

Maureen and Mike

Mansfield Library

UNIVERSITY OF MONTANA

Archives and Special Collections

Mansfield Library, University of Montana

Missoula MT 59812-9936

Email: library.archives@umontana.edu

Telephone: (406) 243-2053

The following transcript, with its associated audio recording, was provided to Archives and Special Collections by the [University of Montana's Department of Mathematical Sciences](#).



Oral History Number: 412-017, 018

Interviewee: Merle Manis

Interviewer: Merrie Rampy

Date of Interview: February 24, 2007

Project: History of the Department of Mathematical Sciences Oral History Collection

MR: Interview Dr. Manis, the day is February 24, and the first question we're asking is why did you choose to become a faculty member at the U of M?

MM: Well, I had a bachelor's degree from the University of Montana, and I'm from Montana, so I'm very familiar with the school, and I also, at the time I finished my Ph. D. had a wife and four children, and looked around at other universities I could go to and the cities that they were situated in, and decided, of all of them, places that I wanted to raise my children, Missoula was probably right at the top of the list. They wanted me here so I came.

MR: Where did you get your Ph. D. then?

MM: University of Oregon.

MR: Well, the second question isn't directly related to that, but it says, 'Who was the most influential person in helping you choose mathematics as a career, and how did they influence you'?

MM: Well, I can't actually say that I chose mathematics as a career. I drifted into mathematics. When I started out as an undergraduate, I didn't know what I wanted to major in. It was out of

a small high school in Montana, and, but I felt that whatever it was I was interested in, it was going to require some mathematics. And so, I also didn't know whether or not I could make it through college. And so, I decided one way to find out is to get mathematics out of the way first, and I just never quite got it out of the way.

MR: What, you said small school in Montana, where?

MM: Charlo, just 50 miles north of here, in the Mission Valley.

MR: I'm familiar with the town; I have in-laws there, in-laws or something...

MM: And you know, ordinary people off the farm in Charlo didn't go to college. But I had the G.I. Bill; I'd been in the service, had the Korean G. I. Bill. And figured what the hell...?

MR: Couldn't hurt.

MM: ...couldn't hurt. Probably beat working for a living, and it did.

MR: So, you didn't really expect to graduate, when did you finally realize that math was what you were doing?

MM: Well, by the time I started my junior year, I already had enough credits in mathematics for a degree so I decided, that might as well get the degree in mathematics, even though physics was more interesting.

MR: Was that what you were?

MM: Mathematics was easier.

MR: You were pursuing physics then too as an option.

MM: Yes, I came up three credits short of a physics degree because I hadn't finished German, and it conflicted with the courses I needed for a math degree.

MR: You have my sympathy on that one.

MM: Yeah, back in those days, serious math majors were also physics majors, and conversely.

MR: It was. They pretty much went hand in hand.

MM: Yep, so.

MR: So you didn't have any...?

MM: Like I said I just drifted into it.

MR: And you didn't have anybody, any professor or anybody who said, 'you should do math; you're good in math'?

MM: Well, yeah. I mean, this was a small school, you know. Yeah, I attracted attention; it was practically assumed that as a freshman. I mean, by the time I finished my first quarter, some of the faculty members were basically embarrassing me by talking to me on the sidewalks. You know, I tried to hide, but yeah, I did well enough my first quarter here that the faculty knew who I was and they all talked to me. Probably Hashasaki was, Joe Hashasaki was one of the more aggressive of talking to me about mathematics. I mean, I didn't, I mean, I thought that was just part of their job I guess. Because I never really felt like I'd probably finish college; I mean every spring I left college permanently, and worked for the summer, and at the end of the summer, I decided that going to school beat working, so I'd go back to school. And, by the end of my junior year, I, well it was obvious that I'd get a degree, but I wasn't at all sure when I'd do it, but...

MR: Well, in math especially.

MM: Right.

MR: Well, that kind of leads into question number three which says, 'what were your goals when you started, and have these been accomplished; have they been altered? If so, how and why'? And I guess when we wrote that question we weren't specific to when you started here at the U, or when you started your...

MM: Right, I was going to say it's not terribly specific to when I started what.

