1. INTRODUCTION TO OPERATIONS RESEARCH

WILL THOMAS: I'm Will Thomas, a historian and member of the INFORMS History and Traditions Committee. We're in Boston today talking with John Magee, who is one of the original members of Arthur D. Little's OR group. And also a former President and CEO of Arthur D. Little.

So thanks very much for speaking with us today. Why don't we begin by just saying that this isn't the first time that you've delved into your history. So you might as well mention that in the 2002 anniversary issue of Operations Research, you wrote a piece on the origins of OR at Arthur D. Little.

And there's also a profile of you written by Saul Gass in the Profiles and Operations Research book which was edited by Arjang Assad and Saul Gass.

So we won't perhaps dwell as much as we might have on the early years since it's already been covered. But the best place to start is the beginning. So why don't you tell us a little bit about how you got started in OR at Arthur D. Little.

JOHN MAGEE: Well you know, my-- I think my life has been like a little ball on a ping pong, pinball machine. I'd never heard of operations research or, matter of fact, I'd never heard of Arthur D. Little.

I was at Columbia. I wanted to get married. I was looking for a job. And I left a resume around anywhere possible where somebody might see it, including the placement office at the business school, at Harvard.

One day I got a call from a man named Harry Wissman, who represented Arthur D. Little. And they were forming something called an operations research group and he'd see my resume. Fairly strong in mathematics and strong in business and he thought maybe I would be a good fit.

So I met with Harry and they lent me a copy of the old Morse and Kimball Methods of Operations Research--

WILL THOMAS: That was still the report at the time, and not the book?

JOHN MAGEE: What's that?

WILL THOMAS: It was the original report and not the book that was later published?

JOHN MAGEE: It was the report. It was just been declassified. And it was intriguing. It sounded very much like something that I'd always imagined I'd like to do. So they offered me a job. Promised me that they'd keep me for at least a year. And I was delighted to take it.

WILL THOMAS: Do you know how Arthur D. Little got started in OR? How they became aware of it during the war?

JOHN MAGEE: There were several members of the company staff who had worked in various aspects of military research. And including some who worked in the military operations research groups. Phil Morse at MIT of course led the Navy group. And he was a good friend to people at the company.

So there was an interest. Arthur D. Little was a multi-disciplinary operation that was always looking for new and interesting ways to help clients. And this seemed like a possibility. To transform the point of view that was used in military operations research to the issues that their clients faced in industry. So they decided to see what they could do.

WILL THOMAS: I think, when once before we spoke, you mentioned there was a fellow named Gilbert King and--

JOHN MAGEE: Gil King.

WILL THOMAS: --another one, Bruce Old, I believe.

JOHN MAGEE: Right. Gil was a physical chemist who was actually working on long chain polymer research at the company. He had served in the, on an Air Force group. And he was one of the ones who urged that the company see what they could with operations research.

Gil took a year off from his work on long chain polymers to work with the fledgling operations research group. And I really-- from a technical, professional point of view, worked for Gil for the first six or eight months.

WILL THOMAS: OK. And you've also mentioned in one of your other pieces that you'd worked for a little while at Columbia, as a student under Abraham Wald and Jacob Wolfowitz. But that you didn't like mathematical statistics in the end.

JOHN MAGEE: Well I went there after graduating from the business school at Harvard. I wasn't quite sure what I wanted to do. I loved mathematics. It seemed like a new and interesting area. But frankly, I came to be bored by it.

I never really knew Wolfowitz or Wald. We met in large classes of 100 students, faculty member would come in, his back to the class, write all over the blackboard and leave after. Now it was just, I found it dull. I loved some of the abstract mathematics courses that I took.

One time I went to see, the only time I spoke to Professor Wald, I went to talk with him and ask him about career opportunities in mathematical statistics. And he thought for a moment he said, well, he said you can always teach mathematical statistics.

And that was enough for me. So I decided to leave. And as I said before, I wanted to get married. I wanted to look for a job.

2. OR AND INDUSTRIAL DEVELOPMENT CONSULTING AT ARTHUR D. LITTLE

WILL THOMAS: Could you tell us a little bit about how the OR group came about its first project with Sears?

JOHN MAGEE: Well that was a strange background. The-- Sears had been negotiating the purchase of a technology for making ethylene glycol for automobile antifreeze. And Ted Houser who was the senior vice president of merchandising, and a very powerful man at Sears, asked Arthur D. Little to just check out the process to see if it made sense.

And the Arthur D. Little staff looked at it. They did a simple chemical balance and discovered that it didn't balance. And with a little detective work they discovered that the inventor of this process was actually at night, feeding the process with fresh ethylene glycol and extend its-- improving its apparent yield. So that saved Sears a good deal of money and embarrassment.

So when the concept of developing a group in the company, in operations research, began to circulate, one of the senior officers in the company went to see Ted, whom he knew. And said, you owe us one. So see if we could do something in the area of operations research for Sears.

