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Charles West Churchman

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MODERATOR: Our next speaker again demonstrates a tremendous amount of versatility. He is Professor of Business Administration at the University of California at Berkeley. His doctorate at the University of Pennsylvania is in Philosophy. He has been a professor at Wayne University and Case Institute of Technology, and Associate Director of the Space Science Laboratories at Berkeley. He has had many honors and awards. My first contact, indirectly, was through a book on operations research of which he is a co-author, and which is one of the now-classic books on the subject. It’s a great distinction to have him here. He has been in with his books on the systems approach which probably probe more deeply than anyone else in this particular area of systems. Many of us have gained a great deal of inspiration. So, I’m very, very pleased to present to you Professor West Churchman, University of California at Berkeley, who will speak on “A Philosophy for Complexity.”

[applause]

CHARLES WEST CHURCHMAN: As did the other two speakers this morning, I will try to keep my remarks on a fairly informal plane, although the subject matter of the talk is a pretty deep and complicated one. I mean, how complicated can you get when you want to talk about complications? I’ll try, nevertheless, to introduce a breeze now and then so it doesn’t get too heavy. As the title of the talk indicates, I’m going to make my remarks from the point of view of a philosopher. I should warn you in the beginning, therefore, that there are a couple of characteristics about philosophers, they’ve just got them and there’s nothing to be done about them. One is that they dearly love to ask questions. And if they sniff out that there’s going to be an answer somewhere, they’re very unhappy. So, if you sense that I seem to be approaching a conclusion and then get as far away from it as possible, you sense correctly. If I can leave you in a state of confusion I’ll grant that my talk has been a success. Now, one way to avoid that is to

fall asleep. So, you can always use that as one of your simple options about this talk about complexity.

The other aspect about philosophers is that they dearly like to point out that none of this is new. And it isn't. I mean, I really assure you there's nothing new about complexity. It's been going on for a long, long time. And I'll keep referring to other epics in history that seem to me to reflect the same concerns that we have in the 1970s about the ideas of complexity. That will ruin some of you, because some of you are very proud to be in the 1970s where we are facing the most complex problems that humanity has ever faced. I'm going to try to tell you that ain't so. There are other periods of history where they could say just the same thing. In fact, we've got it pretty simple from that point of view.

There are three key words that I'll make as a theme of my remarks this afternoon that philosophers like to use. They're the only technical words I'll use in the talk. One is ontology, which is the philosophy of reality. It deals with the question of what reality is. It's basic, of course, to everything we are talking about in these two days together. Because we really want to know whether complexity really exists. Is there real complexity in the world, the real world. That's the ontological question. The second technical term is epistemology. Epistemology is, for the philosopher, the theory of knowledge. The question of how we know certain things to be true and other things to be false and so on. So, our question is, if the world is complex, then what is our theory of knowledge that will enable us to face that complexity? What is our epistemology in a world of complexity? And the third question is ethics. And the question here is, is complexity a valuable thing in our society, or an evil thing, or neither? So those will be the three themes as I go through the talk. I'll be talking about ontology, the reality of complexity; epistemology, how do we know in a world of complexity; and the ethical question: what is the value of complexity? Is it something we want to reduce, or increase, or what? All of my remarks are really related to management in the most general sense this afternoon. I'm interested in how the world is going to manage its affairs. And these three branches of philosophy are intended to give me the base for management thinking about this crucial problem.

I'll begin with epistemology because we have now, at this stage in the development, quite a literature on the epistemological ideas of complexity. As I say, there's nothing particularly new about it. The first is the differentiation between complexity and simplicity. And the differentiation is based on the notion that to know something we have to know it in a simple form. And the primary knowledge test, then, that a manager faces is to go from complexity to simplicity and from simplicity to knowledge. Now I'm warning you. I'm not saying that's the answer. There ain't no answers here. But that's a classical approach to complexity. It consists, essentially, trying to take the complex and get it into a simple form where we can understand it.

Now, Buzz's talk this morning is a perfect example of that. Where he hid from us the enormous complexity that lay behind his research and with a few charts got us all excited about, what were they, bugworms? other kinds of things and what they do in the forest, and so on. That's a classical approach to getting you in a state of knowledge by taking the complex, putting it into

the simple. And to quote a genius on this matter, “It takes a genius to create simplicity out of complexity.” And one of the great geniuses of all time is Spinoza. And Spinoza’s Ethics is essentially that. He takes, out of all the complexity that we face in life and filters it down to the elementary postulates that make up the beginning of that book and comes out with a very, very simple theme for every one of us. Namely that the ethical mode of life is understanding. That’s the only message you need from Spinoza’s. That’s all you need to know. So out of the total complexity comes this genius’ creation of simplicity.

That is not the sense, or not the epistemology I think that we are trying to use today in systems science. We are not essentially struggling to cull the simple truths from the complexity. Rather we have the spirit of our age is really hitting complexity straight on. Taking it for what it is, essentially. So now complexity comes to be a characteristic as a second suggestion of another mode of attack on knowledge. Namely letting everything that’s there be examined that’s relevant. And trying to put complexity together into a system which we call a model. Now complexity will consist of, certainly, the number of variables we face. There is, for example, just to show you the growth of this, when I first started doing operations research, in the early 1950s, the biggest linear program that we could face handled maybe 15 variables and a few constrained equations. That’s the biggest we could go because it was all being done on a freehand machine. You may not know it, but there are computing machines that you can operate with your fingers. The numbers show up in the register and so on. That’s how we did the task in those days. I understand that in 1975 there is a linear program that has 2 million variable and 35 thousand constrained equations in it. Is that complex enough for you? What’s it being used for? I think it’s being used for an oil company. A lot of good it’ll do them. But, they put a lot of money into it, so I guess they’ll have to use it. So, that would be one definition of complexity. No attempt in that program to get simplicity really. There are some qualifiers to that but essentially, it takes the world to be the way all those variables are and not try to go towards some kind of simple culling of the truth from it.