MR: So, you get to pick when you started your...family, I don't know.

MM: Oh, I thought you wrote that. My goal when I started school at the university was just to satisfy my mother who had wanted me to go to college. I figured I'd go back into the service as soon as I flunked out. So certainly my goal wasn't to get a degree when I started at the university. I didn't think that I'd get one. And, I don't know to my junior, I was taking courses with graduate students, and decided, that well, you know I thought it was sort of unfair that they were getting master's degrees for what I was getting a bachelor's degree, and so I decided that I'd get a master's degree, and applied to NSF for money. Sputnik had went up so there was money available, and they paid for my master's degree. And I felt that, I don't know, probably end up teaching or something. My senior year I went into the, you know to take tests so that, tell you what you should do, and it was the first time I was ever told there was anything I couldn't do. And they told me that I couldn't teach secondary school.

MR: Were you thinking, oh, high school?

MM: That's right, they said, 'Don't bother! You'd never be able to do it.'

MR: Huh?

MM: And, so then I wasn't at all sure. I applied for a few jobs, a couple jobs when I was going to graduate with a master's degree. A couple jobs teaching, and didn't get any offers. But I did; I applied to a couple schools for graduate schools and got more offers than I applied for that; faculty in other words took the opportunity to apply for me. But I wasn't, at that point, still didn't have any means and since I didn't have anything else to do, to work on, I took an assistantship at the University of Oregon, and went to, went there. And, then I got, got married just before we went there, and the woman I married had a couple of children, actually three. And so after I got there, it was a little bit tight on money, so I decided to try to get a job. And I went out to Boeing who was hiring people with master's degrees. I figured it would be, should be a shoo-in. I had a pretty good record, academically. And what happened is I had too good enough record academically. And I went in, and they started out the interviews, and their reaction is, you know, well, we don't anything to keep you interested, why don't you go talk to this next level up. And I spent all day being pushed one level up after another because they didn't have anything that would keep me interested. I finally got to the top level; and they said yeah, there were interested in me, but I had to finish my Ph. D. Anyway...

MR: Caught in one of those loops.

MM: Right, so I went home and figured well, I'd reinstate my teachers' union membership, but my wife had sent out Christmas cards, and she had told the people here that I was going to drop out, and they had called and offered a position. They had one starting in the spring. Actually I guess it became winter quarter that they'd hired me. So, I came back here, and I'd done a little bit of teaching at the University of Washington as a graduate assistant, and started teaching here, and I decided that was, I think that's probably when it first sort of developed some aims because you might say I really got out of standing in front a bunch of people, bullshitting about mathematics. And I like that; I've always liked mathematics. Anyway, so I came back here with a two-quarter contract to teach, and they offered to renew it for the following year under condition that I would apply for another NSF fellowship. And so I applied for another fellowship, got it, didn't, paid well enough that, I didn't have any excuse just for not going on. It was renewed again the next two years.

MR: Did you actually finish your Ph. D. here?

MM: No, I went to the University of Oregon. I went there because I really felt that I could pass the German exam there, and I knew if it wasn't dumb, I'd probably pass it. And there was a person there that I did feel that I could probably, would be good to work with. And so, NSF paid well enough that one of the job offers I had after finishing my degree then, it was less than I

was making. This NSF fellow, and so I didn't have any excuses not to go. So, I drifted into graduate school. I finished my Ph. D. out there in '65, something like that. And it was just before the...NSF had really kicked in a lot of money about then...

MR: For teachers especially.

MM: Pardon?

MR: For people who were in education, to try to bring us up to speed in the sciences, right?

MM: But they pulled a lot of it in, the year I graduated. The year I graduated, every school in the country was looking for mathematicians. They pulled in money off a lot of people that were in faculties that were on NSF money, research and teaching, while I was going to school, and a year after, they all had to go back to teaching. The year after I finished my Ph. D., nobody wanted any mathematicians. So, I also finished just at the right time.

MR: Sounds like it.

MM: I could of, when I finished I could have went to any school in the country. The job market was that good. People that I went to school with, and finished the second year, were four or five years trying to find a tenure-track position.

MR: Nothing open.

