



Interview of
Dr. John N. Warfield
George Mason University

A Telephone Interview Conducted by

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INTERVIEW: Dr. John N. Warfield

INTERVIEWER: David Houpt

PLACE: Telephone Interview

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HOUP: Hello, and welcome to an oral history interview with Dr. John Warfield. Today is June 27, 2008. My name is David Houpt, a Special Collections & Archives (SC&A) assistant at George Mason University's Fenwick Library. On behalf of everyone here at Special Collections & Archives, I'd like to thank Dr. Warfield for agreeing to take part in this oral history interview.

I'd like to start by just talking a little bit about your background, Dr. Warfield. If you would, would you briefly describe your background, where you were born, education, military service.

WARFIELD: Alright. I was born in a small town in Missouri named Sullivan. At the time I was born, the population was 1,013. I was educated in Sullivan schools. Went to the University of Missouri as an undergraduate. I was there for almost two years and was drafted into the Army. In the Army I was pulled out, while in basic training, and sent to Penn State College where I was placed in the Army Specialized Training Program (ASTP). I was in that program for 15 months. By that time World War II had ended. Following discharge from the service, I went back to the University of Missouri at Columbia and completed a dual degree program, the one I had started

before and the one I had been placed in in the service, which was electrical engineering.

After completing my two bachelor's degrees and a master's degree at Missouri, I went to Penn State to teach. And from there I went to Purdue to work on a doctor's degree in electrical engineering, which I finished in 1952. My military service was in the years 1944 to 1946, and was primarily infantry replacement training and the Army Specialized Training Program, as I said, which was primarily studying electrical engineering. That's about it.

HOUPT: Well, excellent. Thank you. If you could, would you discuss some of your involvement with the early development of computers? Digital/analog computers specifically? Digital and analog?

WARFIELD: Yes. Well, I got interested in computers during my doctoral work at Purdue. And then when I returned to Penn State, I was asked to take a lead in building a digital computer. They had a very small budget. This was in 1952. And we were able to take advantage of a lot of gifts from different industries. So we designed and put together a digital computer [called PENNSTAC] which was actually completed in 1957. And it actually served Penn State College, which was later changed to Penn State University, until 1970. They had a formal retirement ceremony [for it] at that time. And they still have, I believe, plaques in the lobby in the engineering building where they tell some of the early history of that machine.

As far as the analog computers go, we actually also built an analog computer there, and that served the university for a while. Then later on, when I went to

Purdue to teach, I was in charge of the analog computers in the School of Electrical Engineering and also was the associate director of the Computer Laboratory at Purdue. Then later on I worked at Ramo-Wooldridge Corporation for two summers and did studies that related to the missile programs where they had underground missile sites, missile control system sites, using transistorized computers. These were computers that had to be ultra-reliable. And I had studies on how to detect faults in ultra-reliable computers [for] which there was very little knowledge at that time about how to do that. Then when I went to Battelle, I did work relating to how to use computers more on the applications side. Then at George Mason University where I taught later on, we applied computers a great deal in work involving complexity. And I think that probably covers more or less the waterfront on that.

HOUPT: Yes, thank you. You mentioned Battelle Memorial Institute. How is it that you became involved with Battelle?

WARFIELD: When I was at Penn State working on the [PENNSTAC] digital computer, we recruited a man by the name of Robert House, who was at Wright-Patterson Air Force Base, because we were using quite a bit of information that we'd gotten from General Electric company in New York State, and he had been there for a while. Then he had gone to Wright-Patterson. Wright-Patterson had purchased a digital computer [called OARAC] that had been built at General Electric, and he had been involved with that machine both at GE and also at Wright-Patterson. He wanted to work on a doctorate, so he came to Penn State and helped me work on the machine there, which we called the Penn Stack. So he stayed with it when I left Penn State to go to

the University of Illinois. And later on, after he got his doctorate at Penn State, he went to Battelle. So he knew me from that experience. He was heading a department--I guess it was called a section rather---at Battelle called a Systems Science Section. As it turned out, I ended up working for him, and that's how I happened to go there...because I was interested in systems science, and he decided that I could help him quite a bit in his work there. So that's basically the connection.