Another meaning, formal meaning, of complexity lies in the interaction between the variables. Now we’ve heard enough today so I don’t need to go into that in great detail. We’ve come to be aware that when you change a variable in a system, as a manager changes a variable, the impact on a lot of other variables throughout the system occurs either immediately or in some kind of time lag. So, we’re beginning to understand that our systems that we are dealing with are essentially complicated in that second sense. So that Forrester’s model that Hal talked about this morning essentially just had five basic variables in it, so not very many. But when you think of the interactions in it it gets to look pretty damn complicated. So, the DYNAMO, which is the simulation word for what Forrester and company do at MIT could be thought of as a fairly complicated model. Now that’s one meaning of complexity, another meaning. It says to try to represent, in some model form, some thinking form, all of the relevant aspects of the situation, of which there are many, and that’s what makes it complicated.

A third meaning of our epistemology of complexity recognizes that we live in a world of uncertainty. Now I'm making historical references. For the first mode I referred to Spinoza. For the second, which is model building, large-scale model building, I refer to no historical figure. I don't know of any. I think this is one thing that's truly modern, is very large-scale model building. That may not be to our credit in history but at least that's what's happening. In the case of uncertainty, however, the historical roots are many. I'll pick out one figure, Carneades, who lived in the post-Aristotelian period. It was Carnaedes that emphasized the point that no assertion is ever known with certainty. We live as human beings in a universal uncertainty about everything that's happening, ourselves and the outside world. But, said Carneades, that doesn't stop us from making assertions. God knows it certainly doesn't. It's the only certainty we have, is that we certainly go on making statements even in a world of uncertainty. But, said Carneades, we can make statements, some of which are more appropriate than others. So he comes up with a measure of confidence in the assertions we make which is based on the word appropriate. That word in English, appropriate, has exactly the same root as probability. In fact, all the probability theory is simply an extension of Carneades' idea that we need to be able to measure, somehow measure, the appropriateness of the statements we make. So, our world becomes complex because it is uncertain. And the suggestion here is that we need to develop a calculus of uncertainty.

This morning we had a little bit of byplay about the unexpected and the expectation of unexpectedness and the unexpectedness of the expectation of unexpectedness and so on. That's apt to go on forever if you don't stop it somewhere. One way to stop it is begin to define 'measure unexpectedness.' Because it's on a scale ranging from 0 for the completely unexpected or impossible, to 1, certain. So, we have developed in history a theory of probability. A theory using, that now uses a lot of the classical figures, Markov and Bayes and so on to try to measure probabilities. I won't go into that, excepting to say it's obviously going to be in the models we build. Some form of probability. For those of you who are in statistics, there's no question that it's going to have to be at least Bayesian. If we're going to do this we have no chance in world model-building a world as we see it of using classical notions of probability. But there's a much more fundamental uncertainty about our understanding of the world that is not reflected in probability theory. And that has to deal with data, the information we use to build our models, to describe the parameters that drive the model, essentially. Because you need that kind of information if you're going to, if your model's to have any content.

But the character of information in our understanding of the world is totally different from the rather simplistic notion of information that empiricism gave us. Empiricism said that if you have a question to ask: Are all swans white? Then for heaven's sakes go look at some swans. And if they all turn out to be white then you're on the right track. But if all the sudden you go to Japan, Kyoto, and you see the black swans, that's done it. There is a black swan, unless those Japanese are painting the damn things. There is a black swan in Kyoto. I saw it. So not all swans are white. That's simplistic. We have no way of doing that.

I'll just illustrate this complication of our model-building understanding of the world. We would like to know what the cost of this program is at Portland State, this new systems science program. It's in effect. I heard the president praising it this morning. So, if I were on the board I'd like to know, what's this program costing? Now what you might like to do if you're an accountant is add up all the salaries and equipment, computer time, student pay and all the rest of it. And say that that figure with an overhead is the cost of this program. But that wouldn't be right. Epistemologically, that isn't the cost of this program. You know what it is. It's the lost opportunity of all these characters that are in this program at Portland State. What could they be doing now if they weren't doing this? And we have to get the value of that thing they could be doing because they're losing the opportunity by being here at Portland. It's the lost opportunity that makes the cost.

That's why we're so unpopular as systems people. You go into a room and they're arguing about which programs to have at Portland State. And we keep saying what other programs could we have. Those are the ones we need to talk about here. Maybe a lot that don't exist and so on. Now do you see what I mean? Where do you go to look in the world for cost? What do you look at? Nothing to look at. You've got to think about lost opportunities. In other words, you've got to have a big value loaded model to get these lost opportunity costs.

