RUTGERS
Edward J. Bloustein School
of Planning and Public Policy

Alan M. Voorhees Transportation
Oral History Project and Archive

Interview with Martin Wachs, January 2015
Conducted by Nicholas Tulach
Edited by Robert B. Noland

April 2015

ALAN M. VOORHEES TRANSPORTATION CENTER
Rutgers, The State University of New Jersey
33 Livingston Avenue, New Brunswick, NJ 08901

Disclaimer Statement

This document contains the content of an oral history interview and is part of a series of interviews conducted by the Alan M. Voorhees Transportation Center (VTC). These interviews are personal, experiential, and interpretative, reflecting the memories and associations of individuals. All reasonable attempts are made to ensure accuracy, but statements should not be interpreted as facts endorsed by Rutgers University, the Edward J. Bloustein School, or VTC. The associated website also contains links to other resources, but does not endorse or guarantee their content.

Acknowledgments

The Alan M Voorhees Transportation Center would like to thank the generous aid of Tamara Swedberg in assisting with these interviews and providing the necessary equipment to conduct them. VTC would also like to thank the National Transit Institute for the use of its facilities for a portion of these interviews. Finally, these interviews could not have been conducted without the financial support of the VTC board and the University Transportation Research Center grant program.

Biography of Martin Wachs

Martin Wachs is Professor Emeritus of Civil & Environmental Engineering and of City & Regional Planning at the University of California, Berkeley, where he directed the Institute of Transportation Studies. He earlier spent 25 years at UCLA, where he was Chairman of the Department of Urban Planning for eleven years. After retiring from the University, Wachs became the Director of the Transportation, Space, and Technology Program at the RAND Corporation in Santa Monica. He remains active teaching courses and conducting research at UCLA in transportation policy and working on transportation policy projects at RAND.

Wachs is the author of 180 articles and wrote or edited five books on subjects related to transportation finance and economics, relationships between transportation, land use, and air quality, transportation needs of the elderly, techniques for the evaluation of transportation systems, and the use of performance measurement in transportation planning. His research also addresses, equity in transportation policy, crime in public transit systems, and the response of transportation systems to natural disasters including earthquakes.

Dr. Wachs served on the Executive Committee of the Transportation Research Board for nine years and was the TRB Chairman during the year 2000. He is the recipient of numerous distinguished fellowships and awards, including a Lifetime Associate of the National Academy of Sciences and the lifetime achievement award as "Distinguished Planning Educator" by the Association of Collegiate Schools of Planning.

Dr. Wachs was Transportation Policy Advisor to Los Angeles Mayor Richard Riordan, and was appointed by Governor Pete Wilson to a "Blue Ribbon Commission on California Infrastructure." He currently serves on a statewide committee created by the legislature to design a new system of road user charges for California to succeed the motor fuels tax.

Martin Wachs is married to Helen Pollner Wachs since 1963 and they have two children and two grandchildren all living in Los Angeles.

This interview was conducted in January 2015. The transcript has been appended with minor grammatical edits, additional notes, and clarifying comments provided by Martin Wachs in brackets.

NT: I'm Nicholas Tulach from the Voorhees Transportation Center at Rutgers University. I'm here today with Martin Wachs, a long time transportation professor from UCLA and UC Berkeley. Also, your title was Director, I believe, of Research.

MW: Director of Transportation, Space, and Technology at RAND.

NT: At the RAND Corporation. And recently retired, as far as I understand?

MW: Recently retired from RAND about four years ago, and I stopped being the Director, but I'm still a consultant. I still work on a few small projects. I mean, I do a small amount of work on a few projects. But I spend more time at UCLA.

NT: So we're here today to talk about your career, and your achievements, and other people who have touched your career throughout your professional life. I usually start off by asking a question of why transportation, how did you get into this field, and what made you decide that transportation was something that you wanted to spend your life working on?

MW: In my case that is a question that I've thought about a lot, and have a ready answer. And it's a very typical story, I think, one that as an educator I think I'd appreciate myself.

I came from a relatively low-income family. Most of my relatives had never gone to college. My father was a high school dropout. And I had the pleasure of going to a wonderful high school in New York that prepared me very well…Bronx High School of Science for additional study. And I had no idea what to do about college, but since we didn't have any money I only considered going to a city university. And at CCNY [*The City College of New York*] which is a wonderful at the time especially, and still is wonderful, institution for transition from working-class to middle-class. I majored in civil engineering. I don't exactly know why I majored in civil engineering when I look back at it, but I think it traces from the many times that I traveled

around New York in my father's vehicle, across the Triborough Bridge, and looked at the Hell Gate Bridge, and said "who built them? How did they get here?" I always used to enjoy, even at the age of six and seven, standing in the front car of the subway train, and looking at the tracks and so forth. So I was fascinated, as many kids are, with trains and cars and bridges and so on. And I didn't really have much guidance or instruction from anybody about what to do. Civil engineering was a very common major among first generation college students. It had a tie to the working class, and yet it was a career path. So I decided to major in civil engineering. And I was doing reasonably well in school, but I remember this vividly. In the second year or so of college, I was wondering do I really belong in civil engineering? So I went to the Career Counseling Service and they gave me a battery of tests. I was sort of undecided, and I took tests for hours. They were mostly about interests, you know, what magazines you read and what do you like to do, and what do you see. Then I went away, and a week later I came back and had an appointment with a counselor, and the counselor said, while you do pretty well in civil engineering, and you would do pretty well in social sciences and sociology and political science and whatever. And I still remember that like it was yesterday, because I think of what I do, urban planning, as a kind of a blend of those things. When I got my degree in civil engineering my classmates all wanted to do structures and build great bridges, and I wanted to deal with how did the bridges get built, and the politics around them, and the money around them. And that came right from the beginning.

But I should also point out that in the civil engineering curriculum, there was a course that dealt with transportation, and it was taught by a professor who really only - he passed away like only two or three years ago – named Joe Pistrang.. And he taught a course about subways and highways and the typical first civil engineering course in transportation - geometric design, and how to find out how many parking spaces to attach to a building, and so forth. But he taught it with such enthusiasm. And he took us on field trips, and he himself, I thought, was such a brilliant teacher. So I can remember talking to my then-girlfriend, now-wife for fifty-one years, saying I think I want to be a teacher. He seems to enjoy what he's doing so much. So I went to him and he talked about graduate programs, and I followed his advice. He said go to Northwestern, and I went to Northwestern, and I had a wonderful…the reason I'm sort of getting emotional…I had this wonderful experience 30, 40 years later of telling him that, and he broke into tears. And he just recently passed away, so I miss him. It was a very emotional thing.

But at Northwestern, again, all my classmates were all interested in traffic engineering and [*demand forecasting*] whatever, and I was interested in planning. And I can't explain why, buta very supportive faculty, William Garrison, Don Berry, who taught traffic engineering , and Paul Shuldiner,who ended up later at Massachusetts, [*and Adolph May*] guided me in a very helpful way. And again, I felt comfortable in an academic environment because of my teachers. So I've naturally gravitated to the notion of [*teaching and*] doing research. And my doctoral dissertation was about a route choice. It was quantitative and I used factor analysis. I did 260, 270 interviews, and I modeled people's choices based upon stated preferences rather than upon the [*then more common*] performance measures of traffic. And it was fun and interesting and I published the results.