HOUPT: What was Battelle's mission or function then?

WARFIELD: Battelle, as it turned out, at that time was the largest contract research institute in the world. And they pronounced their mission, and it historically had been, to apply science for the benefit of mankind. This is the one that had stemmed from what was called the will of Gordon Battelle, who had set up this institute when it was very small. It had grown to be extremely large. They took this concept of science as a base for all this work that they did very seriously, and that's one of the reasons I was attracted to go there. As it turned out, they were in a particularly good position to do this at the time I went there; because although I didn't know it, they had a quarter of a billion dollars that they had recouped from the work they had done on developing xerography, which came from owning 22 percent of the Xerox stock. [They owned this] Because they had developed something like 257 patents on the Xerox process, which they had ultimately sold to the little company that became Xerox. That provided a base for what I was going to do for them.

HOUPT: So what exactly were the types of problems and questions that you were dealing with there?

WARFIELD: As I got into it, they asked me to develop a science to work with very large and difficult issues. This came about because at the particular time that I had been there just for two years, was the time when the U.S. was having all kinds of major difficulties. This came from a combination of the issues related to the Vietnam War and the civil rights problems where people were actually setting fires and burning cities. And these were the two main issues they had, and Battelle felt they were hopeless to deal with these things because they were much larger than any issues they had dealt with. So they decided to take a portion of the substantial income they were able to derive from this portfolio and apply it to develop a science to deal with the complexity. This is the challenge that I took on. And examples of such things that would be dealt with with the science that I proposed to develop would be functionality of urban environments, the design of large cities, issues related to world problems, and their interactions. Collateral to this would be something you would call the effectiveness of groups of people when they work together.

If you watch TV, you see these big-shots that get together, and you have this massive room with a huge table and maybe 40 or 50 people sitting around the table trying to talk about how they would deal with healthcare or how they would deal with world peace. And can you imagine how anybody could ever resolve anything in a setting like that? Well, that's the kind of situation that we...prototypical situation that we took on as to how we would deal with situations like that scientifically.

HOUPT: So how did this lead to the development of Interpretive Structural Modeling?

WARFIELD: Well, one of the things that I did is I wanted to see.... First of all, I looked at this thing, this issue, this question that I took on from two angles: one was a highly theoretical and philosophical base, and the other was the empirical or practical situation. And on the practical side, I developed a project called the Large City Team. I brought people together from a lot of different places like the man that, for example, was in charge of John D. Rockefeller's skyscraper building in different cities, and the sociologist that had handled the design of Columbia, Maryland, and people of that ilk, and combined them with some of the people from Battelle. And they met for three days a month and talked about how they would develop a theoretical base for designing a large city. So we would have a model of what we called the Well City.

Well, they met for, I think, about a year and a half, and they could never come to any conclusions on anything because they lacked a process where they could aggregate and organize their collective knowledge. So I concluded that one of the major challenges for me was to develop a process where you could bring together people that individually possessed useful information and experience, and find a way where these people collectively could aggregate their knowledge and organize it and put it into some kind of a design setting where it could be applied to resolve difficult situations. So that's the challenge that led me to develop Interpretive Structural Modeling.

Fortunately, I found some theoretical work done by a mathematician at the University of Michigan named Frank Harary, who had developed a lot of the theoretical base. I took that theoretical base and transformed it into this process. Most of that work was done between ten p.m. and two a.m. while I was trying to think it through at night, because I had no interruptions from telephones and things of that type. And besides, I couldn't get to sleep worrying about how in the world to do it.

Then another portion of this had to do with group processes, just the human side of group processes. And I found a lot of [ideas] in the empirical work done by a psychologist on group processes. But his was mostly just a study of how people behaved in groups, and it really had nothing to do with designing group processes. So I ended up putting all that together. Once you have the Interpretive Structural Modeling, you still have to figure out what kind of an environment to do it in. And it involves the use of the computer to present questions to groups on a large screen. So that's part of the picture of all of that.