Houser incidentally was an MIT graduate himself, said there's one area where we've studied and studied for decades and that's the question of how to distribute our major mail order catalogs. If you could do anything in that area then you'll really prove yourselves. So he gave us the job to see if we could improve the efficiency with which the Sears catalogs were distributed.

Basically they had a customer list of about 10,000,000 names. And every spring and fall and intermediate times as well, they would distribute 5,000,000 catalogs to the-- and have to choose which of the 10,000,000 names were going to get the books. And the issue was, how did you pick the customer to get the book?

WILL THOMAS: And they had a lot of customer data on file and--

JOHN MAGEE: They had a--

WILL THOMAS: --punch cards was it?

JOHN MAGEE: Well they kept meticulous records of customer purchases in a variety of towns spread around the country that were, they were test sites. So they had a lot of data. This was the information that they'd been analyzing for decades, to try to improve the system. And we were able to look at this information, and I think it was really Gil King, who identified some interesting phenomena.

One was that in predicting what a customer would do in the future, the size of the orders that the customer had placed in the past weren't particularly relevant. What was important was how many orders the customer had placed.

And George Kimball came up with the notion that the information should decay exponentially. And when we tested these ideas out on the data, we discovered that yes indeed, we had a better

predictor of customer purchasing than the system that Sears had used, which depended quite a bit on total dollar purchases.

We ran an experiment, a very large experiment, probably about 10,000 customers. And within this customer group we ranked the customers by the existing Sears system and by the new system we were proposing. And we ended up basically with four groups. The ones that were chosen by both systems, the ones rejected by both, and the ones one would choose and the other wouldn't.

Those two groups that one would choose, that the other wouldn't, were not huge. But it turned out that they were very significant in the difference in business that they produced. So our system was demonstrated in the field to work.

WILL THOMAS: Now I know that Arthur D. Little is traditionally very strong in research and engineering consulting. That they'd also done some economic consulting with something called Operation Bootstrap in Puerto Rico. Did that have anything to do with what the OR group was doing?

JOHN MAGEE: No, that was something that the name had really was coincidence. Operation Bootstrap started before World War II. And it was a program that the Puerto Rican government sponsored to plan for the industrial development of Puerto Rico. And to then help execute that program.

It involved some technical research, it involved marketing studies, it involved economic analysis of what industries could fruitfully develop in Puerto Rico. In particular, looking for industries that had high employee content, high-level content for employees. And it was a very successful program. One of the, you know side-projects incidentally, was the development of improved Puerto Rican rum.

WILL THOMAS: So one of the other big context was that in the prewar period, management consulting had really boomed. Was Arthur D. Little heavily involved in that at that point?

JOHN MAGEE: Well to some extent. And this grew out of its technical background. In the 1930s the industries like the chemical industry and other process industries were beginning to develop.

The financial industry didn't know what to make of some of these. They didn't really understand these industries. So they came to Little's to help them understand the economics. Help them understand the market's. Help them understand the comparative advantages of different technologies, different product areas.

And out of that we began, the company began, to develop quite a bit of what was characteristically management consulting work. On marketing, marketing strategy, product development, competitive analysis, organization issues for marketing, and so forth.

WILL THOMAS: Was there a lot of interaction between the OR group in the early days, and the people who were doing that?

JOHN MAGEE: Well the OR group didn't really get going until after World War II. And there was-- coming back again to the nature of the company. Little's was probably unique in being a truly multi-disciplinary company. We had groups ranging from food and flavor, technology, to chemical engineering, to electronics, marketing, operations research.

And our focus was on working on problems and projects for clients. And drawing on the different groups to form teams that would fit. So yes we did work together with these other groups. Both the more technical groups and the groups concerned with more traditional management consulting.

WILL THOMAS: How did Arthur D. Little distinguish OR? What did they view it as essentially being? What did they market it as?

JOHN MAGEE: Let's-- how would I describe this? I think that it was a different approach to problem solving. Many-- the groups in the company consisted in many respects, of discipline-based groups like electronics, or chemical engineering, or people who were experts in certain industries. And they came, they brought industry knowledge.

The operations research group was a compliment to that sort of activity. It was a group that focused on the observational approach to addressing problems. We were very strong in looking at data, experimentation. In fact we were much more interested in looking at the facts than we were in particular esoteric technology.

3. THE SABRE SYSTEM

WILL THOMAS: Did you mainly concentrate on sort of logistical issues? Or did you go into managerial decision making?

JOHN MAGEE: Well of course logistical issues include managerial, I mean they incorporate managerial decision. But no we worked on marketing questions. We did work on logistics starting with early production control and inventory management issues. We worked on financial questions.

We-- I remember one long project that I worked on had to do with the analysis of a retail store chain. And one of the more interesting projects that I worked on, I was in charge of actually, was the evaluation of the proposed Sabre System for American Airlines.

Where IBM had proposed a computer-based reservation system for managing an integrated reservations process at American. And the American leadership wasn't sure whether the technology would work. And they were uncertain about its economics.