At that time…I should also mention that I had an obligation to go into the military for two years, and I did. As I told you in the car, I did work on transportation issues for the Army. I was in the Ordnance Corps, stationed at Aberdeen Proving Ground, and I was at a research laboratory. But at that time, the job situation for young academics in transportation was completely different than it is now. You have no idea how lucky we were at that time. After World War II, universities began creating planning programs, engineering programs, and were expanding. And so people in my situation were being called up[*on the phone*], and invited to come and interview without even applying. And that happened to me, I was invited to Cornell. I was invited to Georgia Tech. It was so much fun. But I finished my doctorate in Chicago at Northwestern, and soon after, I finished the Army, I went back to teach for a year at the Chicago Campus of the University of Illinois. It was in the Systems Engineering Department, and I was teaching transportation planning and policy. And I just didn't feel that it was a perfect match. I was frustrated by the emphasis on the technical and not the context for planning and transportation, and I then moved to Northwestern for a year. During that year, as an assistant professor, during that year I got a phone call. I was sitting in my office, and [*was contacted by*] John Friedmann, who was Chairman of the Department of Urban Planning at UCLA…it was then an urban planning program in the School of Architecture and Urban Planning. and called and said that he had heard about me from Marvin Manheim at MIT, and that they were looking for a person to do transportation in the *Planning* Department. So at Northwestern I was in Civil Engineering, and at Illinois I was in Systems Engineering. He invited me to come to Los Angeles for a visit. I

had never been west of the Mississippi. I accepted sort of instantly. I called my wife immediately and told her that I was going to go interview in Los Angeles in February, when it was about 20 below in Chicago. And her response on the phone was correct and interesting. She said, "I know we're going to move to Los Angeles because the Dodgers are there." And I grew up in New York as a Dodger fan as a kid, and continue to follow them and root for them [*to this day*]. And she was right. And the first day I was in Los Angeles I went to a Dodger game.

But to be serious. At UCLA the Dean of that school was a [*wonderful*] man named Harvey Perloff. And he was my model of what one should do. He believed in rigorous analysis, but he also placed it in its political and institutional context, and that was what I was sort of missing. The engineering schools were fine schools and my colleagues were wonderful people, but it just wasn't the right niche for me. And, I had, I think it was a three-day interview process at UCLA, 1971, in February. And I sort of, after the first fifteen minutes, I said [*to myself*] "if they offer me this job I'm taking it." And they did, and I did. I stayed there for, whatever it was, thirty-something [*25*] years before [*moving to Berkeley*].

What happened with Berkeley was I was asked to direct the university-wide, multi-campus transportation center of the sort that they still have –[*The University of California Transportation Center, known as UCTC*] - US-DOT [*United States Department of Transportation*] funded [*the*] Region 9 Transportation Center. I would have preferred to stay in Los Angeles. By that time our children were adults and were not going to be moving with us. So I would have preferred to stay in Los Angeles, but they wouldn't let the Center be directed by somebody in Los Angeles. We carefully considered it, and we loved the Bay Area, so we moved but with a kind of expectation that we would return, mostly for family reasons. There was nothing professionally involved in that [*decision*]. And so I [*had*] spent several decades at UCLA teaching transportation policy, teaching methods, teaching ethics, and serving I think it was eleven years as the Department Chair, and enjoyed every minute of that, and thought UCLA had the most wonderfully collegial, supportive group of faculty and very stimulating students.

And I went to Berkeley and I found it a little tougher. I thought people were more entrepreneurial and there was a little more tension and conflict, but still, they were personally wonderfully welcoming and supportive of me. But after…whatever 2003 [*actually 2004*] yeah,

because the same year I became a member of the Cosmos Club - I got a letter from the RAND Corporation. And it said that they were seeking a Director to build a transportation program. I had always respected the Rand Program. I had known people at Rand when I lived in Los Angeles.

NT: You hadn't had a relationship with them previously?

MW: I had done a few things like [*peer*] review a report and send comments. And I had met people who worked there, but I had not worked there in any capacity. And so I got this letter and it asked me to recommend people. And I called the woman who wrote the letter, Debra Knopman, and I asked her whether she'd consider me. And she said, "Yes, of course." So I went through the interview process, and I was made the offer. In large part, that was motivated by our desire to, after whatever, nine years in the Bay Area, to get back to where our children were. They were married. They were soon to have children; they didn't have children yet. And we wanted to be closer to them, and it was an interesting experience, and I could, as the phrase goes, double-dip. I could retire from the university and get my pension, and at the same time do something new and different, but still related to transportation. And I think I was modestly, moderately successful at RAND. The program grew. We hired a few people, six, eight, in transportation. Good people like Paul Sorensen and LisaEcola in the Washington [*office*], but I was more an administrator, and a team builder, and a project manager, and I did write[*reports and papers*], but [*fewer than I had in the University*]. And RAND has a Ph.D. program [*in Public Policy*] and I did have a doctoral student of my own, and I did teach a couple of courses. But I couldn't commit to teaching very much because of the need to travel so much, because of the project development work. I travelled to China. I travelled to India. It was so demanding, and I was starting to tire of *that*, and of the responsibilities to manage a program, and be essentially a business development person. And when I really understood that teaching and working with students was more pleasurable, so…I retired again. And RAND was also very good to me, and people there very respectful and very helpful. As soon as word was out that I was doing that, people [*colleagues*] at UCLA asked me to come back and teach a few courses, and I agreed to do that as an emeritus on the condition that I not be, you know, involved in administration, management, personnel decisions, or whatever. So I go there, I teach. I have a few doctoral

advisees, master's advisees, and I spend time on research projects and writing. And that's, right now, a wonderful mix, though I think I'm reaching the end of my teaching time.

NT: So teaching was obviously a very important part of your career, from the very beginning, and you identified some people that touched your life very closely.

MW: Yes.

NT: Let's talk a little bit more about the role that you played with your students in teaching, and what you thought from a professional standpoint, as a teacher, what were your values that you were trying to impart on them? What was sort of your method of teaching that you learned from your mentors that you brought to your students?

MW: Well, most teaching is done in the classroom, and with pretty large groups. And I was pretty comfortable after learning how to do it, doing lectures and asking students questions, leading discussions, writing examinations and so on, but that's most of one's time and activity. But I thought that the more important human dimension of this was the time spent with individuals, and they include master's students and doctoral students mostly, not so many undergraduates, a few but not very many. And I think that the, one-on-one time [*with students*] enabled me to make a contribution. I think very often the contribution was mostly centered around building their self-confidence. You know, [*they would say*], "I can never do this. I can't compete in the world. I don't know this; I can't do that." And helping them understand that everybody else faces the same questions and perceived their own selves as being limited. And I had very good relationships with quite a large number of students. I probably have had more Ph.D. graduates - I've been the advisor, the signer of the dissertation, for more Ph.D. graduates in transportation planning than anybody I know. It's over 50, and that's a large number. I've been doing it for 50 years, so it's not that many per year. And I've lost track of some of them. Some of them are dead. Some of them left the field. But I maintain very close relationships with quite a large number . It's over 30, I would think, and they're good friends. I've just spent hours and hours with them today [*here at the TRB Annual Meeting*]. And that's very satisfying; that's wonderfully satisfying to me. And the thing that gives me the most satisfaction in my career is watching them achieve. It's really wonderful.