HOUPT: I see that you proceeded to then go on and establish a Center for Interactive Management. The first center was located at the University of Virginia. Why did you first choose the University of Virginia, and what was its mission?

WARFIELD: Well, as it turned out, you know, [Battelle lost] almost all of its money in a lawsuit from the State of Ohio. I won't go into why that happened. But when that happened, I went to the University of Virginia. The dean there encouraged me to start this center. And it was going to be applying the things that I'd learned and

developed at Battelle. The dean actually gave us space. So we had a large room, and we were able to set up a large screen where we could have computer-driven interaction with a group of people. And we were able to get some contracts right away with some people from the Virginia Department of Forestry and some people at the U.S. Forestry [Service]. A man from Battelle, who had been learning to use the Interpretive Structural Modeling and act as a group facilitator, actually came there. So he joined me to facilitate groups, and we were able to bring all this together.

The dean picked a room that had been an old wind tunnel, and it was just filled up with typical university junk, where stuff collects, and nobody is using it. And they don't want to get rid of it, but they don't have any use for it. So we just had this stuff carted away. And that meant we had space and so forth. We got a nice air-conditioner for the room and some nice new chairs and nice tables and stuff. We got some magnetic wall boards so we could put papers on the wall and attach them to the walls with small magnets, so people could view the materials that they developed during these group processes.

So that worked very well. And thus we had the first center going. Its function was to help these different clients resolve the complexity that had been bothering them for quite some time. And that's why we chose it at the University of Virginia. And its function was to help these clients with the kinds of issues that we first set out to develop a science to resolve.

HOUPT: Thank you. Why did the center move to George Mason University?

WARFIELD: Well, first of all, the center was killed at the University of Virginia because of a dispute between the dean of Engineering and the dean of Liberal Arts who became a provost. And when the two were deans, they got in an argument because the dean of Engineering told his people to go and use the supply room of the Chemistry Department without asking the dean of Liberal Arts, which infuriated the dean of Liberal Arts. So when the dean of Liberal Arts became provost, he decided he was going to get rid of the dean of Engineering. That was number one.

Then the associate dean of Engineering didn't like the fact that the dean of Engineering had taken this room and given it to us because he felt that room had been his property even though it wasn't being used. Then the third thing happened: The dean of Liberal Arts, who became provost, didn't like the fact that the word management appeared in our title. And he said the word management was the property of the School of Management and could not be used by any other part of the university. So we lost our name, we lost our space, and we lost the dean. And the new dean was a man whose specialty was aluminum and had no interest in interactive management.

So with all of these problems, I decided I'd had it up to here with that situation. I left, and I went to work in industry with the Burroughs Corporation, which allowed me to take a job where I would be writing contracts with universities to develop software. And I had been developing software for Interpretive Structural Modeling. However, I hadn't been there very long when I realized that they didn't know much about education. An ad appeared in the *Chronicle of Higher Education* for someone to come to George Mason and set up an institute for information

technology. It sounded like the ad had just deliberately been written for me, even though I knew it hadn't.

So I applied for the job. And sure enough, they liked me, and I decided to take it. A big part of this job would be to develop centers, and these centers would have a variety of responsibilities. But one of the centers' jobs I thought would be just about like what we'd been doing at University of Virginia. So I told them that I would like to have the center at George Mason. And since it was going to move from University of Virginia anyway, rather than have it die, I thought why not have it move to George Mason? And they agreed. And it actually moved to George Mason before I'd even left Burroughs.

So that's what happened. It moved to George Mason. They started building a nice room just like I had had at UVA, even a little bit better, according to the specifications that I had made when I designed the room. So when I got to George Mason, the room was almost ready, and we were almost ready to start contracting with people to help them resolve their difficult issues.