MM: I finished just at the perfect time. And my, I gave you reason for coming back here... Montana's, it's a good school. Much better than the state deserves. And it's a good math department. They instituted offering a Ph. D. while I was at Oregon; they weren't offering a Ph. D. degree here when I went to school here and was teaching here at first. I've always felt that was a mistake. It's not a big enough school for, to offer it.

MR: No, we shouldn't have a Ph. D.?

MM: It's not a big enough department to offer a Ph. D. in it. You have too few students, spread out of, over too many disciplines at too many basic levels of where they're at. I mean, you know there, have six or eight disciplines, three or four levels of how many years you're into it, and what you're up into the 20s as far as the number of people ready for any one particular class that might be offered. You can't offer classes that are big enough that, where there's really any competition, and you need a modest amount, you don't need a lot of competition between students; you need a modest amount for people to, you know, to get students to work just a little bit harder. And, you need bigger classes in order to go very deep in the subject. And it wasn't...

MR: Okay.

MM: It wasn't there while I was teaching...

MR: Do you think that's true in the master's program, or just the Ph. D. program?

MM: Ph. D. program. The master's program's real shallow and they're not going into any specialization very strongly. I mean, the math, when I got a master's degree here, it was a very, very good master's degree program, and I think it continues to be a fantastic program. You just, it's always surprised me how good some, a lot of the students have turned out, were. But they also didn't have the background that they should've had, as far as depth goes.

MR: And that kind of leads to the next question. It says what changes has the department gone through since you've been here, were you directly involved and what did you think of them? It sounds like you weren't here right away, but right away there was a Ph. D. program added. What other things have happened? You've been here; you were here for quite awhile.

MM: Well, quite a few things happened about the time I came back. Of course there was, I came back in the mid-60s, and of course the Vietnam War protests were in the later 60s, and it spread onto the basic (?) movement. The 70s, and in the 70s, the students decided that they knew what they needed to be taught, and the universities and a lot of the faculty members, not necessarily in mathematics, indulged them. I will always feel that education at the college level took a nose dive in the mid-70s.

MR: And you don't think...

MM: And I don't know that it's ever flattened out as far as going downhill, as far as what the (?) was being offered and the expectations of the faculty to what the students...

MR: Do you think in the math department, that's been the case?

MM: Definitely, certainly. I mean, what happens when you water down the freshman course? Sophomores come along, they're not ready for sophomore level courses, so you water those down, and over the years, junior level courses are watered down, and after five or six years, you have to start watering down the graduate level courses also. Because the students just flat at any given point really learned at the level there were 10 and 15 and 20 years earlier. They're not! They are not as well prepared. They're every bit as smart, but they're not as well prepared, and they have, you also, because they've been babied all these years have a totally different attitude than students had when I was going through school, and when I first started teaching.

MR: Some of the privilege versus responsibility type of thing?

MM: Right.

MR: I taught high school for a long time, so...

MM: You know, you always had students that, you know just sort of wanted to get validated. They've always been around, but not as high a percentage. There's still some awfully good students up there; there are, I mean they're every bit as smart, and a lot of them are just every bit as motivated, but I don't know, maybe a part of it is the population of the state of Montana really hasn't grown much in the 30 years since I got out of high school. The, when I came here in the mid-50s, I think the student population was around 4500. What is it now, around 11 or 12? The population has stayed about the same; the number of students has tripled. Two-thirds of those students probably, well a lot of them are out-of-state, but they're not the best students from out-of state, probably two-thirds of those students shouldn't bother. And the third of the students that would have represented the third that's been going when I was going, they're so good, but you've got...

MR: So what would you recommend?

MM: ...so you've got these other two-thirds...I don't know how you turn it around. I have no recommendations on how you turn it around. I wish junior colleges were trade colleges, I mean, really do need trades. They don't need laborers, but they do need trades. Well, the students are, they're not gonna, they're not getting anything out of it. All they're doing is getting four years older. Maybe that's...

MR: Necessary.

MM: Maybe that's all; maybe that's enough. I mean I've always felt that...that's the main thing anybody every got out of high school. That's certainly all I got out of high school, is four years older, but it was an important four years older.