NT: Let's talk a little bit about your achievements in the field of transportation, because I think that relates very closely to the reasons why a lot of students were attracted to have you as an advisor, to have you advise them on their careers. Not just because you obviously established a very close relationship with a lot of these students, but also because of the types of research that you did. And I want to start, I think, by talking about ethics, because that, I think, is central to what your whole philosophy of what the problem - as it's been described to me as a Ph.D. student - do something that really makes you, like, investigate something that really makes you upset, right? And that's the best way to carve out your niche.

MW: That's neat; that's a nice way to put it. That's very nice. Let me say one thing [*first*] and then I'll turn to ethics. What motivated me to study what I did, as I said earlier, is this blending of the technical and the political and social characteristics. And what attracted me to work in urban planning as opposed to civil engineering, let's say, was the notion that it's a blending, it's a combination of, hopefully, good technical analysis and politics and social impacts and influencing the world, financing projects instead of just doing the physical design and so on. And I thought that when I entered the field there was an opportunity in a professional school, a school of urban planning, to focus on that linkage between what one learns and does in modeling and statistics and whatever, and the actual policy-making in the real world. I always envisioned myself from the start as a bridge person. I'm not going to develop planning theory, because I'm not very good at that and I don't fully understand it, and I truly don't really value it as much as some of the people who are deeply in that field do. But I was also not going to be a mathematician and develop travel demand models. So I always thought of myself as being a person who would talk to agencies, and bring back experiences to teach from the tough problems that they face where they were doing technical analysis embedded in a political environment. And frankly, I thought that a lot of people helped me build a career around that intersection, and that it was actually easier to focus on that back then, [*in the seventies*] 1973-5-7, than it is now. That the pressures of academic life [*today*] lead people to do highly quantitative work, and to avoid what people call community service or involvement in politics or whatever. And, I'm sort of disappointed that young people have to choose either to work in policy or politics, or be an academic, and that people doing dissertations now find it difficult to justify using qualitative methods or doing political studies and so forth. Because I think a lot of

the quantitative analysis, while it's useful and interesting, is limited. I won't be hostile toward it, but I think there's only so far you can go if you don't place it in the context of the world, when you're focusing on a topic like transportation or housing or air quality or the environment, which is inherently done in the real world, not in the laboratory or on a computer. I honestly felt that the UCLA Planning Program was wonderful about that, and is not as good now in that dimension. It's much better in terms of modeling and quantitative analysis. I don't think it's blending theory and practice nearly as well as it used to, nor are most of the university programs. Now, it's from that concentration – on how do they build this? Why do they do that? Why would they make that choice instead of this choice? - that I began to see that the results of the analysis were not influencing the policy making, and that the policy-making was often denying the results of the analysis. I had several very important, to me - maybe not to the world, but important to me - experiences with this notion of doing analysis on a real project, and having the people responsible for the real project not only refuse to listen, but try to damage me because of the position that I'm taking.

I had an experience in which a student who had taken a class in which I taught about travel forecasting [*who*] went to work for an agency in which she was asked to do a forecast, which demonstrated that a light rail line to downtown was justified and was eligible for federal funding based upon its ridership [*forecasts*]. And she ran the models, and she came up with an average daily ridership that was quite low…2,000, 3,000. And she was told by her supervisor that she had to go back and change it, because they needed at least 30,000 or 40,000 to justify a federal grant. And she went back and changed all the assumptions and reran the models and came up with 7,000 a day, and said that's as far as I can go without violating [*ethical principles*] - and they said, well if that's the best you can do you're fired and we'll get somebody else who will do it. And she came to me in tears. I taught her the methods and then she faced that experience.

I had another experience with a Ph.D. graduate, who had worked for a really successful transportation consulting firm, and had done the travel demand forecast for the Miami subway, and was told similar…he related a very similar experience. And the firm that he was working for had been chosen to do travel demand forecasting in Los Angeles because of its "success" at modeling. And I immediately understood by what they meant by success. It was getting the federal funding, not doing the best [*or most accurate*] model. And so I started to investigate and

interview people about their experience and to do analysis in which I changed assumptions of some of the models, to what I thought were more realistic assumptions, and found out that the assumptions of the models had been twisted in order to justify predetermined outcomes.

I had the wonderful experience of being appointed to a committee, of the Central City Association in Los Angeles, as the city was considering a rail line. And the other members of the committee were very powerful businesspeople.

NT: Can you give me a timeframe about when this is?

MW: Yeah, 1973 through about 1977, in that time period. And we would meet in corporate boardrooms and they would talk about how to bring federal grants to build a subway to Los Angeles. And I was their, sort of, technical consultant. It was important for publicity reasons and for appearances,you know they have an academic on the panel. I never believed that I had any influence over them, but it was really interesting to me to be like a fly-on-the-wall watching how they dealt with it [*policy*], and how they talked with the mayor, and they went to Washington and so on. And I felt that the things we had learned in school, and things we were teaching in school were not responsive to those very complicated and political environmental issues. I also didn't feel that the individuals that I was working with were unethical people. I thought it was more the institutional setting, and the context in which they were working, that challenged the ethics of a professional planner, who might be doing modeling and statistical analysis, that it would be too simple to say the individuals were unethical. However, I then…later in life…it's now 20 years later, I remember this like it was yesterday. My wife and I were at the Hollywood Bowl, and it was intermission and we went from our seats [*to an open area*], and a very elderly man tapped me on the shoulder. And he said, "You're Martin Wachs." I said, "Yes, I am." And he identified himself and said he had been a member of that group, that committee. And he was probably around 90-years-old at the time that we were talking, and he said, "You don't know how much I envied you. You were able to tell the truth." And he said, "You have no idea what was going on. You were just so naïve." And I said, "Really?" He said, and his face contorted, he looked terrible, he said, "I took suitcases full of cash to Washington to makes those things happen, and I'm so ashamed." He said, "You don't have to be ashamed."

NT: Wow.

MW: It was a wonderful experience. It was all like two minutes. And it sort of made me feel that the students really needed the kind of focus on ethical issues that I developed in my teaching. And I joined the Ethics Committee of the AICP, and we rewrote the Ethics Code, and I was able to put an ethics in forecasting item in the code, which I thought was a tremendous accomplishment. It was my idea. It was debated. It was included eventually. I'm not sure it's in the current code, but it was for a number of years. And I thought that this issue of forecasting, it's very interesting and complicated because you can never tell if your forecast was right until after the action is taken.