And I led a team that included people from marketing, electronics, people in operations research, people to try to figure out was this technically feasible? And was it operationally feasible? And

could we make it economically feasible? And for example, Martin Ernst studied what reservation clerks actually did. And among other things, found how much time a reservation clerk, when addressing a customer's interests, how much time actually spent on the ticketing. As compared to the discussions and negotiations.

He-- one element in the proposed IBM system was a modem that would connect the reservation agents device to the circuit that was being polled by the computer. They're very expensive elements. And the original proposal was that there would be one modem for each reservation agents unit. And the number of reservation agents varied substantially during the course of the week, during the time of day, and during the season of the year.

So to build a system that would allow each reservation agents, at maximum staffing, to have their own terminal, was going to be very expensive. What our electronics people were able to demonstrate was that you could multiplex those modems. And Martin Ernst's work on the work of reservation agent demonstrated that basically using queuing theory that there would be very, very little interference if you had multiple agents on a single modem.

So we were able to redesign the system to bring down the capital cost by about a third, which made the system substantially more economically viable. And we went ahead then with IBM and Sears, I mean excuse me, we went ahead with IBM and American Airlines to work on the installation.

In fact, one of our staff was the person who made the first reservation on the Sabre System. They were sitting in White Plains with this, where the computer was based. And they had activated the office in Hartford, Connecticut and nothing happened. So Dick Heitman, who was our staff member who was there, went out and found a pay phone and called the Hartford office and placed a reservation request over the telephone in Hartford. And that was-- came through to White Plains, and that was the first active use of the system.

WILL THOMAS: You mentioned Martin Ernst. Was he a member of the Operations Evaluation Group originally?

JOHN MAGEE: Yeah. He was one of several that came from that group to our group.

WILL THOMAS: Did you maintain contacts with that Navy group as well as with your neighbors on the Charles River Basin, MIT?

JOHN MAGEE: No not particularly. You know we were casual friends, we saw each other at meetings. But both-- but George Kimball had been active in that group and Arthur Brown was one of the first to move to Little's. Then Jack Latham [Lathrop?] came, Martin Ernst, David Boodman, Sherman Kingsbury.

So we had an informal, friendly relationship, but we were not actively close. As far as MIT was concerned also, we did not have any, very active relationship. We did employ a number of the MIT graduate students as part time staff. And people like Ron Howard worked with Little's for some time when he was at MIT. But it, there was no close formal relationship.

4. ARTHUR D. LITTLE AND THE ORIGINS OF PROFESSIONAL OR

WILL THOMAS: So you were telling us a little bit earlier about Arthur D Little's involvement with the creation of the Operations Research Society of America. How there were offices there. And also about how the head of a National Research Council committee on OR that existed before ORSA, Horace Levinson, was a consultant for your company.

JOHN MAGEE: Yeah. Well Phil Morse at MIT was a friend and consultant to the early operations research group at Little's. And George Kimball I think in those days was still at Columbia but actively consulting with us. And they were at least two of the people who were part of the core group that thought we should form a Operations Research Society, a professional society.

And Jack Latham was in our group and Jack undertook to serve as the secretary for this first little organizing group. So that it was in our offices that a lot of the work was done to prepare for the Crotonville meeting, where the society was initially formed.

And several of us from the group were part of that initial organization meeting. So we had a very active role in the formation of the society and continued to be active for many years afterwards.

You mentioned Horace Levinson. Horace was a very interesting man. He was I believe, a professor of astronomy at Princeton, who left to go to work for Bamberger's Department Store in Newark. Really to do work that was operations research on the activities of the store.

WILL THOMAS: Before operations research really existed.

JOHN MAGEE: Well it existed, he was doing it. He just didn't call it that.

And one of his pupils at our graduate students at Princeton was Arthur Brown. And Arthur Brown followed him to Bamberger's and they worked on all kinds of issues there. And then when the war broke out and the OHE was formed Arthur was recruited to go to OEG. Or I guess it was the Operations Research Group first.

But later Horace served as a consultant at Little's. And he was very interesting, very interesting man. He smoked Egyptian cigarettes, very strong. My boss at the time, Harry Wissman, very nice fellow, but he could not for physical reasons, he could not stand cigarette smoke.

But Horace would come visit and he would drop into Harry's office, close the door and proceed to give Harry his advice. After a while Harry would burst out, smoke coming out behind him and ask if somebody else wouldn't please talk to Horace for awhile.

Horace became interested, among other things, in dowsing. Horace was a friend of Kenneth Roberts, the novelist, who had written a book about a dowser in Maine. And Horace wanted to run a field experiment to see whether this guy really was, was really what he claimed to be. Arthur Brown was at the experiment.

He said it started out at in a very, very focused way. But over the course of the afternoon and evening it tended to deteriorate substantially. So they're not quite sure whatever Horace was able to prove.

WILL THOMAS: What exactly was this? Dowsing?

JOHN MAGEE: Dowsing. Do you know what dowsing is?

WILL THOMAS: I don't.