Now that's the data problem. If you wonder whether Forrester's model that's reported in The Limits to Growth, used good data or not. The answer is not. There ain't any model around today that uses good data. We don't have it. It isn't there in the sense of being epistemologically sound. Now what do we do? We use past data. And we use the period that was mentioned earlier, from 1900-1970 or something like that. God knows what was going on in that period. But, surely there was a lot of mismanagement. I know there was. I lived through a hunk of that period. And if the hunk I lived through is anything like the remaining 10 or 15 years of that period it sure shows a lot of mismanagement. They really didn't know how to manage affairs. I know, FDR is a famous man but he really was a lousy president. I think. But compare him to Coolidge now. Coolidge was really a great guy and so on. Lots of mismanagement in that period. So, you use historical data and what is it? It's generated out of bad management. And we're using that data to make our forecasts into the future. So, of course it's bad data.

Some of you are looking puzzled. You'll have your chance in a little while. To get up and say, "I have a good data bank," if you want to do it. But then I'd like to know how you know that because that's my philosophical question. So, the interlinkages are at that level. The complicated interlinkages are at the data collection level. How do we get the necessary data? Now I'm not here to discourage you. I think that's a damn good question. You know what we do in operations research? We want to know what the cost of holding inventory is. You can't get it out of the accounting books. I assure you, you can't. There isn't any firm that has it. What you do is go talk to that smart comptroller who seems to have some grasp of the financial system. And you talk and talk and talk, or rather you listen, listen, listen to them. Because 95% of what you're getting is irrelevant. But out of that you cull some estimate. And that's the number you

use with your own judgement. It's a guess, based on the best judgement you can make. But it may be terribly wrong.

Now some of you are saying to our systems science experts: "Why not talk about sensitivity analysis?" The answer is, I won't because some of the data have to be critical. They really do. If they're not then we're not doing a damn thing. I mean, if none of the data matter at all, we might just as well forget the whole story. Or as Don's going to suggest, tell you a myth instead. But if we really think we're doing anything, some of the data have to be critical. So, I don't think the answer lies in sensitivity analysis. That's complexity, dear-hearts. That's the real root of it for systems minds. We're faced with trying to figure out what the… *know* what the reality is with that kind of difficulty in obtaining our data. We're not laboratory technicians with good measuring devices in front of us. We just don't have that.

Now's the time for an ontological interlude in this symphony. This is sweet music I'm going to give you now after that piece depressed you. This is a little sweeter. So, I bring out the violin section accompanied by a few cellos. And we'll point out that in classical rationalism, the question of complexity had a beautiful solution. Descartes realized that he was dealing with a very complex question. His question was, "Is there any proposition I can know with absolute certainty?" And he realized he lived in a complex world, and somehow or other while he was conducting that search for the unqualifiedly true proposition, he needed a mode of living and some support. And the answer is the guarantor, as I call it; namely the job is to prove the existence of a benign god. If we are the children of a benign god, then the problem of complexity is not even threatening, depending on how you define benign to be sure. And I won't go into all that detail. But God will take care of us poor children in a messy world, no matter how messy it may be. Because he is benign. He is not evil.

So, if you now have the opportunity of being a reactionary, which there's nothing wrong with that, and returning to classical rationalism of the 17th century, and to your own satisfaction, and probably many of you have, prove the existence of a god or establish for yourself that there is a god. In which case the complexity is there, but resides in the infinite wisdom of the deity and not in your rather limited capabilities. That's the ontological interlude. You have that option. Anytime somebody is in a gloomsday mood, you can reflect on that question. And if you do and come up with it, the answer, then you've got the answer. The epistemological answer and the ontological answer and the ethical answer. The key figure in my talk is Descartes. Because in the Meditations and the Discourse on Method that's essentially what he was after. He was living through that same experience. Living through a complicated world and finding some way in which he could feel the guarantee.

Now the interlude is over and we're back to the present-day society. Which has not opted to go that route. Not, I might argue, on any rational grounds that I've been able to find. It's still an option. It's not by any means closed. Even though some of the uglier people in the scientific community say, "I will not entertain that hypothesis,"and all the rest of that nonsense. The

problem of the guarantor is with us. Is there any guarantee that human development progress is going to take place and if there is, that's a god? So that's the option before you.

But I'll come back to today and leave the world godless for the time being again. And talk, now, about the ethics of complexity. Is it good or is it bad that we live in a complex world? I've assumed that the ontology has given us the answer we live in a complex world. And so has the epistemology.

So, we have, first, the simple-minded gloomy side. And that says complexity is bad. Why? Oh, come on. Why is it bad? It'll kill us all, for one thing. If you look at Hal's chart, pollution goes way up and kills off a lot of population. I guess that's sort of what happened. So, bang. That wasn't Hal's, it was Mesarovic's chart. But, bang, that's the end of things and so on. So, that ain't good. It'll kill us all and besides, it frightens me. So, complexity is bad because it's frightening. Or complexity is bad because I want it to frighten me. Whatever your answer is at this level, you just become part of the gloomsday, the general gloomsday philosophy.

But I'm not going to talk so much about that, which is really not very interesting, though it's highly publicized. And talk, instead, about the bright side of complexity. Complexity is good. I'll do this first part with a little bit of tongue in cheek. Complexity is good. The theme here might be called the Club of Rome syndrome. You know how the Club of Rome got started? It was a group of people meeting in Rome. Who sat around and more or less said to each other, "We are very important people." Now they didn't say that, it wasn't on the agenda. Because there wasn't any debate over it.