NT: Yeah, after the money's been spent.

MW: And so if they've already spent the money and built the bridge, so what if the estimates were exaggerated? It doesn't matter. Because the purpose of the estimates was to get the thing [*i.e., the project*] built, not to honestly do a benefit cost analysis. It's not a terrible thing that the world works that way; it seems to me a terrible thing that it places on professionals a kind of pressure. I don't mind politicians making political decisions; I mind them directing their staff to state things that are not correct. And the staff feeling that they must do it, because they're employees, and they're going to lose their jobs if they don't do it.

NT: Do you feel that the relationships that you have with organizations, planning organizations, and other political organizations that do forecasting and make decisions based on those forecasts, do you feel that, that has changed? That ethics has become more of a centerpiece in the discussion? Or that things are pretty much the way they were when you started your career still?

MW: I have very clear feelings about that. I think they're pretty much the same as they were, and I think they likely will stay that way. And I think what's different is that maybe some planners working on those projects are sort of more aware of it. There are doctoral dissertations being written about it. There's a whole body of scholarship [*on this theme*] - one of the most principal names that you'll hear is Bent Flyvbjerg who's looked at projects all over

the world. He was actually my student, and I'm very proud that he's still also a friend. He never finished his Ph.D. because…he's from Denmark…and in the course of his Ph.D. program, he was offered a professorship in Denmark, and if he didn't go and take it [*the position would not be held for him*]… So he actually later finished his doctorate in Denmark, and not with me, but we've remained good friends. And he's built his body of scholarship based on the experience he had working with me on these issues, and I think it's a very influential and important body of scholarship. He's right; I mean that it's a worldwide phenomenon. It's not a function only of the U.S. It's not a function of only democratic states. It's quite a complex issue, that the relationship between analysis and decision making isn't the linear relationship of collect the data, run the model, get the output, and then they'll do what you recommend. What I thought was very interesting, but this is an issue that has followed me [*throughout*] my entire career…it's certainly not resolved, but it remains interesting to me.

The RAND Corporation would like to present itself to the world as an objective think tank. There are liberal think tanks. There are conservative think tanks. They say they that we're a fact-driven, analysis-driven think tank. And the president…Jim Thompson was president for a long time when I was there, and Michael Rich, who was the executive vice-president and who became the president when Jim Thompson retired…I've had long talks with both of them and they both believe [*in*] that model. They actually believe that policy is better if you do analysis, and that decision-makers should listen to the analysis. They're not naïve people. They believe that it's a model that should be pursued, even if it's ultimately unattainable. And they saw the RAND Corporation as perhaps the last institution that tries to place its focus on objectivity. It's not a consulting firm. It's not a university. And it's not a partisan think tank. So it fills a very narrow niche in American policy analysis. And it was an interesting place to be. The people are so smart, and they work so hard, and they're enormously productive. It was another context in which I could wrestle with this question, of how do you do good analysis, find things that you believe are true, and use it to influence policy? And sometimes we succeed, but often the policymakers don't want to hear the analysis. And RAND was wonderful in telling potential funders, you know, when we do this work, we're going to be independent. We're not going to change the results. We own the intellectual property; we won't let you take it and change it. And very often, when marketing on those terms, the people who came to us for analysis turned us down. They saw RAND as a very prestigious organization, and, therefore, they wanted it to

say what they wanted. And we said, well the prestige of RAND came from its intellectual independence. And they go, oh yeah, we don't know what we're going to get if that's the case, and we won't fund you to do work for us.

So it was always a struggle to find projects, but it was also an environment in which people of principle could feel comfortable. And it remains to be seen what the long term future will say about that. But I think that RAND's effort to be independent is noble and notable, and I think ultimately they too are unsuccessful in being completely independent, because it's unattainable. What I'm not decided about is whether it's appropriate to have unattainable goals. Maybe it is. But that was still another phase of this exploration of the relationship between analysis and policy.

NT: The question that has always baffled me in planning, and this is more of a general planning question, not necessarily focused on transportation, but I'd love to hear your thinking cause it intersects so closely with what we're talking about. But how much agency do planners have - transportation planners or other types of planners, how much agency do they have over the decision-making process? As you've pointed out very political process, very much driven on that, but also this idea that it can be rationalized, that it can be a rational process that you go through these steps, and it's a decision making process like that. But I've always struggled with the planners at the table, in the room doing the analysis, being a part of this overall process, but how much do they actually affect the outcomes?

MW: That's truly an interesting question, and I think that in most ongoing planning processes, relatively little. But I also think that they can be influential informally. So if a mayor will sit down and listen to you, and I've had the opportunity to talk to several senior elected officials, if they actually want to listen, you can be quite influential, especially as an academic. The average practicing planner will get fewer of those opportunities, but I think it's through informal influence and convincing and personality and… not [*with a technical*] report that they can have true influence. The formal analysis that's done is really not as influential as we would like to think it is when we teach students to do it.

NT: Yeah, when I was taught the planning process, we were taught that political feasibility is one of the aspects of the analysis, but also one of the aspects of the decision making process,

and that always stuck out to me as being the thing. It always seemed like we stopped short of addressing, of actually concentrating on political feasibility, whatever that aspect was and left that for other groups of people. And it always felt like, well this is it. Political feasibility is the thing that we have to really consider carefully, because ultimately, that's where the decision comes from, how do the politics shake out.

MW: And the people who are making those decisions are either elected or chosen by elected officials, and there's every reason in a democracy to want the decisions to be made that way. But I don't especially want decisions to be made because they're being influenced by people with a lot of money, and not being influenced by people with a lot of data. And the money trumps the data, and the students have to understand that from the beginning and develop strategies for dealing with it. Some planning students sometimes are very militant. I mean the way they deal with this by marching and carrying signs and occupying spaces and so on that has never been my style. I've been more conservative, and been more involved with political processes by testifying or advising. And I've some influence over elected officials, and that's been very satisfying when I see an elected official making a statement, and I know that the material that he or she is using came from a meeting that I had with them. That's important; that's very nice. It's very gratifying. But it's still quite rare, I think.

NT: Do you think of significant examples that come to mind about particular events where that happened that you'd like share?