JOHN MAGEE: Dowsing is using I guess something like a willow stick.

WILL THOMAS: Oh a divining rod. Ok.

JOHN MAGEE: A diving rod to find water. This, Horace had a brother Ronald Levinson who was a philosopher at the University of Maine. And in fact, that's how Arthur Brown got to Princeton, because Arthur was a student of Ronald Levinson's at the University of Maine.

And he was a, he wanted to know whether, if the dowser could dowse, how far could he be effective. Particular philosophical question. And so he asked the dowser is there water on moon? Typical. And the dowser's answer is yes, 12 feet under the surface. Something like a lot of philosophical questions, could never be answered.

5. PUBLICATION AND THE PROMOTION OF THE OR GROUP

INTERVIEWER: So, I know that you wrote a few pieces for the Harvard Business Review. There was one that was explaining what operations research was in the very early years. And later on there was an extraordinary three parter on inventory policy. Can you tell us a little bit about how those came to be and how they were received?

SUBJECT: Well, in the early days of the group, back in the early '50s, we were trying to express to potential clients what it was that we were doing. So, I undertook to put together a memorandum that would describe this. Describe what we were doing, describe our philosophy, give some examples that we had been working on. And Cy Hermon, who was a young faculty member at MIT at the time, was also doing some consulting with us. He was a professor of marketing. And he looked at this and said he thought it could be published in the Harvard Business Review. So he took the lead in getting the editor of the Business Review to take a look at it. And they decided it was interesting, and published it.

They cut it back quite a bit. Which was their privilege. So later, we had been working on some production planning and inventory control issues, and different ways-- And as I looked at our experience, it seemed to me that they created a sort of a coherent whole. That you could see the functions of inventory as a productive investment that could be managed. Rather than something that people wished they didn't have to deal with.

So, I wrote this little paper on describing this point of view about inventory management. And since our previous experience with the Business Review, they'd cut back the manuscript, I decided that I'd make it long enough, so that when they cut it back, it would still make sense. Well, when they looked at it, they said, it's great. And we want you to expand it.

So I think that was perhaps one of the first times they ever published something in series like that. And it worked out very well.

INTERVIEWER: Did you get people inquiring about OR for a lot of those things?

SUBJECT: A lot, yeah. From the early paper we got quite a bit of interest. For example, I remember Cy and I had dinner here with the chairman of Proctor and Gamble. Who had read the paper and hit us. Stacked some work on there. One aspect of their operations, as a result.

6. INVENTORY, PRODUCTION CONTROL, AND EARLY INFORMATION TECHNOLOGY

INTERVIEWER: Could you tell us a little bit more about your experience. I know you developed a specialty, which was a source of the Harvard Business Review article on inventory and production control. And of course, you then subsequently wrote a book on it. So could you tell us how that came to be a specialty? Was that something for which there was a particular need in industry?

SUBJECT: Well, I guess it was by chance. We had been working on the Sears project for some time. And we had an invitation to do some work at Johnson and Johnson on their baby products plan. The question was here was a plant, it had five automated lines with fixed capacity at each, a staff that could manage some combination of these lines, a very seasoned demand for their products, very peak demand in the summertime just at the time when the by tradition J&J closed down for two weeks. And the question was, how the dickens do you manage inventory so that you can get through this period?

My job in the assignment was to get down and look. Try to under-- Get all the data I could, just what the capacities were, how products interacted, what the staff could do, what the costs and marginal costs of the different products were. George Kimball was consulting at, well he was still at Columbia, would visit once a week or so. And we'd talk about the information I had and he'd kind of speculate on how we might organize it. One time he came and he said he thought he had the approach. And he explained to me this concept. He used the example of optimizing the contents of a can of mixed nuts.

And what he was talking about, of course, was linear programming. But it was before Dantzig's book. When I wanted to know more about the subject he said he referred me to Herman Weyl's monograph of the Princeton mathematical series. And that was kind of a heavy dose to learn about linear programming.

But we ended up setting up a system that was basically an application, a very simple transportation model, that optimized the way in which-- you would think of inventory really as

an accumulated investment in product. And the question was to minimize the investment while meeting the goal of having a production available. So, this transportation model was one we could use to decide just what products to make at what time. And which ones to build, and which ones to postpone. And it was our first look at the issues of production control and inventory control. It brought out very clearly that inventory was an investment. And a productive one, if productively managed.

It wasn't too long after that we got active with the light division of General Electric in Cleveland. I think the group it at Case was also involved with them. Russ Ackoff and--

INTERVIEWER: Churchman?

SUBJECT: Who?

INTERVIEWER: West Churchman?

SUBJECT: West Churchman, yeah. But are our job was to see if we could help them manage their field inventories. Light bulbs at that time, I know how they're sold now, but they were put out on consignment. And the retailer basically paid GE when they sold the bulbs. So it was a pretty heavy investment for GE. And we worked on how to improve and manage that issue. So the idea of investment in the field operation through inventory management kind of came to the surface.