[laughter]

We are very important people and we should be concerned about the world. And so, then they met again and they'd asked Hasan Özbekhan to write a position paper. And in that paper, Hasan first introduced, as far as I know, in the systems science literature the French word *problematique,* standing for the complexity that I mentioned earlier, the interacting of the variables. Or of the world's problems; every problem is interrelated with every other problem. I might say just parenthetically at that point that lots of systems scientists, lots of people in the world don't recognize that to be true. Up in Richland, The Battelle Memorial Institute has a project called DEMATEL. In which they asked experts to sort of identify the world's problems. And they identified 47 of them. I have an, incidentally a mystery, why these things always come out to prime numbers.

[laughter]

But that's sort of in the mystical aspect. Put it in your myth if you want. So, 47 problems. Then they asked experts in the world in transportation, education, and so on, to fill in that 47x47 matrix with numbers from one to seven indicating the interaction of the problems. And I said to them, "For God's sakes, what are you doing that for? The only way to fill that matrix in is put nothing but sevens in it." And they said, "Oh, yeah. We know that. But look at how the experts

of the world do it." And true enough, many of them left many of them left […], they saw no connection between, say, energy and education. I don't know how they thought the school buildings are lit for that matter. But anyway. That's a beside.

Now I'm on the Club of Rome syndrome. It says, in effect, the world is in a complicated situation. Complexity is there. And therefore, we need, in effect, the best minds to try to tell us how to get out of it, to get ahead, to progress, make things easier. Now when you're getting into that syndrome, complexity is pretty good. Because what happens? Planners become important. They really do. For a while, we didn't know whether we were important, in the late 50s and 60s. There we were muddling around with queuing theory and inventory theory and trying to solve little problems of little companies, or little problems of little government agencies and so on. But now, by God, we're hired by the Club of Rome and we can really take the whole world on. And as we do it, our titles of our books reflect our modesty. Limits to Growth, boy that's it. We know once and for all we got to limit growth. Mesarovic, Mankind at the Turning Point. I, little old Mike Mesarovic of Case Institute of Technology, recognize now that man is at the turning point. Stafford Beer, modest title: Platform for Change. I, Stafford Beer, am not just Stafford Beer, I'm a whole goddamn platform for world change. And finally, Russ Ackoff, Redesigning the Future. How do you like that? Little old Russ Ackoff, University of Pennsylvania, sitting there with his students, he has a systems science program, and he's redesigning the whole damn future. I really think the world's getting great for us planners.

[laughter]

But that's just a facetious aside. I don't know that you have to take that so seriously. Let me say now, take that side and say, "Seriously now, why I think it's a bright side, really. Despite the titles of the books and so on." What those people are doing in the world modeling today, for me, is that they are making us pay attention to the future generations as a moral obligation on our part. Now I'm deadly serious. I'll try not to even smile in this section. There was a time in my young life when I was struggling with "what is morality" and I came to the conclusion that morality is what a future generation would ask us to do if they were here to ask us. And I don't know if I believe that anymore or not, but it's still good enough for this afternoon. I believe that that voice of future generations is a morally critical voice today. Because a lot of the things we're thinking about today have their implication for the future generations, in terms of species that we heard about this morning, or say nuclear energy. You know what one suggestion is after that stuff cools off and solidifies? We don't know what the hell to do with it now. We really don't. The salt mine is no longer, necessarily, a good solution. Some people think to take it down to Antarctica and sink it through the snow. I'm talking about nuclear waste, if you don't know what it is. One suggestion is since we don't know what to do with it, what about orbiting it. And let some smart technologist of the future take care of it. They'll figure out what to do with our crap. We'll send it up there for a while.

[laughter]

This is a serious space application. That's immoral. I think that's just plain immoral. Not to be argued about. It's just immoral, that suggestion. We may have to do it, incidentally. But we at least ought to admit we're being immoral in doing it. Hal talked about discounting for future. Any positive discount is immoral. My children are a lot more important than I am in my life, and their children's children are more important still, and all the rest of it. So at least there is a moral theory that says that value goes increasing, and you have negative discount; the value of future generations just keeps increasing on these charts, becomes an amplifier rather than a diminisher of the picture. So, the bright side is that we are being made aware in the 200-year projections, whatever they may be, of the things that we are doing today and their implications for future generations. We're facing the problem of how we're going to assess values that are out there 100 years. Given our own incapability of assessing our own values, that's a tremendously complex problem. But that doesn't diminish its importance. And therefore, I think that complexity is really on the bright side by making us face up to that. There's a gloomy side of that, which says that we can't cope with that problem. So, you can play that dialectic in your mind between the complex… complexity is bright in that we are deeply concerned. Gloomy because we don't know how to handle the problem.

There's a lot that's encouraging before I leave that. It seems to me that some programs like our bureau of sport fishing and wildlife programs and preservation of species is a good program, because it's very self-conscious about the indefinite future. Now I'll come back to it before I finish my remarks. So, that's that part of it. Now I come to another bright side, another view of complexity. And this comes to all of us that have been faced with this problem of world planning and world model building, worries about the future and so on. And that can be summed up in economic literature by the problem of aggregation. If you know any of these models they have to aggregate a number of things. One of the things they aggregate is you. In great globs, you are aggregated into statistical classes. There's nothing more frustrating than the damn statistician. You know? You get up on the Golden Gate Bridge. You've been thinking for months that you will take your life. And you finally go and you stand up on the bridge. And as you're falling, some statistician says, "Yep, that fits right on the probability distribution." The end of your glorious suicide, ruined by these aggregators.