HOUPT: Oh! Well, I'd like to talk a little bit about Interactive Management itself.

WARFIELD: Yes. Well, Interactive Management is the process that was developed to enable people to resolve their difficult issues. It was based on the science that I had developed starting at Battelle in 1968 and moving on to 1974 when I left there. And then I continued to develop it after I left there when I went on to University of Virginia and continued on while I was at George Mason. And actually continued on to the present. So Interactive Management is actually the action portion of that

science. However, I should say first of all, [the process of Interactive Management] got its name in 1981 at the University of Virginia. And then it sort of lost it as far as the university was concerned, but retained it when we wrote a book in 1994 and published a book in which we defined it very carefully and specified all of the different roles of the different actors: said who does what, what do they do in what sequence, and so forth. In that book we described something like 135 different applications that had already been carried out in different locations by different groups of people.

I should say, I guess, that some of those.... Well, that was a mix. Some of them were done at University of Virginia, some were done at George Mason, some were done in other countries. Some were done in Europe, some were done in Asia, some were done I believe in South America—I'm sure some were done in South America—and so on.

Now eventually the name of the process was changed to the Work Program of Complexity. And the reason that happened was that I got a very large project that went on over the years. It started with...it was with Ford Motor Company. It started in 1990, and it ran on for, I guess.... Wait a minute now. Let me make sure I've got this timing right. Well, let me put it this way: It ran for 15 years anyway, and we got an awful lot of new information where we were able to expand on Interactive Management. And since we defined Interactive Management very carefully in the 1994 book, it didn't seem right to keep calling something Interactive Management when it had been sharply defined. So I called the new process the Work Program of Complexity.

And the way I describe it, I used a term that was presented by Michel Foucault, a French scholar, who talked about absorb and expand or absorb...something like absorb and expand, I believe is what he called it. And he described this as how science evolves in the physical sciences. So you don't throw away something, but you absorb the old, and then you build around that to grow something that's improved and more expansive. And that's what we actually did.

The reason I brought that up now is that it's important in later applications, that we went beyond Interactive Management, and we used the Work Program of Complexity as a new defining term. So it might look like a step back and forth between Interactive Management and Work Program of Complexity, and we may use them interchangeably. But I want people to recall and remember that whichever term we're using, nowadays we want to talk about the latter.

HOUPT: Oh, well, thank you for that clarification. I appreciate that.

WARFIELD: Sorry it's pedantic, but that's the way it goes.

HOUPT: I appreciate that. If you could, would you briefly describe some of the preparation for one of these workshops?

WARFIELD: Some of the preparations?

HOUPT: Yes, sir.

WARFIELD: Well, the ideal preparation is to prepare what's called a Workshop Plan. The first time we actually did one of these with great care, is the one I did with the Ford Motor Company. And I worked back and forth with a man named Scott Staley. We did this remotely where I was at George Mason in northern Virginia, and he was in Dearborn, Michigan. And we kept the fax machine humming, and we did seven drafts.

Now, this draft gives you about a one-paragraph description of what the scope of the workshop will be. It identifies all the participants who will be doing the work. It identifies the staff and what the staff roles will be. It tells where the workshop will be held and how long it will last; what the facility will be, where it will be held. And it will tell which of the five different measures of success will be applied. And this is very important because, you know, people often don't realize that it's very important to talk about success. And in order to talk about it, you need to know what you're going to mean by success and ideally before you start.

So in the book, the 1994 book called *The Handbook of Interactive Management*, we defined five success measures. When you have a client, you ask them which of these [five] measures do you want to use? They select one, and I was very surprised. They almost always select what I would call the weakest one. And the weakest one is just to learn more about the situation. This is very encouraging because what people are admitting is that just what we had thought from the beginning, that the kind of things that we're working on here are things that people really don't understand. And that's what we set out to work on from the beginning, was to develop a science that applies to things that people just don't understand. And that's what we're dealing with from the word go.