MW: I actually had a title of Transportation Advisor to the mayor of Los Angeles when Richard Riordan was the mayor. And I've heard him make statements a number of times that were derived from my sitting with him. We met every two weeks for breakfast, and he listened, and he asked questions, good questions, and I heard him taking positions that were informed by what I had told him. There were also other times that - one of the most interesting…two of the most interesting professional things that I did - both involved lawsuits, and watching the same basic question about the relative importance of politics versus analysis, came to the fore in both of them. One that chronologically it came first was I served as a special master to a federal judge on a lawsuit brought by several environmental groups. NRDC was the most prominent, Natural Resources Defense Council, Sierra Club was involved, brought against the Metropolitan

Transportation Commission in the San Francisco Bay Area. And they were claiming that the MTC was violating the Clean Air Act. And the reason…the nature of the violation was that they had, in their Regional Transportation Plan, they said we are going to achieve this much air quality improvement, and if we don't by this [*precise*] date, we have certain - they were called backup measures, I think there were ten or eleven items that they would implement if they failed to [*achieve the standards*] , by [*implementing*] their principal plan. And they had failed to implement those, and they had not met the deadline and the standards, and so they were brought into court by these [*environmental organizations*]. And the federal judge then, Thelton Henderson, said that he was issuing an injunction against all [*federal*] transportation spending in the Bay Area that was indefinite until this was resolved. And so this was a big deal. And then he said he needed a special master. A special master is a technical expert to the court. You neither represent the prosecution nor the defense. Basically, you're part of the judge's extended staff. I was invited to be considered for this. I sent my resume and all of that, and I was informed that I had been selected, and I would go to San Francisco every few weeks for court hearings, and I would sit in the courtroom and listen to the arguments, and then I would meet with the judge in his Chambers, and help him interpret things that were said about travel demand forecasts and [*other technical elements of the discussion*]. The funny part about this was that I was thrilled and I was so impressed that I was chosen for this. I had to appear in court when the announcement was made, and the explanation was that they had five people that they had [*considered*], and of the five I was the only one in California so the travel cost would be the lowest, [*and that is why*] they chose me. And it was very fortunate. They didn't say I wasn't qualified, but some of the other people were probably more prominent, especially [*with respect to*] travel demand modeling, which was not my specialty. But that was extremely interesting. And ultimately a settlement was reached, and I participated in designing the terms and the conditions of the settlement. The problem was that the MTC had listed this long list of actions that they would take because they were required to by federal law, they had to meet the standards. They didn't believe that they would need to implement them, and they didn't have the authority to implement them ultimately. So things like raising tolls on the bridge [*implementing*] congestion pricing because the other measures didn't work, or eliminating downtown parking. They couldn't simply do that, but yet those were the backup measures. So that was an interesting experience, where things were actually put into a plan that were

politically infeasible, more or less knowing that they were politically infeasible, in order to comply with federal guidelines.

The other sort of pinnacle of my excitement about being engaged in this sort of linking theory and [*practical politics*], whatever, was the Bus Riders Union strike in …not strike, but suit in Los Angeles. LA Metro was building...the predecessor to LA Metro was LA County Transportation Commission…was building subways and they were…

NT: What was the timeframe for this one?

MW: Later, '80s. So there was a ten-year injunction…there was a ten-year agreement that expired around 2011. The agreement was 2001, so it was '90s. Richard Riordan was the mayor, so it was '90s. The Bus Riders Union represented poor, carless, low-income people. And LA was building a subway, and they were spending on the order of 50% of their budget in a given year on capital investment, [*almost all on constructing rail lines*]. And they were raising the fares on the buses. And the argument that the Bus Riders Union…very left-wing, led reallyby Eric Mann, who's a Trotskyite, very clearly anti-establishment…their argument was that in order to pay rich contractors a lot of money to build a subway, that would be used by rich people going to work in law offices and so on, they were raising the bus fares for poor hotel workers, who were taking the bus home at two in the morning, and that this was just indecent.And we could demonstrate, Brian Taylor, who's at UCLA, was a graduate student and he was my assistant on this, and we worked with Thomas Rubin, who is the former Chief Financial Officer of the LA Metro, who became disillusioned with them and joined the other side. He was a fiscal person. We did fiscal analysis. And we could show, for example, that they had a small portion of the rail system operating, and they were spending annually as much money on police services on this small [*part of the*] rail system, as they were in the entire bus system, which was carrying 60 times the number of daily riders. And that seemed clearly unfair. And it wasn't so difficult to demonstrate that the rail program was to benefit upper-income people. And that was a very interesting experience. There was a judge, Terry Hatter, who was African-American, and was sensitive to the needs of minority communities, and he was assigned to this trial, I understand, randomly. We brought suit under the Title VI of the Civil Rights Act, and never thought we would win. It [*had*] never resulted in a successful challenge to a transit fare increase before,

never. It had been tried three or four times, [*without success*],and we just didn't believe we were going to win. We prepared our information…mostly I gave depositions, but it was all about these issues, and some of it was almost comical. [*For example*], the judge was told in court: "it's not possible to argue that the services are discriminatory, because look, here's a map of our services, and here are where the minorities are. And you see that the bus routes are concentrated in minority communities. Don't tell us that they're not getting the service they need [*since the bus lines cross cross their communities*]." . And I was in cross examination able to say quite simply, a large number of those routes were express buses that were going through the neighborhoods and not stopping there. And it was so obvious. I mean the case made by the LA MTA [Los Angeles County Metropolitan Transportation Authority] was so weak, it was [*not at all*] persuasive. Then the next thing that happened was that there was an agreement made,okay let's negotiate a settlement, let's not keep fighting. They selected Donald Bliss, a Republican former, I think, Treasurer or Chief Financial Officer of the U.S. Department of Transportation, I'm not sure that's the right title, to come out from Washington. [Donald Bliss was Acting General Counsel and Deputy General Counsel of the U.S. Department of Transportation during the Ford Administration]. And we took him on the Vermont Avenue bus, and it was crowded, not at peak hour, people were standing, they were crowded everywhere. And he looked at me, "We're the only white people on the bus." "Yeah, that's true." And then we took him on Metro Link which is the commuter rail line, and it was relatively uncrowded, and people were working on laptops, on countertops, and wearing suits. And we actually stopped and talked to passengers in both cases. On Metro Link we talked to a person who was riding, and he didn't know who we were. "Do you make this trip every day?" And he said, "Oh sure. Why would I drive when the county is subsidizing me so much? You know, they're paying me to ride the train. Why wouldn't I ride the train?" And it was so impressive, in the same day, to see these two things. Again, very subjective, very personal experience, was much more important than the [*quantitative*] data. But the mediator said, "I think I can see that we have a problem here." And there was an agreement crafted - not so much by me, I was not involved in that, I did more the front-end, the data collection and analysis - to add bus service, reduce crowding, set a standard for crowding that would last ten years, to increase the policing on the bus service. Not necessarily to reduce the rail program, but to rollback the fare increase for a period of time, and so forth. And there was no court verdict that said that Title VI was violated, (Title VI of the

Civil Rights Act), was violated, but there was a tacit acknowledgement that it was. The case was cited as a precedent by many others.

NT: So it still had precedence status; it was able to employ future decisions.

MW: That's why I chose to say what I said. It [*had influence and was seen as a precedent, but*] didn't have the same status as [*it would have*]- had it gone to trial.

NT: Was there a push to take it all the way to the end?

MW: No, the agency and the plaintiffs were happy to reach a settlement and regard it as a victory for the low-income people. And I regarded it as a victory for, just for rational analysis, I mean transit is a service that's most heavily used by loyal customers. They're loyal because they don't have many alternatives. When the fares go up, the rich take alternatives and the poor continue to ride and pay higher fares. So it seemed to me a wise thing to do in the interest of improving the quality of life in Los Angeles, and yet it was also an exciting experience that related to all the other things I talked about [*earlier*]. The importance of the context in which the analysis done is in order to make public policy, and the ethical commitments to fairness, and doing the right thing. I should add, I think that being an academic gives one more opportunity to do that. If you work for an agency or a consulting firm it's a different environment. It's one reason why I think, another reason why I treasure academia as an environment in which to work. It's not just the wonderful students and the bright colleagues and so on; it's also the independence to pursue the values that you believe are important. My career has given me that opportunity, so how can I complain?