They ruin our lives in very, very deep ways because they aggregate. Aristotle's probably at fault. At least I'll blame him. He gets so much credit, it won't hurt to give him one little criticism. He's worrying about logic and trying to figure out how logic works. And he knows pretty well in his own mind that if all cats are animals or all men are animals and all animals die, then all men will die. And then he thinks about Socrates and how would that do in his syllogism? And so, it comes out that Socrates is a man. All men will die. Socrates will die. At that point in history, Socrates was made into a class. And that was deadly. And people have been doing it ever since. They've been taking us unique individuals and classifying us. And making decisions on classes; not on us, but on classes. And that's deadly bad. It forgets that there is another side, another deep side of reality.

And back to the ontological problem, just as complex, just as broad, just as complete and that's your own inner self. The self, the individual, whatever you want to call the label: psyche, soul, self, not brain, not mind, but self. Has this ever been said in history? Is this the first time anybody's stood up at a podium and said it? No. It goes back, certainly to Hindu philosophy, to a compassionate Buddha. The whole mythology of the self in Hindu philosophy. It's said over and over again, in poetry, in drama, always dealing with the self, the individual. One of my favorite philosophical characters, this really is my favorite of all, is Immanuel Kant. And Kant, after writing his first Critique of Pure Reason which deals with science, decides that something has been left out. Now his own language is different and so on. But he finds that there is another aspect to reality which he calls the will. He could just as well have called it the self, for that matter. But for his own reasons he calls it the will. And he develops in the second Critique and in the Foundation of the Metaphysics of Morals, a whole story about that world. In The Kingdom of Ends we are all wills, and nobody is a class, and nobody is just a man or a woman or an adult or white, black and so on. You are all wills, not distinguishable by any of these class categories.

Now this is a man who had spent his life in what we would call hard science today. He worked in physics and astronomy and wrote, really, the basic textbook on the philosophy of science, A Critique of Pure Reason, and so on. Who comes in his life, 1780s, to a realization that something deep has been left out of all that complexity that lies on this phenomenal side. That there is another world. And so at the end of The Foundations there's the famous statement, "Two things fill my heart with never-ending awe: The starry heavens above, and the moral law within." If I could paraphrase that without ruining poor old Kant, two things fill my heart with never-ending awe: the complexity of the total social system forever, and the self within. And no one is to stand up and say, "Look you've got to forget that self within. We've got other problems of pollution, poverty, so on on our hands." I mean they're not going to say that to me, I hope. Because that world is just as important. "But it isn't as immense as the starry heavens." Yes, it is. It's just as immense, just as awesome, just as compelling and so on. I think. Don't forget it.

In modern times it's phenomenology, Husserl, Heidegger. It's especially Charles Gustav Jung and the Jungians, for me. But there are many other writers writing on the same theme, namely the development of the self. In two essays on analytic psychology, Jung actually says that until you have gone through a process of individuation, which is his label for the understanding of the self, you will not be able to face the social problems. You will not be able to build your models and tell the world what to do. Now, I didn't check on whether Jay Forrester's self has developed, or Mike Maserovic's. And I don't mean to do that this afternoon. It's just a reflection I'm putting in. There is another world there, which is the world of the inner self, just as important. Is it really? Yes.

For the Christians in the room I'll cite Matthew 25. I'll tell you a little story why I'm citing it. I had some students who were down in Laguna Beach trying to help that community in its

desperate plight. It really isn't as a desperate plight as a community that's torn apart at its very foundations. Because some people… it's a lovely little town on the Pacific beach, south of L.A. Some people want to put up high-rise developments on the beach. Because, why not? it's one of the nicest beaches on that stretch. Other people see it the end of the old Laguna. The artists and so on will all be gone. And there'll be nothing but big shops, big hotels, and so on. And there are the hippies there, living off their pot and other things and painting pictures. And there are three rich man ghettos with walls around them. And you can only get into a rich man's ghetto if you have got a card in your hand. So, it's a city that's torn apart really.

And this group, my student and his, his crowd were trying to try to help the community pull together to some extent. I visited them one day. They had a little place in the center of town they called the Volunteer Post. Where people could drop in and talk about their problems. And even the police chief came in occasionally. That day they had a schizophrenic on their hands who was a very disturbed young man. And eventually he went out to get us some coffee. And they said to me, "You know what? We've been talking to that guy all day long." Here in their minds was this big city, relatively big city, Laguna Beach, being neglected because they were spending all of their time with one disturbed young man. So, then I got out Matthew 25 and in it, "It is the king of judgement day. And he says to those on his right hand, 'You fed me when I was hungry. You clothed me when I was naked…' and so on. And they say to him, `Lord, when did we do any of these things?' And the answer was, 'Even as you did it onto the least of these, my brother, you did it onto me.'" One case, one unique thing, is your salvation.

From that perspective of the unique individual, it is not counting up how many people on this side and how many on that side. All of the global systems things go out. There are no trade offs in this inner world. You don't trade off your evil by going out and doing some good someplace. Forgiveness happens. But, that's not a tradeoff. All of our concepts that work so well in the global world don't work. Other things are needed, I think, in the inner world. Essentially, a world that's ineffable for the English language. We have great trouble describing it very well. But it is there. It exists. And it's important.

Now I know the global philosopher's answer would be, how am I going to put the two together? How am I going to put the individuated person, individual, into the model? And, of course, the answer is you ain't going to do it. Well, what am I going to do? Are you telling me I have to pay attention to the unique individual or aren't you telling me that? And any way I don't know how to do it because I have to handle 300 years, and billions of people. And you're telling me that there's a unique individual. Tell me what to do. The philosopher is not going to tell you what to do. I warned you at the beginning, I wouldn't answer any questions. I'm not going to answer that one.