MR: Right.

MM: And the four years older after high school is probably, well it was obviously very important. I was not ready for college when I got out of high school. I kicked around for a couple years out of high school, I was ready to go to college. I really wasn't any more than most of these people out here now are. I needed those four years; I'm just not sure college is where they should be while they're gaining those four years.

MR: Right. I'm reflecting on my students, as I say I teach high school and have for awhile. There are a lot of them who could use...

MM: They need four years...

MR: Something between...

MM: I think I'd probably flunked out of school if I went right out of college, college right out of high school. I needed four more years to grow up. I mean I didn't. I was too damn dumb to know that, but ... I did; I needed it. And, I think this is a lot, you know a lot of the kids I knew when I was going to college had also been out of school four years. A lot of my friends were ex-service people.

MR: Yeah. That's what I was thinking.

MM: They were, but, they were four years older than the ones who were just coming. And it showed then, and it, how mature they were, the function of college. I think those four years are real important. But, we've got too many of them spending those four years in college, and they're not ready, they're not interested. They're not anywhere close to mature enough to get what , what they're paying for.

MR: And what they could get.

MM: Yeah. I don't know. My feeling is, my time I spent in the service is very valuable. I, but when young men ask me what they should do, I often suggest that they go in the service for two or three years, take advantage of the programs that are, sort of, like the G. I. Bill and the service still has, grow-up a little, attitude gone...

MR: Get away from mom and dad.

MM: ...come back in four year and with the wherewithal, the maturity to gain something and go to school. I think universal military training is really great for the boys. It didn't do much for the girls; all it left for the girls was getting married. I mean, in fact,...

MR: Well, that's changed.

MM: I mean when I was...

MR: Right, even when I was a young person it wasn't really an option, and now it's much more so.

MM: So, I don't know. That...

MR: It'd be interesting if they could implement something. That you didn't jump right out.

MM: There's nothing wrong with the kids, other than they're not grown up.

MR: Well, yeah. I guess that's been my experience as a high school teacher is, they think they're leaving for college in three months, and they don't have a clue what they're leaving for; they're just getting out of Dodge.

MM: Yep.

MR: That's all they want to do.

MM: And they need to, they need to get out.

MR: But maybe not, while their moms and dads are paying \$15,000 a year to go somewhere.

MM: Or when the state is paying that much for the...

MR: Right.

MM: Yeah. I don't know. It's not the kids' fault. It's the system. In, you know, when I was an undergraduate that system wasn't here yet. You know they didn't have easy loans and whatnot, and guys on the G. I. Bill have worked to go to college; everybody else had to have six separate sources of money.

MR: Right. Student, in fact even it's been in the last 20 years that the loans have become so prevalent, and you're getting. Because even when I came through and, I'm a generation after; I started school in the early, early, early 70s. You paid your own way pretty much, unless you were G. I. stuff, or even scholarships.

MM: You were going early 70s, that's when I was just starting to teach right?

MR: We may have shared a class.

MM: Great, right.

MR: Although I have to confess, I'm not a math major; I was a...I have a biology degree. And I teach high school, so I went through and got sciences and then eventually added on the math, and I'm back in the master's and Ph. D. program, while I'm still teaching. Well, the next question kinda follows what you've been talking about, some of the difficulties with teaching students these days, and that is if you can think of one thing that's really positive about the math department specifically, some real strength it has? For faculty, students, or all?

MM: Relative to when I was a student here and actually, when I was a student teaching here, it's lost its strength.

MR: It's lost...

MM: A lot of its strength was the fact that there were small class sizes, and that the faculty, and the students could interact from the time the students were freshmen on up. The faculty and

the students just don't interact anywhere near as much as they used to. And that was when I was going to school here, the main strength. When I was first started teaching here, that was the main strength of the department. The faculty, I don't think has, well, don't have anywhere close to as much time for undergraduates, and they definitely don't have as much time for graduate students either.

MR: Why don't, why has that changed, I guess? Is it a personal choice that you see the faculty making, or is it something the administration has put on them?