And around the same time we had an assignment with a company that made threads of various sorts. And this is really almost-- it looked like a job shop. And we had to work out a method for scheduling the work. Incidentally, one of the things we did discover in the course of work on inventory control over the years, was that so-called job shops really were in most cases, really weren't job shops. They had a product flow, and if you managed them as a product flow process, you could get much better effects then if you thought of them as a job shop where orders would move around one by one. But anyway we got some experience in how you fed that kind of a system and so looking at these, putting these together, kind of an idea emerges of a coherent view of how to manage inventories and how to use production management to do that, production control. And over the course of time, we did quite a bit of work in that field. And another member of our group, Bob Brown, became almost a specialist in inventory control work.

INTERVIEWER: So, I know you started in Arthur D. Little at a time when there wasn't a lot of formalized baggage, I guess you might say, surrounding the subject of operations research. It became increasingly mathematically oriented with time. Of course, you'd had use for some of those tools, such as linear programming. But you've said in other places that you felt in some ways divorced from where it was going academically.

SUBJECT: We, and I'm not sure I understand why, but we were focused on gathering facts. We were focused on experimentation. We were focused on seeing what was happening. And learning as much we could. Either through observation or experimentation. And drawing conclusions from the data.

So that, we didn't think of ourselves as being model makers. Or being tied up with technology, or, that's not a very good word, tied up with mathematical method. We did occasionally draw out of the data. We were able to produce a model, it would be helpful.

Jerry [INAUDIBLE] was working with me on the Sears case. We were able to carry Gil King's work to the point of showing that the Sears population was made up of people who individually acted order to call in an Poisson distribution. And with means that were distributed exponentially in the population.

We wrote a paper incidentally on the subject. And it was first turned down by the editors of the Journal on the grounds it was too pragmatic. Incidentally later, when I had written a series of inventory control, the editor of the journal wanted to know I hadn't published in the Journal instead of the Business Review. Anyway, I forgot the question.

INTERVIEWER: Well, let's take a specific example. So at the same time as you were developing an expertise in inventory and production control, there was a theoretical literature that was growing around just those subjects. Did you have much use for what was published in those areas?

SUBJECT: No. No.

INTERVIEWER: Simple as that.

SUBJECT: No. I could remember some of the assignments in that area that I worked on. And we had to develop management processes that were simple. That the people in the client organizations could use. And so, we didn't have much need for a very elaborate technology. Incidentally, we were along with doing a lot of work on logistics, which included not only inventory control and production control, but plant allocation issues and locational issues and such, we were also doing a good deal of work on marketing. We were quite active in information technology and the implementation of new information systems. So, we weren't strictly an logistics group.

INTERVIEWER: When you speak about information technology, was that, you mean it in kind of the older sense of the handling records and that sort of thing? Or do you mean it in the generic sense of just implementing computers or any sort of digital technology?

SUBJECT: I'm not sure I understand.

INTERVIEWER: I think once upon a time, well, now a days of course IT means just about anything having to do with computers, the internet, and so forth. As my understanding that in the 1970s, in the 1960s, information technology referred to a more specific set of uses. Oriented around retrieving information, cataloging it, that sort of thing.

SUBJECT: Well I'm not sure I know how to respond to that. One aspect of our work in information technology was advising client companies on the type of installation that they should make and operate for their business purposes. We were also doing some quite sophisticated

system development for a variety of things. One was sort of a far reach for me, operations research. But developing a system for analyzing pipe stress. And the movement of pipes in a piping system under different temperatures.

We did a little related work. For example, in the Sears case, in our work for Sears, one interesting issue Sears faced was when an order came in, determining whether it was from an existing customer or a new customer. It could be the same name, but it might be a slightly different address. So it might be a parent, a child, or might be two different names. But at the same address. And there were a lot of little twists like that. And it was important for Sears to keep their records clean. They wanted to get a customer's whole record together. At on the other extreme, they didn't want to apparently merge two customers that were really different. And so, we developed a-- by then their customer records were on computers. And we developed the technology for them to use to analyze a record and determine whether it was a fresh one or an existing customer. So we got into all kinds of different aspects of--

The American Airlines case that I mentioned was another example of getting involved in a large information system.

INTERVIEWER: So Arthur D. Little is, of course, the first consulting firm into the OR field. Are you able to tell us anything about how OR got along in the consulting field in general? Were other firms interested in it?

SUBJECT: Well, SRI, on the west coast, SRI had many features similar to Arthur D. Little. In fact, there was one point of view that SRI was formed to provide west coast industry the kind of services that Little was performing more broadly. They had an activity that was-- But among the traditional management consulting firms like Boise or McKinsey, I don't think they were particularly involved.

I was once recruited by a senior officer, a senior partner at McKinsey, to join the firm. And in the process, I met Marvin Bower, who was the famous organizer, founder of the firm. And he was quite skeptical of operations research, and what I as a young squirt could contribute to clients. And I remember mentioning to him that I was doing some work in production control. And he said, we know so much more about production control then you do, why would anybody want to hire you? And I thought afterwards, if I were quicker on the draw I would have commented to him that they may know more now, but we're learning faster.