So that's why we need a Workshop Plan. That's why we had put into the plan the success measure that's going to be applied. And then the staff know what their roles are. So when the time comes to do the workshop, everybody knows what is expected of them. The participants know what is expected of them. There's a...the scope is given so they know that they're working within that scope. If the participants who are invited to come to the workshop see that scope and don't believe they can contribute within that scope, then they don't come. This is not a forced appearance, you see; it's an invitation even though the corporations often don't work that way.

There's also an appendix in there that describes briefly what Interactive Management is. So what we say is we like for people to come to the workshop in such a mood that there will be no surprises. We don't like surprises in these workshops. And fortunately that very seldom happens. Now, what we find is that about...there's about a 98 percent success rate. And about the only time these workshops don't work—and there's only about three of them I would say in the many years—that fail, is when we get one of these people that you see once in a great while, that thinks they know it all, and they won't shut up, and they just insist on interfering with everything. And if that happens and nobody shuts them up and makes them quit, the best thing to do is to just shut the whole thing down. That's only happened twice in my recollection. But that's basically what happens. And everybody sees this Workshop Plan before the workshop ever starts.

HOUPT: Yes. And if you could, would you walk us through the steps of a workshop and maybe explain how to help groups better understand the complexity they're dealing with?

WARFIELD: Well, first of all, you don't help groups understand, at least at the beginning. But here are the steps. And first of all, when you say that, many times people don't go all the way through the steps that I'm going to recite. They may decide they're happy when they get part of the way through. But I'll give you all the steps anyway, and sometimes they want to stop after some of them have been completed.

First of all, there are two main parts. Part 1 I will call Discovery. And in Discovery, what they're trying to do is find out how to describe and diagnose a situation. Many times people will stop after the Discovery because they've learned so much, they feel they don't need to continue. Part 2 is called Resolution. And in Resolution they design what may amount to a strategy and a procedure for resolving and implementing the design. So let me say that one more time: Discovery involves description and diagnosis. Resolution involves design and implementation. Now there's one paper that's published that's the most complete example of this. And it's the description of the strategic design of Ford's Enterprise Information System. That was published in 2007 in a journal called *Enterprise Information Systems*. So if anybody wanted to find a very thorough description of the steps, they would find it there.

Now, as far as you asked me to say how we helped them understand....

HOUPT: Deal with, overcome....

WARFIELD: To overcome. And the Interpretive Structural Modeling gives you graphical portraits of relationships among components of the situation. And we found by research done at George Mason that people are unable to read these graphical pictures without a lot of help. And so part of the problem that is dealt with is to, after they've done all this work and after all their knowledge has been structured for them, we do what's called an Interpretation Session. This is something we learned by working with Ford, that we do an interpretation session.

In that session a person very familiar with reading these structures and interpreting them does that for them in front of them so that, by the time they get through with this session, they understand very thoroughly what they've said and how the components of the situation interrelate. And if they see anything that looks strange, they have an opportunity there to correct it or amend it. And I'll say that that almost never occurs. They almost never need to change anything. And we have the data to show that they've learned a massive amount of information by what they did. And furthermore, their viewpoints change dramatically as a result of what they did because we have ways to measure what they thought before and after what they did. So I guess that's my response.

HOUPT: I see that you worked with some fairly big-name clients such as Ford Motor Company, Defense [Systems] Management College, and the National Marine Fisheries Services. Could you discuss some of the issues these clients hope to deal with through your workshops?

WARFIELD: Yes. But let me say first we also worked for some very small clients. So don't let your viewers think, your listeners think, that we only work with biggies.

HOUPT: Certainly. Thank you.

WARFIELD: Now the National Marine Fisheries Service, they wanted to organize their thinking for the 21st century. So this work was done as they were approaching the end of the 20th century. They wanted a strategic plan for the 21st century, and that's basically what was done [with] them.