NT: I want to elaborate a little bit more on that decision, with the Bus Riders Union and some of the work that you've done previously. I know one of your oft-cited papers is "U.S. Transit Subsidy Policy: In Need of Reform" from 1989. It was a paper you had in *Science*. [Wachs, M. (1989). US transit subsidy policy: In need of reform. *Science*, *244*(4912), 1545-1549. http://www.sciencemag.org/content/244/4912/1545.short]

MW: *Science*, yes.

NT: I wonder if, like you said, the context is very important in all of these situations - has the context changed? Do you feel that things are different now with respect to public transit and public transit finance and the types of projects? You know, we've seen sort of…some people might say a renaissance in public transit over the last maybe 20 years, maybe less, 15, 20 years in the United States in particular. Do you think that that context has changed? Do you think that things are different now?

MW: You're touching on what is…I'm 73 years old; I'm still involved in these issues. Many people my age have retired. In a way, I find it difficult to withdraw because of the challenges associated with just the sort of issue that you're talking about. There is more interest, more consensus, more political support for the things that 20 and 30 years ago we were pursuing. More public transit investment, more investment in streets that are walkable, more investment in cycling programs and so on. And the fact that that's happened is certainly noticable, and it certainly influences the environment in which students go to work when they graduate. And I'm finding myself, again, troubled that often these solutions are being promoted on the basis of political commitments, where they aren't fully justified [*by supporting analysis*]. So, for example, I never intended more attention to public transit and cycling and so on to be constituted as a war against the automobile, and I see that happening in places like Los Angeles. We're not going to spend a penny on fixing the streets when 90%, 95% of the people are still using automobiles for most trips and most corridorsbecause we're committed to transit and bicycling, and complete streets and so on, and that's not what I wanted to see either. Somehow I think we can have a transportation system in which…I certainly use public transit. I walk. I don't bicycle much anymore, but I use my car a lot, too. And I think of this as a…I think that the transportation system should be an integrated system, in which all of these [*modes*] are considered. But we've evolved into a social context, through transportation, where we are modally committed, and anti-, and that doesn't make any sense to me at all. I think we'd have better transit if it were more carefully integrated with cars, and we'd have less auto use if it were carefully integrated with transit and bicycling and land use, of course. Instead we've divided ourselves into armed camps about it, and I find myself strangely agreeing with some of the criticisms by the Tea Party, you know, of the planning process. And I don't come from a Tea Party type perspective. I am troubled that we have not learned from past experience, which

was clearly, and as the critics say, too automobile-centric. We haven't learned from that that the answer isn't to go to an anti-automobile alternative; it's to go to a more balanced alternative. Now maybe, and this is what I'm struggling with, maybe it's necessary to present it that way [*as a struggle*] in order to become [*more*] balanced [*in the end*]. If the automobile is still so dominant in terms of its economic supporters, car companies, [*concrete and*] aggregate people and so on, if it's so powerful, that the only way you'll have transit and bicycling and pedestrian investments is to portray [*the auto-oriented system*] as a monster, maybe possibly that could be a valid [*strategy*], but it's not me certainly. I can't do that.

NT: Interesting. And I think that relates a bit to your recent piece in *Transportation* that the sort of urban transformation over the last few decades and how downtowns are being reshaped by transportation in different ways [Wachs, M. (2013). Turning cities inside out: transportation and the resurgence of downtowns in North America. *Transportation*, *40*(6), 1159-1172, http://link.springer.com/article/10.1007/s11116-013-9501-6]. And I think in that piece you had some very interesting points to make about the environment, about goods movement and distribution, and all those other things. I wondered, I read the piece and I wanted to ask you and now I have the opportunity to, what is the alternative that you see? Or do you see an alternative? Like what's happening now with this sort of inside out of the cities, and certain things are moving to the periphery, while people are moving back, is there some other way - not to be too utopian about it - but is there some other way that you see as being a way to balance those things?

MW: I have no argument with the smart growth downtown mixed use approach to planning. I grew up in the Bronx in the 1950s, and I think, in effect, what's happening in Los Angeles they're trying to create a downtown that's like the Bronx in the 1950s. And I loved it, and think it was wonderful. I applaud the people in Los Angeles and other cities. I happen to live in Los Angeles, that's why I mention it, who have turned the downtown into a lively place, a place which is going to be even more exciting in the coming 10, 15, 20 years. My intent in writing that article was not at all to be critical of that, it was to say that something is left out. For a city to exist and survive having 14 or 15 million people, it depends critically upon the ability to bring in and bring out goods, and that is usually done, at least the last part of it, is done by truck. And the smart growth movement is not paying sufficient attention to goods movement. And not

paying sufficient attention to things like places for deliveries and for trucks in downtown, but also not paying attention to the fact that sprawl is still going on because the distribution center and the logistics locations and warehousing is all moving to outlying areas, and that generates trips by truck into the center. So is there another approach? Yes, I think so. There are so many, essentially brownfields-type land, in the city. The land is more expensive than at the periphery. But the environmental effects of putting some of those land uses closer to the population center, the benefits of that are worth some subsidy of the process of converting old industrial sites into logistics and distribution centers. And I think that should be part of smart growth. That's all I'm saying. I'm not saying that smart growth is a bad thing or that it's making a terrible mistake. I'm saying it has some unfinished business, and that unfinished business is largely about goods movement.

There's also beginning to be, and I'm getting involved in this a little bit, a backlash against the smart growth movement by rich people, who are car users only, who are saying "what's wrong with these people, they're creating worse congestion rather than [*reducing it*]". I'm wrestling with the idea that maybe worse congestion is necessary to make the transit, bicycling and pedestrian activity more feasible. But there's a war coming. Until now the smart growth people have been most influential and they've been very successful. People in New York like Janette Sadik-Khan have been [*very effective*]…I so admire what she's achieved. But in Los Angeles, and some other cities, there is [*the*] beginnings of a movement to stop the mayor from his Great Streets Program, because we're sitting stuck in traffic congestion on the West Side where there are low-density residential communities. And this is all going to be very interesting so, again, I find it hard to retire.

NT: I can see, yeah. I wanted to talk a little bit more about the environment as well. Because I think that a lot of the work that you've done has focused on that, especially the Clean Air Act that you talked about before. But your contributions to the environment, where you find that that fits within the overall realm of your work, and maybe what you think the future holds for environmental policy within the context of transportation, and what are the issues that have been addressed, and what are the outstanding issues that are maybe more challenging to address going into the future?