INTERVIEWER: When was this about?

SUBJECT: Oh I don't know. Maybe early '50s?

INTERVIEWER: OK.

SUBJECT: So I don't have any recollection particularly of the other the major consulting firms.

INTERVIEWER: Could you tell us a little bit about the appetite for operations research in industry? You mentioned that after you published you're Harvard Business Review article, there

were a lot of people who came knocking. What about the reputation of operations research in general over time?

SUBJECT: I really don't know.

INTERVIEWER: No?

SUBJECT: No. I know I was looking out, and really, so I really don't have a good point of view on that. We were happy.

7. LEADERSHIP AT ARTHUR D. LITTLE AND ORSA/TIMS

INTERVIEWER: Right. So, you eventually rose to become the head of the OR group at Arthur D. Little. And then I believe, the head of the management services division as a whole, is that correct?

SUBJECT: Yeah. Harry Wissman moved on to work in the corporate management of company. So I succeeded him as head of the OR group.

INTERVIEWER: 1959, I think? The profile in [INAUDIBLE]

SUBJECT: I think that's about right. What happened was that Jim Gavin, who was a famous Army general and had been head of Army R&D, resigned and came to work at Little's as executive Vice President. And Harry, since Jim was totally unfamiliar with the company, Harry moved in as his assistant. And so I moved into the spot of running, or in charge of the operations research group. And a few years later, the job of leading the management services division, which included operations research, and some of the industry oriented groups, and our marketing, and financial management groups, here opened and they asked me to take that job. So I did.

INTERVIEWER: OK, could you tell me a little bit about your ongoing relationship with the professional societies or certain TIMS. Of course, you became president of-- I feel it was TIMS, correct?

SUBJECT: Ongoing, you mean now?

INTERVIEWER: Well, no. I mean through time, from the '50s, the '60s, perhaps the '70s. Were they interested-- Did they maintain an interest in fostering the industrial aspect of OR?

SUBJECT: The society?

INTERVIEWER: Yes.

SUBJECT: Well I think the society tended to move much more toward the academic side. We maintained a strong interest in it. Members of the group continued to be members of society. And played an active role in various ways, in committees. And I eventually became president of

Operations Research Society. And it was also an interesting time, because The Institute of Management Sciences was formed and developing. And there was a certain element of competition between the two. So it was certain, I guess, a philosophical difference. But I felt that they both had a lot to contribute, and remained active in both of them. Eventually became president of TIMS as well. And tried to support the idea of the two working together, rather than being competitive.

INTERVIEWER: What would you say the philosophical difference was?

SUBJECT: I think-- how to put it? I think at the beginning, there was a sense among some professional people that the Operations Research Society was being captured by people who were too much focused on professionalism. And not open to a broader perspective. And I think so the Institute for Management Sciences was really, in my recollection and this was many decades ago, was really focused on-- they felt they had a broader perspective toward the issues of management science.

John_Magee_Video_third_segment_of_three

JOHN MAGEE: And they've, I think, sort of considered the core of the Operations Research Society Membership as being technicians.

8. THE EVOLUTION OF ARTHUR D. LITTLE/ECONOMIC DEVELOPMENT PROJECTS

INTERVIEWER: Well, why don't we talk about Arthur D. Little in general. You became president of the firm in the 1960s, is that correct? Or perhaps the '70s?

JOHN MAGEE: It was in the early '70s. And then I became chairman later.

INTERVIEWER: Right, so how did the firm evolve? Of course, it became one of the big players in management consulting, but it retained its research and engineering focus as well. Maybe you could talk about Arthur D. Little in general, if that's not too big of a question.

JOHN MAGEE: Well, how to talk about the company? First of all, we had fun. And secondly, we were very-- we were proud of our ethical standards. And we were not a big moneymaker, but we did do really interesting and useful work by the ability we had to bring together teams of people. And worked hard to foster that.

As time went on, I suppose at one stage I characterized our market reach as how far a person could travel in one day. When I first joined the company, that meant somewhere like Chicago, Saint Louis, Washington. And of course today it means Singapore. So our reach across the globe expanded enormously in that period of the '60s and '70s and early '80s while I was involved.

We had our first office outside the United States I think was in Mexico City.

INTERVIEWER: When did that start about?

JOHN MAGEE: Oh, I think it must have been in late '50s perhaps. I'm not sure. We opened an office in Europe in the late '50s, around '59, because it was a period when a lot of American companies were looking to expand into Europe. And they wanted information about markets and business opportunities and competitors and acquisition possibilities.

The operations research group opened its first office in London in the-- it must been-- oh, it was probably about 1959, 1960. It was a curious experience, because you saw the reflection on how the company managed itself. We decided to run-- we used to like to run seminars on subjects in the group for clients.

And somebody wanted to try one in London. So we did. And as a consequence, we ended up with a couple of assignments for British companies. And we decided that this was fun, so the next thing we knew, we rented an office.