The Defense Systems Management College was very concerned about the defense acquisition process. This was back when everybody was reading about \$800 toilet seats and things like that in the news. So the faculty there undertook to redesign the Defense Acquisitions System. Now, this was really a major job, and they used this process to provide leadership over a five-year period. They worked with several hundred defense program managers. These are people that run projects that may involve billions of dollars. As a result of that, they were able to write [draft] legislation which eventually passed through Congress and was adopted and became law which is called the Federal Acquisitions Streamlining Act of 1994. So that was the first time this was actually used to develop legislation.

Then the Ford...there were a lot of different projects at Ford. But one of the main ones was the one I've just mentioned, which was to do the strategic design for their Ford Enterprise Wide Information System. This was done in 1995, and that system is still in use today, and hasn't changed significantly in terms of the strategy

because it was done by a group of Ford people from different parts of the company. They anticipated the different problems they would encounter, and they [constructed] options that would resolve those before they actually built the system. So the changes that get made are those that update the technology, but they don't update the strategy because the strategy is basically something that doesn't need to change over time in terms of information processing. And that system is used at all levels and also by their suppliers and their dealers.

HOUPT: Thank you. You have donated a significant number of your papers, as well as audiovisual materials, documenting various Interactive Management workshops here to the Special Collections & Archives at George Mason University. What do you see as your most important contribution to scholarship?

WARFIELD: Well, I think that we've developed what's called a systems science. This is a science that can be applied to any problematic situation. And we've demonstrated this over almost three decades, and we've demonstrated it with the help of a lot of different people in a lot of different places. For example, it's been widely demonstrated in Mexico, and it's been fairly widely demonstrated in Europe, and it's being demonstrated now in Asia in different places. So that meets the requirements for science if you do the fundamental theory and you demonstrate the theory is applicable to a lot of different situations

HOUPT: Okay. Throughout your collection here at George Mason, there are many references to Charles Sanders Peirce. Would you be so kind as to talk a little bit

about his influence on your work and any other influences you see as very important?

WARFIELD: Well, when you're trying to develop a science, you want to go back and look, try to find people that thought a lot about science. And there are only about six or seven people in the history of the world that I know of that really thought a lot about it. In the United States Peirce is the one that thought a lot about it. When he thought about it, he went back and read the writings of almost all the people that had thought much about it.

He grew up in Cambridge, Massachusetts. His father was head of the Mathematics Department at Harvard. He took his young son at about the age of eight, and told him to read all the philosophers and figure out where they were wrong. And Peirce went back, and he read almost all the philosophers that he could find, I think, and he understood the...he read all of Aristotle that he could get his hands on. He read all of Bacon and, you know, all the other philosophers that had written about science. He more or less formulated—integrated—the thoughts of these people.

Not only that, but he developed a logic...he was a logician himself. He developed logic to a considerable extent. He went to Europe and met the people who were...the leading logicians over there. He discovered over there a man named Augustus De Morgan, who had developed a theory of relations which, as it turns out, is the fundamental mathematics behind Interpretive Structural Modeling. So I discovered that in Peirce's work. And then later found it applied in Harary's work. This generally speaking took Peirce as a kind of a model to compare myself when

I'm looking for a standard of behavior. I guess there are others that, you know, I could go to, but....

HOUPT: No, that's....

WARFIELD: I think he's good enough.

HOUPT: Actually...well, thank you. You've written quite a bit on the state of higher education and offered some general guidelines on how it can be improved. One particular piece, "The Great University," an article outlining complete overhaul of the current system. There have been many changes here at George Mason and in colleges and universities across the country and world, for that matter, since you wrote this article. How would you assess the current state of higher education in the United States? And have they adopted or have you seen changes in the right direction?

WARFIELD: Well, if I could go back to what you asked me very early on, see, when I told you when I started this work at Battelle, they were nonplussed because they looked around, and they said there's no science that we can apply to deal with these large issues. I don't see that the universities have done anything to deal with large issues. They just keep doing more of the same. They're dealing with the smaller issues that can be dealt with in a one-hour lecture. And they're not willing to deal with what it takes to deal with the large issues.

