, this Dean. I don't like him much. He doesn't like me much.

CAF: Now, is this [Jeremy] Teitelbaum?

MTT: Yeah, Teitelbaum

CAF: Teitelbaum. Oh, too bad.

MTT: He wanted...he really wanted to do something different. That was his plan. So continuing with things that the previous two deans had contributed to dramatically. They were wonderful.

CAF: Yeah.

MTT: Brilliant.

DPS: Yeah, he wants to put his own stamp on things.

MTT: Yeah that's it. Yeah. I might try to get back to him. Maybe give him another year. But one of the things that's important is that we have three professorships for CESPA. So there's the Gibson Professorship...So, we're already...We've got these lined up. When I pass away. We've got the Gibson Professorship; we have the Bernstein Professorship, and we have the Turvey Professorship.

CAF: All right! I was waiting for that.

MTT: Turvey's from Claire [Michaels], and the other two are from Claudia [Carello] and I. So CESPA, that branch of the University, as it were, has funded professorships. And UConn moved two years ago to the Ivy League way of doing it. So if you endow a Professorship, your endowment is research money for them.

CAF: Very good.

MTT: And the university picks up the salary.

CAF: mmhmm

MTT: So the university gets the professor, they pay the salary, but coming with it...So this is how they get really good people, right?

CAF: Right.

MTT: That's how the universities do it. So, So we have those. So I would hope that, at some point soon, the dean begins to realize we're going to have to do some....We're running short of personnel.

CAF: Right, right.

MTT: We're a bit short. I mean we've got a bunch of retirees. And still busy! Everyone's amazingly busy. Still tons of stuff going on. But I haven't answered this question: "What am I most proud of?" I guess I've answered it in a roundabout way. I have to say I'm not sure any of this would have come about if I had not been at UConn and Haskins. I think it was the right place to be.

CAF: I know, it's amazing how things come together sometimes.

MTT: I've never felt any need to leave. I've had offers.

CAF: That's a good point. You have.

MTT: Quite a few offers over the years.

CAF: I remember, was it Vanderbilt was trying to get you?

MTT: Vanderbilt was trying to get...Two places were trying to get CESP. But over the years, there have also been...just trying to get me as a Professor. So I turned Stanford down; that was a long time ago.

DPS: Well Stanford sort of tried to get Haskins, the whole kit and caboodle.

MTT: Yes.

CAF: That's true.

MTT: Well, we did that. And that could have been something. We did that whole thing. People went out. If that had happened, then we could have imagined maybe a better deal on other things. Yeah, I remember when we all went off to, well not me, but the whole team went off to Stanford, and they came back, and we were talking. We were talking maybe moving, right?

DPS: Yeah.

MTT: Who was President then? Was Al [Lieberman] President then?

CAF: I think Al.

MTT: Yeah. You went out, right Don?

DPS: No, I didn't.

MTT: So Al and...We sent a team, yeah.

CAF: Michael [Studdert-Kennedy], I think, was part of that.

MTT: Michael, yeah. [next question:] "What did we neglect to ask that we should have?" Of course, I've always, recognized myself as primarily a teacher. And I try to educate my doctoral students that their first duty is teaching. And if they are lucky enough to have some time left over they can do research. And you can appreciate that the reason I might say that is because teachers have been so important to me.

CAF: Right.

MTT: Some of my best friends are old teachers. There's only one of them left at the moment. I never took a class with him in high school, but he recognized that I had something, and he and I became very good buddies. And he's now ninety or something or other. He's still reasonably functioning, I hear. I hope to see him in a

few months. But he occasionally realized that there were things that the school could do that I couldn't afford to do. And he would ask me in a certain special way: "Mike, the school is doing a trip. You can't make it because...?" I'd say; "Well, parents don't have the money." He said: "Um, we'll see." So he'd do a little thing with the other teachers and they'd pick up the...

DPS: Yeah, I think...

MTT: So the teachers across the board, when I was at [little] school, Miss Daisy Donkin, D-O-N-K-I-N, a Miss Plante, who many years later I met and they still remembered me. You know *years* later. You know Claudia and I go to putting a new bell into one of the local Catholic churches in my old neighborhood and the old teachers are there. Dedicated. They would come in on Saturdays. You remember I told you only three of us got to... They came in on Saturdays to work with the three of us to get us through.

CAF: Wow.

MTT: I think, of the three, I'm the only one who actually did something. The others were too Cockney.

CAF: mmhmm.

MTT: I was protected from being too Cockney by at least having..my father having got a son off to university and a daughter into basic computer science. Yeah. So there you go. What do you...what can you say more?

CAF: That was great.

DPS: That was a wonderful interview. You have so much to offer to the Haskins history project. Because there are a lot of things you know that none of us...nobody else knows.

CAF: Yeah, it was very helpful. Putting that all together.