MM: A little of both. I mean, there's a lot more emphasis on the faculty since they are doing, having a PH. D. program here. Faculty research definitely cuts into faculty interaction with students. It puts it on a different plane when they do interact. And, the others, just the number of students changes both the attitude of the students to the faculty, and vice versa. Students get lost while they're here. And of course, that's a strength of a small school. It's changed from a small school to a medium-sized school. The strengths would still be, however if it's closer to a small school than a really large school.

MR: You still see as the same proportion of students coming into math?

MM: No, I don't ...As near as I can tell, there isn't any undergraduate math courses at this moment, the moment when I've finished teaching, that was populated by, I'd say 90% of the students in the class was there because they wanted get what was in the class, they were there not because it was required but because...

Tape ends—only side A was used.

Tape 2 Side A only.

MM: ...it's a complete diversion if 90% of the students are there because it's required by their discipline; with possibly 10% there because they want to be there. And that's total reversal of what it was 30 years ago. Where 90% were there because they knew they needed mathematics, or whatever it was they were studying, and maybe 10% were there because their discipline took the trouble to tell them that they had to do it. My feeling is that the quickest way to degrade a class is to require it.

MR: Is to require it? So...

MM: And all our math classes until you get into the upper division classes, and even basically they also are required.

MR: And in your time there weren't?

MM: There's no freshman course where you've got more than four or five people in there that was like I was.

MR: Who were just taking it for the fun of taking it?

MR: Right.

MR: And when you came through there weren't as many requirements; you just pretty much figured out what you wanted to study?

MM: No, in fact there was, you know, there was one section, at most two sections of anything. My calculus class, there was, I guess there were two sections for the first two quarters, and one section the third quarter. In each of the two sections I had maybe, 14 or 15 people in it, and in the third quarter calculus there was about the same in the third quarter, maybe 15 people.

MR: I know from talking to my folks things have changed pretty dramatically from when they came through.

MM: And that makes a huge difference. These were people that weren't there because they were required. They were going to be math majors, or physics majors, or they knew that they were interested in a discipline or not, that they choose to take calculus because they were smart enough to know that they needed to take it. Not because they had to have it on their transcript.

MR: We face that even in, to some extent, at the high school. If you require two years of math, those first two years, can be pretty crazy, but when you get up to the upper levels where kids are selecting to take it because they need it...

MM: All the difference.

MR: Yep. Well, you've talked a lot about the school, but the next question asks if there's an area of mathematics that you're especially interested in, if you're working in a certain area, or if you've done research or are interested in research, and if there's any place that you have published work? And I imagine you have bits and pieces around.

MM: Yeah. There are bits and pieces around. Abstract Algebra.

MR: That's your forte?

MM: Right. Oh, I'm a firm believer in basically, at least up through the master's level, being what I'd call strictly classical algebra, no specialties, until you start at the Ph. D. level. Which is a change in this school out here that I really, don't think has improved things much. I mean there's what, a half a dozen different, or more specialties at the master's level. And that, as far

as I'm concerned—B. S. There should be no master's, no specialty required to getting a master's degree. People, they're getting master's degrees, should know...

MR: It should be a general...

MM: General... body; they should have some... fairly strong connection with abstract algebra, classical and complex analysis, and perhaps a course or so, not a specialty as something that's not strictly classic. In that algebra and analysis.

MR: So, they know what they're doing first.

MM: I feel real strongly about that, I mean. I think kids that finish with master's degree, your... well, the last 30 years, very few of them have anything approximating a good background.

MR: Too specialized.

MM: I can't think of anything. Because I probably can't use myself as a thermometer, but there's many of them that don't know as much mathematics, when I finished my bachelor's degree, when they finish their master's degree.

MR: And yet there are more requirements.

MM: More, many more requirements.

MR: Interesting contrast that the school is obviously trying to make these people more well-rounded, better educated, but it's not working.

MM: No. That, only a student can make themselves well-rounded and better educated. I don't know just what, how it happens when we require a lot of things. They take more courses, and as many credits, but somehow it seems like they're too damn busy to learn. I mean, I learned much, much more outside of classes than I ever learned in classes, and seems to me like what we've done to some extent is with a lot of requirements, and whatnot, is made it so a student doesn't have any time to learn anything outside of class. I think we've made, we've made the courses worse by trying to cram more stuff into them.