There was one figure in history, I think, that had a suggestion. That's Hegel. Who suggests in his writings that the mature individual is the individual who can hold conflicting world views, *Weltanschauung,* together at the same time, and act and live, and that his/her life is enriched by that, not weakened by it. So if you can think of that, that will be the end of my message

today. That's complexity, dear-hearts. That's really complexity. To be able to see the world globally, which you're going to have to do, as a big global picture, and see it as a world of unique individuals, a kingdom of ends. Each individual infinitely valuable in himself, not to be compared on any base that we normally use, any other individual, excepting through the key words, which will be my last historical figure, Paul.

The key words for that world are faith, hope, and love. With those in hand, was Paul's message, complexity can be handled. If those exist. If they don't, it can't be. Those come out of the inner self; don't try to define them. Please don't. And if you do, realize that you're ruining them. You can't define hope. It's not there in our today's society. Then for Paul, who was a systems man, he was worried about these little communities; the whole thing will fail.

The title of the talk was, "A Philosophy for Complexity" and what I've been trying to do is develop for you a kind of mode of questioning. Essentially using historical literature as the basis. In this case, this afternoon, questioning around this very interesting concept called complexity. Simply generating lots of questions, so that you can reflect on the issue better. Wherein is its reality? And what is our way of perceiving it? And how do we understand it? How do we understand complexity? And then what's the value of complexity?

[applause]

MODERATOR: We're open for questions. […]

[inaudible dialogue]

AUDIENCE 1: We are holding those different philosophies fine, but you didn't tell us how you act? That's my question.

CHURCHMAN: The question was, if you didn't hear it: Okay, Churchman, you said hold conflicting philosophies simultaneously and still live and act. And then the question was, how do I do that?

AUDIENCE 1: No, I didn't say how did anybody do it. I said 'How does Churchman do it?'

CHURCHMAN: How does Churchman do it? He comes to Portland State and gives talks on that subject.

[laughter]

And, there are of course, are two conflicting world views. Namely, forget it and the other is do it. Don't think that… Hegel didn't think… I don't think it's contradictory. I found that as I work with agencies and so on, it's very, very useful, when I'm working with them, to try to develop conflicting world views. It doesn't get me funded sometimes. I mean, once I tell them that the

Earth Resource Satellite is a spy in the sky. Then they say forget it, we'll fund somebody else. But that's how I'm acting in my life. I'm trying to live both worlds at the same time. And you can act in both worlds. How do you act in the world of the individual? Lots of ways. Love is one of them. You keep a journal. You keep a fantasy journal. At the same time, you keep another journal that's got in it some model building ideas. And you keep them on opposite pages. I had a friend who had a desk here and a desk there with a swivel chair between, each desk with a typewriter. Over here he'd be writing his political science papers. When he was feeling it get awfully tight, he'd swivel around to the other typewriter and tell them how he felt about it all. That's living both worlds. That's another way to do it.

MODERATOR: In the back. Yeah.

AUDIENCE 2: [off mic, inaudible]

[laughter]

CHURCHMAN: Well, I wrote a book one time on exactly that subject. So, you're welcome to look at it.

AUDIENCE 2: [inaudible}

[laughter]

CHURCHMAN: …probably more so than I am. But, I think the theory of experimental inference begins with a student t-test. And I said in it, in that particular activity, of these experimental scientists conducting a student t-test. I could see all of epistemology. So, it all came out, falling out. Now I didn't see it in the statistics literature. So, it was little old me trying to see all of the epistemological issues in something as simple as trying to find out whether treatment A is better than treatment B. It seemed to me the world epistemology came out of that question. So, the answer to you was at that stage, 1948, I saw no difference. I thought I could define epistemology out of a statistical problem. But I saw all the difference in the world as to what was going on at the American Statistical Association and the Institute of Mathematical Statistics, where they didn't discuss epistemology at all. Or my friends in the Psych department who were saying that you can't get your Ph.D. thesis unless the hypothesis is proved at the point oh five level. That's no epistemology. That's just authority.

[laughter]

AUDIENCE 2: Thanks, Professor Churchman. A second serious question I had. You mentioned that there's a lot wrong with the data and consequently let's say for the inventory problems you go to a guy who knows what's going around. But I remember from your book, The Inquiring Systems, you mentioned that subjectivism is a very big philosophy with strong implications. Now here's a serious question, not because I'm trying to point contradictions, but because I and one of my associates here, we're doing some work in Bayesian analysis and I would be thankful

to you if you could clarify that point. Because if I understood your speech correctly, your solution to the wrong data would be to seek Bayesian information.

CHURCHMAN: Of course, I do what I always do, generalize on these damn things. So, I'm not talking about Bayesian statistics in the technical sense. I'm talking about its basic mode of proceeding. Which is essentially to use judgement. Now later in the talk, I didn't mention probabilities. I mentioned opportunity costs. And I argue that there's only one way I know of to get a good opportunity cost. And that's use your best judgement. You can't use empirical data excepting as a partial source out there. But it isn't what you're after. The same thing applies to probabilities. I didn't use that as an example. So, my God, yes of course Bayesian. And we never did anything else in any OR project I was ever on. But make a big Bayesian guess. That's all of Bayes I was using. It's just the judgement factor.