As I've shown in the systems science that I've developed, that's not adequate. So my answer is they haven't done anything. And if you look, for example, if you try to measure the success of universities by looking at what their graduates do, look at the U.S. Congress, you see that they can't handle anything that's beyond the norm. They get together, and all they do is bicker. They sit around in this space that's not designed for issue resolving, you see. And if you happen to look at some of those DVD's that we put in the George Mason Fenwick Special Collections, you see what kind of setting you have to have. You see these people working on Interactive Management and doing the discovery portion, the Congress never does the discovery portion. They just want to find out who was responsible for the last mistake. And they don't know how to structure these issues so that they can resolve them. And so until the university is willing to develop this space, then they can't deal with these things.

This is what we were trying to show when we got these special facilities built. And unfortunately we just can't keep them going. You know I'm trying to get the universities to see that if you're doing football without a football field, you can't do football. And if you're doing drama without a stage, you can't do drama. And if you're doing a language without a language lab, you can't do very good in language. And so certain kinds of learning require certain kinds of facilities. They have to start with these facilities, and they haven't done that yet.

And that will be the marker, when you see the universities putting up these special facilities to deal with systems science and then running people through those. That's when you'll begin to see that they're starting to learn that you require these special facilities for dealing with complexity. And until that happens, the

answer will be that they're not doing anything. You have...there have been probably 30 different systems programs started, and they almost all die. And the ones that succeed and stay on are just pathetic programs; they're just turning out people that are not capable of working with these difficult issues. They're shams, and they're just incompetent basically. So it's a great pity.

HOUPT: Hmmm. Interesting.

WARFIELD: That's my answer.

HOUPT: I appreciate that. So moving on to sort of closing here, are you still involved with the study of complexity?

WARFIELD: Yes, I am. I get a lot of inquiries by email, and people want to know things, and I try to respond to them.

HOUPT: Interesting. Where do you see the study of complexity going from here?

WARFIELD: Well, there's not a whole lot left [of the science] to discover at the moment, in my opinion. Mostly what's needed to learn is there. The issues now relate to people learning what to do with what's available. And this mainly requires two things to happen: One is you need to enhance the application of what's available in higher education in systems science, and you need to enhance the practice of systems design in organizations. And the Special Collections is available

to support both of these things. So somehow we need to have a big sales job. I don't know how this can be brought about. I'm not a very good salesman. But the information is there. There's enough literature to support all of this and enough visual aids; there's plenty of DVD's and things like transparencies and so on to support lots and lots of work.

The problem right now is that the educational system is dollar-driven, and everybody goes where the money is. Now, I've written a paper that talks about creating a system science program in higher education. It turns out there's so many billionaires on earth, if you could just get one of them that was willing to support this program and finance it, the whole pattern for how to do it is there in this paper. The paper's under review right now. I don't know what more can be done. All that would be needed is to find that one billionaire who's sufficiently interested in this and sufficiently tired of watching these politicians, you know, fight each other over who made the last mistake and who's responsible for what went wrong instead of getting around to resolving these issues, that he would actually finance the program in higher education.

Then the issue would be how do you prevent the university from stealing the money and misappropriating it. I don't know if you saw this story about Princeton University got 50 million from somebody. And after they got it, they didn't do what they said they would do. And he came back later and took the money back.

[Laughter] This was in the news about a year ago. So you'd have to have a rigid contract and enforce it to get the systems science program to function the way it should. But all the information's there.

HOUPT: Well, thank you. Has there been anything that I didn't ask you that you'd like to add?

WARFIELD: I don't know of anything. I'm afraid I fired away. That was it.

HOUPT: Well, you know, Dr. Warfield, it's been a real pleasure speaking with you. On behalf of everyone here at Special Collections & Archives, I just want to thank you for taking the time out and doing this with us. And we'll do what we can to get your work disseminated.

WARFIELD: Thank you very much, David.

HOUPT: Thank you, Dr. Warfield.

WARFIELD: Okay.

[End of Interview]