MR: And the programs that have so many requirements that the students can't elect to take an extra math class for fun.

MM: And this hasn't improved the education; it's degraded it. The student doesn't have time enough to investigate on their own thing. I mean; I didn't learn mathematics in the classroom...

MR: It was all those days over the coffee and the...

MM: And reading on my own. I actually read math books as an undergraduate. And I had time, you know. We didn't cover as much. Calculus was then, and still should be, was a sophomore level subject. It is not a high school level subject.

MR: And with the advent of some of the technology that...

MM: And, the students, even the students that had what you might say good calculus classes in high school, actually come...It's a detriment to actually learning mathematical calculus. You know, calculus, you think about, rather than what you do. I guess, one of the things that I think of as far calculus was the same as when I came and took chemistry. Lots of kids took chemistry and whatnot in high school, and most students, they didn't have chemistry in Charlo. And walked into chemistry class, and the guy who was teaching said, 'well, you know, a lot of you people who haven't had any chemistry in high school, probably feeling like you're starting out a little bit behind,' he said, 'but believe me, you're starting out ahead. You don't have near as much to unlearn as the kids that have had chemistry in high school have.' And he was right. I mean the kids that have had chemistry in high school thought they knew something, and they didn't because it taught a little bit of cooking.

MR: They hadn't learned.

MM: They hadn't learned anything about what chemistry is really about. The combinations and the thinking. Their chemistry didn't very much grow, and whatnot. And the same thing is, I think, goes to quite a large extent... high school for the average person. I mean, the good students, it doesn't matter...

MR: What you think...

MM: At all, but I'm not talking about the good students. I'm talking about the average student. The average students would have been much better off if they'd have spent their time doing Euclidean geometry and varied equations, more algebra and geometry.

MR: Get the basics.

MM: More basics. Calculus in high school wouldn't be high, because they took calculus at the expense of not having geometry and...

MR: ...and not understanding it. You realize, you're right in the middle now of all that big, one of the things Johnny's talking to us about, the math wars, and...

MM: Well, I was towards the end, rally in a hurry, I wanted to get the hell out and retire before anybody asked me to teach reformed calculus.

MR: I understand. Well, you've actually, again...

MM: You know where I'm coming from. I was educated in, before calculators or computers existed, in a different world than what I'm teaching in, and it's an interesting dichotomy.

MM: Computers are wonderful things, and...

MR: They're nice tools.

MM: And if you know some mathematics, they are wonderful tools to use the mathematics that you know. But, until you know some mathematics, they have no place in a mathematics curriculum. That's my attitude.

MR: Well, you've kind of talked about it already, one of the other question says 'how has the content changed,' and you've talked, at least I think some about that. Was there any other area that you've seen, other than the idea of the reformed calculus, and some?

MM: Well, we've reformed everything. When you started college, I mean they had calculus and analytical geometry, but it was brand new. Before that they had, analytical geometry was a separate subject in the 50s. I guess that I'm enjoying my age, because that was in the 50s, the late 50s. They had separate courses in analytical geometry, college algebra, trigonometry. Calculus was a freshman-level university course. And in the early 60s, it began actually while I was in graduate school in Oregon; they decided that the way to go was calculus and analytical geometry. Analytical geometry was never taught again at the university level.

MR: As a separate?

MR: It was supposedly in the calculus, but it wasn't there. And it still isn't there. And analytical geometry is a very important part of calculus. I mean, a good student eventually will sort of pick up analytical geometry on their own, but it makes it a lot harder.

MR: And it's just got dropped out of the calculus program as far as you know?

MM: Yep. They even stopped putting it on, I think on the covers of the books. I don't think that calculus books are called calculus and analytical geometry, where they were for 10 to 15 years.

MR: I'm trying to remember, and I remember seeing it on any of our texts. We have several copies in our school, different calc books.

MM: You do. Late 60s and 70s was calculus and analytical geometry, but that...books.

MR: Any other content changes? Particularly maybe related to the changes with technology, anything you've seen added, or dropped?