AUDIENCE 2: [inaudible]

CHURCHMAN: Solipsism? …Well, I guess I think that Kant really had the right answer. And it's in The First Critique if you want to read it. It says that if I'm the only person in the world, there ain't any world including me. That's all. In other words, other minds have to exist for my mind to exist. Otherwise I'm never observed. If I'm not observed, I don't exist. So, that's all. Solipsism is a ridiculous philosophy. I think it only came out… Some Englishman got the notion that he knew himself. My God. Once he did that, then he could reflect, "Maybe I'm the only thing around." But I don't know myself. That's what I just got through saying.

AUDIENCE 2: Professor Churchman, you'll excuse me for my ignorance, but I'm not able to understand. I see a clear contradiction here. Would you personally subscribe to solipsism? Please excuse me for a leading question.

CHURCHMAN: Would I personally subscribe to it?

AUDIENCE 2: Yes.

CHURCHMAN: I don't see how I can. I didn't say when I said you have to alternative viewpoints, that you have to have ugly alternative viewpoints. [laughter] No, I think solipsism is a rather ugly suggestion. I don't want to pay any attention to it.

AUDIENCE 2: So how should we solve inventory problems then?

CHURCHMAN: How should. What? I'm missing it.

AUDIENCE 2: Well, I come back to what you said in the speech. In order to solve inventory problems, that being just one example. We have not to look for physical frequencies or physical data. But we have to go and ask a person what his subjective view is. Did I understand it correctly?

CHURCHMAN: You understood me correctly. And that's how we do it, in fact. I'm just saying if you do what the textbooks say, and go and dig out past records and do a histogram of past

demand, you're probably wrong. And your inventory analysis is bad. You oughtn't to do that without a lot of thinking before you do it. It's not a good idea.

AUDIENCE 2: Thank you, Professor Churchman.

AUDIENCE 3: … You said that cost is lost opportunity, okay. What's the benefit?

CHURCHMAN: Same thing.

AUDIENCE 3: Lost opportunity?

CHURCHMAN: Well, to calculate true benefit of a program of this kind, we're in the same act. Doesn't matter. I just picked cost as one of the… You still have to worry about what other possibilities there are. So, they come together in that reflection. Opportunity benefit, opportunity cost have the same characteristic. You need to know how the rest of the system is behaving in order to make those estimates. In other words, I don't like the way cost/benefit is being done in the Federal government today very much. Because, essentially it consists of trying to add together the increments, the dollar increments, that a given program will generate. And it's not really asking what's being sacrificed by having this program. So, you get sort of ridiculous answers, like the most important HEW program is seatbelts. And geriatrics is the most unimportant.

AUDIENCE 3: In the course of the lost opportunity, what's relevant? Is that the gained opportunity or what?

CHURCHMAN: In other words, all I'm saying is both for cost and benefit, we need a global scale. We have to have a global scale. And as we look at this program we have to worry about what its contribution is on that global scale compared to any other program. So, it will have… its measure of performance may be benefit minus cost. But they're the same epistemological problem as far as I can see. Maybe I'm missing something and you can tell me afterwards.

AUDIENCE 4: I've been sitting here trying to think about these, the world inside and the world outside. And as far as I can tell, there's only one image up there and it includes both. And I can't myself, draw a line through there and see it as two images. I could never sit with two typewriters. I would just have to have one. And I don't… Could you give me some examples or evidence for the line or the boundary between those two? I don't see that boundary.

CHURCHMAN: I mean, I'm not going to try to persuade you in one afternoon. I just suggest, if you haven't done it, some reading. And then, if at the end of that reading it seems to you you're still where you are… in some sense you're perfectly right. Because the thinking mind is capable of doing a lot of things. And one of the things it's most capable of doing is swallowing. So, of course it's going to swallow this inside world and say that's just another image, in my thinking. I can't help that, that's what happens. But if you want to read, I would read some Jung. I would read, for example, not necessarily Jung, but you might try James Hillman's Myth of Analysis. In it he's trying to really develop some aspects of the inner world. Which are quite

different. Incidentally it's called Myth of Analysis because the analysis is psychoanalysis. But it might just as well have been called "Myth of Systems Analysis." He's really arguing in that book that concepts of progress and so on are outer; he calls it Babylonia. Whereas the inner life there ain't no progress. It's just process of some kind, and so on. Well, you can read that. You can read Heidegger and Husserl if you can stand it. And read Jung's The Undiscovered Self. Those are all trying to look at inner. But, if after reading a few of them, you know, they begin to get dust on the... because you can't get back to them and so on. It's all right. You don't have to worry about that world for a while. […] And you'll know it's different when it does. I think. I don't know about that. That's simple-minded psychological answer. Isn't it, Don? It may never catch up to them.

AUDIENCE 5: I'm not sure if this is a question or a statement or what.