MW: It is interesting to have lived during a time period when attitudes toward the environment have completely reversed. I can remember when rubble from a demolished building was thrown in a river, and when there was just no, even, knowledge of the air quality impacts of the use of the automobile. And gradually, [*through the*] 1960s, 70s, one law after another - NEPA, the Clean Air Act, the Clean Water Act, the Endangered Species Act, came very quickly. And my own perception of the world around me was changed by all of that happening. And it is true that we have undervalued the negative externalities. Actually, we've also undervalued the positive externalities of investments in highway systems. And now I teach students mostly about how to do environmental impact statements, how to do air quality analysis, what the energy and global warming consequences will be of different investment programs and so on. The context for the work that I do has changed because of the growing awareness of environmental problems, and what we are doing is internalizing the externalities to the point that we're not going to build very many new highways, because the cost is so great and the time period is so long, and we assess the environmental impacts and they're very severe. It's interesting, I don't feel that I contribute to environmental improvement as much as I am influenced by it, I think. I'm more interested in financing transportation systems. I want to finance them in an environmentally responsible manner, and I certainly take environmental issues into consideration, and I'm aware that global warming could be so severe that the damage to the quality of our life could be enormous, but I don't think I'm primarily an environmentalist or an environmental planner. I'm a person who is sensitive to the environment, but focused on transportation. It's very hard to focus on transportation now without also considering the environment.

NT: Right. And some of the criticisms that have been brought to bear on the United States planning process - I know firsthand from a trip I took over to China, and you've been there as well, is that there's all this gridlock in policy and planning, because of all these processes that we've layered on top of each other - environmental, all these other things - and that we can't get anything done anymore. And going over there you can see that the way that the process works there is much different and much more, in my estimation, like the '50s and '60s process, prior to all the regulations that were put into place.

I'm not sure what the question exactly is here, but do you see the contribution of planners as being one in which they are able to create regulations that direct the investment in a positive way, or merely just create regulations that keep anything from happening at all?

MW: That's really an interesting and wonderful question. My answer would be that I see planners as capable of doing both, and that the role of a good educational program is to guide them in such a way that they're not simply bureaucrats making rules which are slowing down the process and achieving nothing, but are instead bringing about social change in a meaningful way that creates environmental improvement. So I'm not answering your question as one or the other, I see some of my students going in one direction, and some going in the other. And it's the job of the university to try to inspire them, and instill in them the capacity to see the difference. That's really what I'm thinking.

I met with a Vice Mayor of Tianjin [*China*] and he said - this is really true! It's funny when you hear it - but he said, "I need your help." I was at the RAND Corporation. "The RAND Corporation can help us." I said, "What can we do? What's your problem?" He said, "We have millions of people living here that were not here five and seven and eight years ago. This is a neighborhood of 350,000 residents that we built downwind of the power plant." And he said, "People are getting cancer, and they're coughing, and getting respiratory [*diseases*]. What can we do?" Well, you know, my reaction was, "There's not a heck of a lot you can do, other than get rid of the power plant or get rid of [*move all*] the people. And why didn't the planning process see that coming?" And it's not like it's such a subtle question either; it seems pretty obvious. I'm not arguing that China is different from the US. One of my first assignments, when I was still a graduate student working with [*my classmate*] Joe Schofer at Northwestern University, when he was still a graduate student, and he's still there, [*was related to planning and noise*]. The client was the Chicago Hearing Society. They were concerned that O'Hare Airport was developing [*and surrounding communities were developing*]…land was developing under the flight paths into and out of O'Hare, and should be controlled, for noise [*exposure*] reasons. We studied it, and it was indeed the case, and we wrote model zoning ordinances and things like that. Nothing happened. A million and a half people live under the flight paths and have [*experienced*] the noise impact. Fortunately, the planes are quieter now than they were then. It's very similar to China. How do you deal with that? With a huge complicated physical

environment, and simple human beings trying to make decisions in a complex, competitive environment… that's why planning is so interesting. I'm not saying the Chinese are failing, and we're superior, by any means, but I'd bet on a democratic process to be more effective, in recognizing those issues and putting aside bad choices, than a highly centralized bureaucratic process.

So as difficult as it is, citizen participation and lawsuits, engagements, bringing charges against people because of the violations of environmental laws, that seems to me to be better than a centralized system in which you can't do that.

NT: So shifting a little bit into finance. I wanted to talk to you a little bit about that, because you talked about the importance to you, of the role of finance. I wanted to understand how you made that shift, or how you brought that into sort of your areas of interest in research or maybe it was there all along and it just sort of emerged later on.

MW: It was there all along. I learned through experience that the real meaning of public policy is where you spend your money. That there are all sorts of pronouncements about helping the poor and cleaning up the environment, but if you don't put the money into doing it they're simply… bland, and in some cases politically instrumental statements, where there's no intent to follow through. By spending money on things [*that are important*] that we can actually make changes. I tell my students that in the first lecture of the finance class, "Why are you going to study boring things like the gas tax and tolls? Because it's the way you get to everything else that you're interested in." And that's been my own history in learning that. And Don, my colleague and friend, Donald Shoup, studies parking. And he said nobody in the world thinks of parking as an interesting subject except him. I can get excited about talking about the gas tax and tolls. And most people would not, but it continues to interest me and motivate me.

NT: And do you see shifts in the world of transportation finance in ways that you didn't anticipate through your career? And do you see that there have been significant changes from the early part of your career toward the later part, and what are those?

MW: Yes, they're technology. Entirely technology. That things that…you know, we talked about congestion pricing for almost a hundred years, and now we can do it because we have the technology to do it. And electronic toll collection changes things enormously. So I do see changes between what was possible 25 and 30 and 40 years ago and what's possible now. And I see it happening. I mean I think some of these projects, HOT [High Occupancy Toll] lanes, are very exciting, and they're working, and they're actually making travel time differences, and improving air quality, and so forth. And I wouldn't have thought that until the technology came on the scene, that it would be possible to do that. I should also say that I think that when we were talking about the environment earlier, watching planners [*assert that to*] deal with [*environmental challenges*] we've got to change land use so that people will walk and so that they'll use public transit or whatever. All of the cumulative effects of planners, interventionsin service of environmental goals are *miniscule* compared with the [*impacts of*] technological impacts [*and change*] on the environment. So cleaner air is more a result of fuels, engines, and so on, than of moving land uses around, but planners have to be at the table and move those land uses around to justify their own existence. And I think it's important to be skeptical sometimes of the lock step ideological positions that planners take in favor of looking at what the data say, you know, what we can actually measure. I think the California AB 32 and the SB 375 which may not be familiar numbers to most people…AB 32 is the first global warming solutions act that requires us to reduce greenhouse gases by 2020 to 1990 levels, and 80% below that by 2050. That's a substantial reduction, and it puts California at the forefront of these things. I think that the vast majority of the progress that we've made - and we're ahead of schedule for the 2020 deadline, which is marvelous…of course it doesn't resolve the problem, but it's a step in the right direction - it's almost all technological; it's almost all technological innovation. People are being motivated to develop new forms of power and more fuel efficient engines and so forth. And yet at the same time, we have SB 375, whichis in the wake of [*AB32*] It talks about land use changes and transit-oriented development, and incentives to build high-density [*dwellings and businesses*] near transit stops and so forth which may have co-benefits in other areas, like the other benefits of smart growth, but which add, at a very relatively high cost, a small margin of additional greenhouse gas reduction. Studying the issue and finding that out, and then confronting planners who would say, "You can't say that," it's sort of opposite of the ethical dilemmas that I found myself in 20 and 30 and 40 years ago.