MM: Oh, certainly. I mean, a lot of the...there's been a lot of pressure to institute, in courses that are, computer-oriented that are set-up to use the mathematics that you do, can do with a computer.

MR: So, kind of a computer-based math?

MM: No, it's, I wouldn't say based, oriented. The... with baby linear algebra type things, and a little bit of combinatorics and whatnot. But they're your general, as far as I'm concerned, worthless courses that sort of can satisfy the requirements of different disciplines. I don't know, linear algebra has been pushed down into sophomore, junior level, and a level of mathematics that isn't worthwhile during that.

MR: So, the linear algebra classes, for instance that's being presented now, you feel has been watered down or reduced significantly.

MM: And the content didn't do anything. Linear algebra is part of, so-called advanced calculus, second-year, not just being taught matrices and stuff for, I don't see it to be, for the sake of teaching it. I don't know. They don't do anything with it. Or at least from what I've seen. They've got a course, 117 or something like this, out there for example, and I taught in the summer a few of time, and it's...; they do some linear algebra for half of it, and probability that other half, and...

MR: Right.

MM: It's impossible, you can't do anything with either of them in half of a semester. And there's other, you know there's been various and sundry times, lots of things stuck in like this. There's out there, I've never taught the..., I don't think they would of ever let me even teach it, but there's a so-called transitional course between undergraduate lower division and upper division, so called Introduction to Abstract Thinking or something like that.

MR: Oh, I know the course, I don't know...

MM: I sort of made an effort not to find out too much about it because I know I wouldn't like it.

MR: Well, you might give just the twist they need.

MM: No.

MR: Well, do you expect any additional changes, or do you just see this as a progression of watering down? Do you think it's gonna...

MM: Well, it's not necessarily watering done; it's smushing out. I mean, it's where you can now spend five years at the freshman level in mathematics, and after five years not know anything

any deeper than freshman level. And it's not necessarily watering down, I mean there's a lot of mathematics at any level. It's just, they keep getting wider and not... no depth; it's just a matter of directing it.

MR: Spreading it. So do you think that's going to continue? Can it continue?

MM: Yeah. And I think one of the reasons that it's probably going to continue until they do something about what all these people are doing in college. Because that's the easiest thing for the faculty to do. Stoop too hard to drag people up that don't want to be drug up, and that there isn't enough of them that want to be. I think we bore them enough at the freshman level that the good people, and I've seen this through the last 15 years, don't stay in mathematics. They go into chemistry, biology, geology, et cetera, et cetera. I think we drive them out of mathematics.

MR: Because the good ones are bored, and the other people don't ever get any depth.

MM: Well, how many people in these courses is even at all interested? The ones that are interested in mathematics are even more interested in something very (?). Good math, good students I've had in the last 15 years, and especially the last 10 years, in my math courses, weren't math majors. I mean they could have been easily enough, but that wasn't the direction they wanted.

MR: They enjoyed the math, but they were looking at other things.

MM: Yeah. And it's not surprising, I mean they're.. They'll probably end up in mathematics anyway, because it wasn't the classes, there were just inherently interested in it. But, you know there are great, wonderful things going on in all areas. It's ...

MR: It's fun.

MM: Pretty strong competition out there. Especially from the biological sciences.

MR: It's amazing, isn't it?

MM: As far as interest groups...

MR: And what they like to call, cutting edge, new things happening.

MM: Yeah, and back in the olden days, we didn't have that competition. There was some competition from physics, but not the...You had to have so much mathematics anyway that physics wasn't that much competition. We need mathematics, but not in the same way in modern sciences.

MR: Well, when you figure we've made some major breakthroughs scientifically in the last 50 years, that's going to turn things around.

MM: Well, how about the last 50, last 10. No, I think mathematics has a lot more of competition for the good students than we did 30 years ago. The competition for the good students wasn't there.

MR: Well, there's a fun question.

MM: There just wasn't that much going on 30 years ago outside of mathematics and physics. Some in chemistry, but not near like it was a few years later, even in chemistry.

MR: Right.

MM: Mathematics, physics, and chemistry... There's been some other areas that were interesting, but not near as interesting then as they are now. A lot of my friends are geologists which was pretty interesting, but there wasn't as much going on now even there.