And we had a couple people working there full time. The company didn't even know we'd opened an office in London.

Anyway, that was sort of the beginning of our European activity in Zurich and London. And over the course of time, that expanded. We opened kind of a complementary office in Brussels, Frankfurt.

It was in the late '60s we opened an office in Athens-- really the service, the work we were doing-- quite a bit of work in the Middle East.

We had built quite an active telecommunications practice, which was working, among other places, in Saudi Arabia. And we had some large economic development projects in Saudi Arabia and Egypt and Abu Dhabi. We-- I'm trying to think.

We were working in India. We opened an office in Singapore. And this was all in the probably late '60s, early '70s.

So that geographic expansion was a major change in the company during that period into the '70s and the '80s.

INTERVIEWER: One of the things I'd like to talk about is the people who were coming into the company. I mean, you've mentioned economic projects, so presumably there were more economists. But you also mentioned that it was a little while before you actually started bringing in people from OR programs, from the universities, who are trained in the subject.

JOHN MAGEE: Well, you know, in part because it took a while for those programs to begin to produce people. But we have people, as I mentioned, from the MIT program who worked with us in some cases part time and in some cases full time while they were working on their thesis, for example.

We tended to find that people coming into the group from science-- fields like chemical engineering or physics or chemistry had a much stronger orientation toward looking, observing,

experimenting then some of the people who were coming out of the formal OR programs, where they didn't do very much of that.

INTERVIEWER: And I asked also about the economists. When you were expanding internationally, was that something that Arthur D. Little concentrated upon-- bringing in more economists?

JOHN MAGEE: No, we had people who were-- we working on industrial development programs, like Puerto Rico, before World War II. We had a growing staff from those days through the '50s and on.

We did a lot of work on economic development during the '50s, both at a national scale and in the urban settings. We did work on education issues, land planning, taxation questions. We had a longstanding program in Nigeria sponsored by AID.

This work on economic development was not economist driven. It was more pragmatic. What were the industries-- what could be done to improve the economic base of the country? What industries would work? What skills were needed? What education programs were needed? How could we start to move our clients economy forward stage by stage.

INTERVIEWER: What was the firm's experiences with that? Of course, it was a very dicey time politically in the third world, of course. And I know that a lot of those program succeeded. A lot of them failed. What was the firm's experience with it?

JOHN MAGEE: Well, I suppose it was mixed, simply because of those circumstances. In some cases, the programs were very successful and longstanding. We did a lot of work in Saudi Arabia when the kingdom decided to use its oil revenues to try to build up a broader industrial base. And that was sustained.

The work in Nigeria, for example, was successful in its time, but the Nigerian political situation I think overwhelmed it in time-- and in part because of the issues of oil revenue.

Oil revenue was a potential disaster for many countries, in terms of their economic and social development.

9. ORSA AND THE ABM CONTROVERSY

INTERVIEWER: As long as we're on political topics, I know you were involved with ORSA's committee to evaluate the anti-ballistic missile controversy. Could you tell me about your memories of that?

JOHN MAGEE: Well, it was interesting. I think the principal reflection that I carry away from that was that expertise in one field or fame in one field should not stand as qualifications to make comments in another.

Basically, I think what I recall-- although the issue was very controversial at the time, I think the committee worked on it very easily and effectively. Well, I mean we weren't divided or anything about that.

INTERVIEWER: OK. And within the society itself, I think you put out to fold the issue of the journal, actually, on the-- what would one say-- the professional standards or--

JOHN MAGEE: Professional standards--

INTERVIEWER: Yeah, professional standards.

JOHN MAGEE: You know, I've forgotten that, so--

INTERVIEWER: Not much to say about it.

JOHN MAGEE: No, I really can't. I'd have to go back and read the issue and see what we said.

~~INTERVIEWER: Right, well, how about -- you've mentioned some of the people who were around you in the early years at Arthur D. Little. Who are some of the people that we should be aware about -- especially in the OR group as time went on -- after you moved up beyond being the head of it, or even while you were the head of it?~~

10. OR IN OTHER ARTHUR D. LITTLE ACTIVITIES

INTERVIEWER 2: If I could interrupt to go back to the international [INAUDIBLE]. I'm curious about the internationalization of Arthur D. Little. Was any of the work done internationally influenced or did any of it contain any operations research? Or what it totally outside of the OR domain?

JOHN MAGEE: I think it was principally outside. Telecommunications engineering was one major area. Petroleum economics-- we were very strong in international petroleum economics. Advised countries like Saudi Arabia, Algeria-- when Algeria got independence from France, they brought Arthur D. Little in to organize their oil industry.

And kind of industrial development-- there wasn't a lot of what I would think of as identifiable operations research content in that work. Now there were members of the operations research group who had moved into the groups that were working on those issues. But I don't think they went in wearing an OR hat.

INTERVIEWER: When George Kimball became vice president, was he in another area or was it still in kind of the same OR area?