CHURCHMAN: Come up a little closer to that…

AUDIENCE 5: Yeah, okay. I hate to get so close that it echoes. I'm not sure if this is a question or statement. I happened to go up to listen to George Leonard last night at Lewis and Clark. He's an educator. He was co-founder of Esalen. I'm sure you are aware of that. And he lamented and criticized alienation from society, from complexity. He never used the word complexity. And I came out of that thinking, as I am recently, in terms of complexity, in terms of the kinds of things he's talking about, about different kids of alienation. Alienation from complexity or alienation from things you choose to be alienated from. Alienation from things you say, "Okay, I'm going to be alienated from that kind of destructive force." And I'm going to take that alienation, or take that agent and incorporate it in my world. [recording is damaged; briefly inaudible] ...you know I'm going to integrate the two of them. It is kind of a wavy line. But, I have a feeling there's a personal development track that's happening there in terms of integrating the concept of alienation and complexity. I'm not sure if you can…

CHURCHMAN: I mentioned it briefly. I think what your talking about, I didn't want to devote a lot of time to it this afternoon. I think it's probably coming anyway in the rest of the seminar, the alienation problem. I said that… I gave you sort of three choices. Complexity is bad because it's going to kill us, which is certainly an alienation. God knows. Or, complexity is bad because I'm afraid of it. Or, complexity is bad because I want to be afraid of it. And so on. In that case it's kind of good again. And so you get kind of a dialectic or dynamics going on that. And alienation seems to come out. Complexity is used as a way of projecting your own inner self out into the world and say it's really there. Because it's complicated. The world is messy, complicated with energy and bombs and all the rest of it. And I see that as kind of a psychological response to the complexity. It becomes a way of expressing our alienation. But I don't want to get… it's not really anything I'm more familiar with than that so... Maybe Don will have some…

AUDIENCE 6: Define or give your conceptions of global management, emphasizing the notion of management.

CHURCHMAN: Yeah, I didn't get into that because of the length of it. One of the things that… The question is what's my concept of global management… One of the things that's certainly missing in most of the books that are coming out on global modeling is who the hell's going to do anything about it. Which is the management problem. As a minimum, it seems to me you have to have a model, if you're going to be in the model frame, a model of world decision making. And if you want to change things, you're going to have to have some concept of how it's done and what you're going to do to change it. And there are awfully good reasons for being skeptical about any kind of response to what's coming out of the Club of Rome, for example, at this stage of the game. Just given the way decisions are made in our world. Or even given the way they are made in a company, for heaven's sakes. Or even given the way they're made at an academic institution. So awfully hard to get things changed even when it's perfectly obvious to almost everybody they ought to be changed. So, I think if… You know, I could devote another talk to these notions of implementation, is what we call it. You're talking about world management from the point of view of implementing some of the desirable things that seem to be there in the literature.

And from my experience with implementation, our big problem is that somehow or other, society segments itself into managerial groupings. And those groupings tend to harden. At least that's been my experience. And I was even able to duplicate that in a laboratory with students trying to do something. It didn't take them very long before they kind of formed a fairly hard group. And they kind of knew what the reality was. It was wrong, incidentally. I mean from the experimenter's point of view, it was wrong. I think that's a lot the way management is in reality. At least one *Weltanschauung*. Well, I think, you know I think, the question of how you're going to get these changes, if there is as a big a question, at least, as all the models for changing. It still doesn't detract from the Club of Rome effort at all, because that may be something you have to start doing. I mean, in operations research it was quite a while before anybody got interested in implementation at all. With the exception of a few characters like, crazy characters like myself. Most of them thought it wasn't even a part of a OR. I mean, OR is getting good sound models and recommendations. And if a manager doesn't do anything about it, it's his tough luck. Now the scene is changing and realizing a lot of the failure of OR is just because it didn't look at the management. It didn't understand it. It really means the coming together of a couple of literatures as I see it, at this stage, from the academic point of view. The literature on management, which is big, and the literature on model building. Somehow or other they've got to come together. If there's any power there at all.

AUDIENCE 6: Most of the examples you have taken have been from Western culture. How can that be reconciled to a worldwide problem? A worldwide matrix, not just a Western society matrix.

CHURCHMAN: Well, in the talk it was entirely Western citations, excepting for the allusion to Hindu philosophy. My favorite management book these days is a book called I Ching. Which is the Chinese Book of Changes. It's a simply ingenious, absolutely, incrediblys ingenious attempt

to do model building for wise decision making. It isn't a gimmick book at all. They had their own mathematical models as a base. And their own system of values. And the nice thing about I Ching is that we planners still haven't learned, is that when I go to the manager to give him my advice as a planner, I ought to bring along an image as well. A fire above water. Manager look, fire above water.

[laughter]

See. So that his mood is carried along as well as his intellect into the decision making. So, the answer to your question is I'm not alarmed at different cultures. I just get amazed at how many cultures, in how many cultures there was an ardent attempt to find a global model. The Aztecs, for example, had a confusing, but they had a global model. And it told them what to do at various times of the year, what kind of ceremonies to have. The Mayan people had a global model and so on. It's not the first time in history. As far as I can see all cultures get involved in trying to understand who they are and what their destiny in the world is.

AUDIENCE 7: I want only to make a very short supporting reference to your very cautious treatment of the concept of data. And I refer to G. Spencer-Brown in his little booklet "Laws of Form." He wants to make the distinction between data, these are the given ones, and the capta. These are the caught ones. And they said, in fact when we talk about data we really speak about capta. Because it is these which we catch with our perceptive apparatus. Leave out the things we do not see, or maybe do not want to see. The data are the logical forms. The capta are the things that these chairs are green. I just wanted to give, at least, a terminological support to your cautious treatment of data, which may be called capta henceforth. Thank you.

CHURCHMAN: You're so generous with your gifts, Hans. Thank you.

MODERATOR: Any other questions? I think we all owe a great debt to West for asking us to do something we are not often asked to do, in academia or outside, which is to think. This is probably the most important element in systems work, as well as in our holistic view of all of life. Now we will have an informal session in room 329, now. The next speech is at 3:15 back in the other room, next door in 338. And will have a coffee break in between. So, we'll see you 3:15 in 338.

[program ends]