MR: Well, again, if you look to technology and what it's opened up for us in terms of analysis of any data that we have. Pretty phenomenal.

MM: But I think that's one of the things that's happened, that has degraded the subject. But, you know, as a discipline as an undergraduate discipline, it has changed radically in 30 years. And not for the better as far as somebody that really loves mathematics. And it's not the student's fault, it's the faculty and the administration's fault.

MR: And you said the system?

MM: And I might add, I mean, how many times out there, how long have you been out there, just at the university at the graduate level?

MR: Oh, a couple of years.

MM: Have you heard anything from the administration about quality?

MR: No, the big difference for me is that I'm, in fact, the school that I teach at doesn't even acknowledge master's degree as a pay change, so I'm not in it for a salary or any of that. I'm going back because I've got a bunch of kids who are all growing up or grown, and I wanted to recharge a little bit. So, it's a, I'm coming to it bringing my own incentive, but in terms of anything from the university, no, they're not. It's not an issue that they're addressing. Not in that context, they're concerned with whether or not there's equity, and...

MM: Quantity is the word.

MR: All those.

MM: Retention, not quality. And that brings us totally all the way around because there's a lot of people up there that they're trying to retain that shouldn't be there in the first place.

MR: Somebody should acknowledge that this isn't going to meet needs. Unfortunately. But we started very early, that whole idea of 'this is for everyone'. Well, there's two fun questions for you to answer. One is do you have a favorite anecdote or memory that reminds you of why you enjoy being at the U of M? You can have more than one, but...

MM: I really don't. I enjoyed it, but I can't ...

MR: No stories?

MM: None that should be told.

MR: I can relate to that too.

MM: I enjoyed it. I really did. I'm very glad to be out of it, but it's not... the reason I'm glad to be out of it has nothing to do with the students or the faculty. It has to do with just what's happened, the education, or what I perceive has happened in the last 30 years. Just, I mean, what you get out of teaching is reaction and interaction with students, and it is very depressing to go into a classroom with 30 students and at most two people who are at all interested in me or...

MR: Well, welcome to the world of high school.

MM: Yes, very much like they told me, 'I couldn't do that'.

MR: That, yeah.

MM: And the problem is, that eventually it's worked its way up. Universities are just almost as bad.

MR: Especially I would assume at the first couple of years before you get up into the...

MM: And this is what you spend most of your time doing. You know, you go ahead and teach calculus which is a neat, neat subject. There are lots of... I mean...It's built up that students are required to be there. They're not prepared; they're not interested.

MR: They don't really want calculus.

MM: They don't want to be there. And it's harder and harder to find anyone that you can get any feedback as far as enjoying the experience of teaching, because you're not teaching. You're talking to an empty room that's full of people, kids, bodies. That's why, it's good; I'm really happy to be out of there. It's just gotten to be too depressing.

MR: The last question, you get to think about; you may not have answer for, but one of the things that we did on our history class was to look at Hilbert questions because they...

MM: I look at that one, and I have no comment.

MR: That's okay, but that was for us, kind of a pivotal thing to look at to begin the class, and we spent our first couple of weeks of class doing Hilbert questions as part of our time, simply because it was so much a...; it gave focus to much of the rest of the century, and you were mentioning things, quantum physics, grew out of, to some extent.

MM: Amazing construct, in an amazing short period of time, but ... brilliant people have practically no data then to work with .

MR: But what fun...

MM: Yeah. That was absolutely amazing period of physics, the 19s and 20s.

MR: It would have been interesting to be a fly on the wall at some those conversations I think.

MM: Yeah.

MR: Any final words of wisdom to share with us all?

MM: No, none at all. I know a lot less now than I did when I started.

MR: I know I know a lot less as I go along; I think that's the key.

MM: But, I've enjoyed it, I really have.

MR: You wouldn't go do something, go back and change it, be a physicist now?

MM: No, not really. No, I don't; I love mathematics. And...(tape ends)

Written notes continue to say:

Trend will continue until college again becomes a privilege instead of a right.

[End of Interview]