JOHN MAGEE: Oh, it was very much operations research. He was major intellectual leader in the operations research activity.

INTERVIEWER: And did the operations research activity remain kind of as coherent as it was in its early years, or did it diffuse more throughout the firm?

JOHN MAGEE: Well, my recollection is that as time went on, it tended to diffuse more into different groups, who we were working in the same spirit, and the operations research group itself sort of diffused.

INTERVIEWER: OK, and I guess I just have one more very general question, which is as you moved up to become president and CEO, did you still feel in a sense like you were doing an extension of what you had done before in terms of using evidence, running experiments, and that sort of thing, or did it feel like a completely different sort of thing?

JOHN MAGEE: Well, first of all the nature of-- I think, actually as I reflect on it, I think in the management of the firm-- the background, they had an operations research-- was reflected in the way I thought about some of the issues we addressed and how I would try to address them.

In my consulting work, it evolved more in the direction of advising people on organization, on governance questions, financial issues. And I think I remained in a sense interested in facts, interested in experimentation, but I was working on somewhat more general, less specific issues. So the nature of the work I was doing just evolved.

11. CASE STUDIES IN INVENTORY CONTROL AND MARKETING RESEARCH

INTERVIEWER: And is there anything else in particular that you'd like to add? I mean, are there interesting projects or are there interesting clients, who might have neglected to mention, that might spring to your mind?

JOHN MAGEE: One of the interesting cases I worked on, related back to inventory control, was a very interesting company in Texas in the oil field equipment business.

The leader of the company was a wonderful man. He was a very inventive engineer, and it his product and process development work that was at the core of the company.

They were having a problem with inventory control. They never seemed to have what they needed. And I went to talk to the fellow who had the title Manager of Inventories.

Now he was the manager of inventories, but he had only two constraints. One was that he had no control over what was sold, and he had essentially no control over what was made. But given those two constraints, he was still obliged to manage the inventories.

This was not a question of setting up esoteric techniques. It was simply a question of changing the process by which he had some control over what was actually produced. And also helping him set up some simple methods deciding what he needed.

And we didn't worry about trying to find out some precise service level. It was simply to build inventories and balance the inventories to achieve what seemed comfortable.

The head of the company later told me how effective this system turned out to be. He said he wanted to buy a new aircraft, and he needed some cash. So we went to the inventory manager and said, I need so much money. Can you release it from the inventories?

The guy did-- very systematically reduced inventories, freed up the cash, the head of the company bought his airplane. And then when the cash came back, they fed it back into the inventories and brought them back.

And then at another time, the head of the company got the notion, I wonder what would happen if we just never were out of anything. I wonder if we just built service to a point where our competitors simply couldn't match us, anytime anybody wanted something.

So he pushed capital into inventories and tested that whole idea. But what he was telling me was, for once he finally had a process in his business-- a way where he could manage inventories as an effective investment to accomplish his overall purposes rather than wondering why they were always out of stock.

INTERVIEWER: So that's one story about inventory. And I know it felt like I was wrapping up a little bit, earlier. I'm wondering if I could press you for perhaps one on marketing studies.

JOHN MAGEE: Well, I'll go back to Sears, the case at Sears.

INTERVIEWER: You worked with Sears for a number of years after that initial study, right?

JOHN MAGEE: Oh, we worked for Sears long after I'd left the work. We worked in the catalog business and some other related issues. But Sears-- this must've been in the late '50s, I was still involved-- was building its retail store business.

And there was a certain amount of tension in the company between the catalog business and the retail stores. There was one point of view among the retail managers that the distribution of catalogs in their towns was hurting their business, because the catalog prices tended to be, say, 10% below the retail price.

And the issue was, what's the truth? Well, we undertook to take this job on, and we ran experiments in a large number of towns, where we kept detailed records, line by line, of merchandise sales.

And we matched the towns as best we could into pairs. And we started out one year saturating one set of the pairs with catalogs and starving the other set and kept meticulous records over time.

The differences were very small, but George Wadsworth, who was another consultant from MIT and a great statistician, developed a statistical technique for gradually monitoring whether there was a developing observable difference. And there was.

So just to test it, we switched the whole thing. The towns where we'd saturated with catalogs, we starved. And we poured catalogs into the other thing. The effect reversed.

And we did some field marketing studies, too, interviewing customers. And what it turned out to be was that the catalogs supported the stores. And from the field research, what we heard was that people use the catalogs as shopping guides.

They pick out what they wanted, but they wanted it now. So they'd go the store and buy it. The catalogs were really stimulating store sales. It was an interesting marketing study that we did.

INTERVIEWER: Excellent, well, if there's anything you'd like to add, please do.

JOHN MAGEE: I enjoyed my time very much. And as I say, I fell into the operations research field not realizing it existed at the time. Had a wonderful time working at it. Met some great people, and I look back on it with great warmth. But I've really been separated-- I've moved on, and my life has moved on. I don't have much association anymore.

INTERVIEWER: Thank you very much. Thank you very much, indeed.