NT: Or the same ethical dilemma, just with different actors.

MW: Exactly.

NT: Very interesting. I'm glad that you brought up technology because I think that it's having…I agree, it's having a huge impact on the field of planning. And I think in one way that it's doing that is, I think, in just the short time that I've been in the field, nothing compared to you, I feel like the transformation in the applied use of technology in the field of planning has been one of the transformative moments. And it has gotten a lot more private industry involved in planning. Not just in the outcomes of planning, but actually involved in planning. And I think that's an interesting change.

MW: If I understand you, you mean tools like Geographic Information Systems [GIS] enable us to do things, and enable individuals or companies involved to become involved in planning that wouldn't have earlier?

NT: Right.

MW: And that's just one example. There are others.

NT: And they're seeing opportunities in planning, business opportunities in planning, in the process of planning, that they hadn't seen before that are yielding new and interesting outcomes. I'm not going to say whether they're positive or not; I can't really tell at this point. But they're new directions in planning. They're being enabled by this broader participation in the process. And that's both in terms of, like, engaging private industry in the process, but also engaging the public, like this democratization of the planning process that's also sort of occurring at some levels. I think that those are two interesting trends that I've identified in my short time, and I'm glad that you brought up technology, cause I think they're important there.

MW: I think it's very important. And in transportation, what's happening right now with … this Lyft and Uber and Sidecar and all that, but now, at least in Los Angeles, I presume it's in other places, we were starting to introduce real time car-sharing where, if I'm driving downtown

from my house, and I can pick up passengers prearranged and prescreened. That suggests that maybe the day will come that we not only do not need taxis, but maybe we don't need public transit if we use automobiles more wisely. And that's all so scary. There's such a huge investment, and so many people with interests in, who would work I think to prevent that from happening. But an alternative would be for transit and taxi companies to come onboard, and to modify, rather than become like horseshoe manufacturers, and buggy whip manufacturers, to move into, as some did, you know, horse wagon companies moved into the manufacture of automobiles, to move into this new space. And I'm hopeful that that means, really, a rather revolutionary change in transportation that's happening right now. It's really fascinating.

NT: I don't have anything else. I've covered all of the bases that I have, but I'd like to open it to you if there are other things, other parts of your career that you want to highlight, that you think that we didn't cover.

MW: The one thing we didn't talk about very much was the time, a very large amount of time, that I spent in academic administration. I honestly believed, and I think this is one dimension in which I think I have to say that I didn't meet my own expectations, if we go back to the days where they were totally unrealistic. I believed that a person who cared deeply about the university, who was committed to students, who enjoyed the academic environment, could actually change things in the university. And I was stymied at every attempt. "The fights," as Clark Kerr [*former president of the University of California in the 1960's*] said, the fights "are so bitter because the stakes are so small." Our inability to deliver a better program, because of our own foibles and preferences and arguments, made me feel disillusioned about academic administration. But it took a long time for me to learn that. I kept trying for 20, 25 years. And then pretty much my career was over, and some of the abuses and problems, and shortcomings really more than abuses, that could be fixed were not. And I don't think the university is a better place than it was 20 or 30 years ago, and that's disappointing to me. I think it can be. It's better in the sense that people know more about things; it's not better as an institution, bringing education to deserving people. And, I feel that very strongly. Maybe it's old folks who always think that things were better when they were younger, but I think the universities are failing. I'm very troubled with the unwillingness of universities to fund positions for young people, and to rely instead upon adjuncts to teach a majority of courses in the United States. That, to me, is

to miss the entire point of an intellectual community, in which students and faculty and researchers and alumni work together to improve what we do. [*It makes short term economic benefits more important than the long-term purposes of higher education*].

NT: And especially when you're bringing more and more students into this system, you feel like the resources should grow to accommodate them, but they don't seem to be. I get what you're saying.

MW: It's getting worse rather than better. And the numbers prove it. The number of academics who are [*on the*] tenure-track is smaller and the number who are adjuncts is larger. Adjuncts are perfectly reasonable and decent people; they're being abused by the universities.

In the 1920s and earlier, if you worked in a garment factory in Manhattan, and you were told you used to make ten hats an hour and now you have to make 15 for the same money, that was called speedup, and unions formed to try to limit that abuse. In the university now, we're engaged in a speedup, so that the number of students is increasing, the number of ladder faculty is decreasing. And they have to advise more students and teach more classes, and the result is a product that's inferior, and an education that's inferior to what it was earlier. And that bothers me a lot.

NT: Well that's a pretty dour note to end on. Is there anything else?

MW: Well no.Some of these research centers and academic departments produce very exciting new ideas and knowledge. But the education product, for students, is the area in which I think things are falling short.

NT: Yeah. And couple that with the cost of the education increasing for students, and the burden that they bear coming out of school, makes it much more difficult for them to be successful later in life, because they've got this huge burden coming out of school, and an education that hasn't necessarily prepared them as well as it had prior. So yeah, those are troubling trends.

MW: One positive thing, I should say, this week we are at the…I'm at my 51st Annual Meeting of the Transportation Research Board [TRB]. And that was certainly an important element of my career. And it's completely consistent with everything I said earlier. That's the one professional association that I've been part of where you do have academics and practitioners, students, faculty, businesspeople, state officials, local officials, all under one roof, talking about problems and issues. I found TRB is very, sort of, conservative and staid in the way it's managed, but that's actually a strength, because it's a stable organization in very rapidly changing times. You can say a lot of critical things about how slow it is to change, but it's an environment that I feel really comfortable in. So I've been active in TRB for decades, and I continue to be, because it's a kind of special place, and I don't think I should complete this discussion without acknowledging that it has [*been wonderful for me*]. I was chairman of TRB in the year 2000, that was a very rewarding experience. It was very satisfying. And I've made wonderful friends, including people like Bob Skinner who has cared deeply making that organization work well. And it's been a very satisfying activity. So if I sound negative about some of the institutions in which I spent more time, I'm also very positive about others.

NT: Yeah. I can't believe that I forgot here we are at TRB, and I forgot to mention that. Because TRB is such a significant part of your career. But yeah, this is, I guess, my fifth TRB. I'm never going to catch up with you.

MW: I know several people who are on their 64th and 65th or whatever, and they're still quite youthful. Maybe it's coming every year that does that. I don't know. Carl Monismith is one from Berkeley. I don't know if you know who he is. He's a soils person.

NT: He's been here for every one.

MW: And he's so dedicated. He's a very impressive person. And TRB is part of his life the same way.

NT: Great. Okay, well I think that's all I have.

MW: Okay, my pleasure.