

[Transcribed from <http://uk.youtube.com/watch?v=UdBiXbuD1h4&feature=related>]

See: take an automobile for example, which is a simple mechanical system that you are all familiar with. Why is the motor in front? Well, you probably know the reason; because it was originally called the horseless carriage: and, therefore the motor was put where the horse was, in front of the cart, right?

But do you think that somebody who didn't know that could find out by taking the automobile apart? Well, let's see. The automobile was originally a 6-passenger vehicle; why? Why wasn't it 5, 4, 15, 9? Why was it 6? Would taking it apart tell you? Of course not. How many of you have ever been to Britain; England? You know they drive on the wrong side of the road. Why? Do you think that taking British cars apart is going to tell you why they drive on the left and we drive on the right? Of course not.

What we began to understand is that "why" questions, about objects called "systems", cannot be answered by the use of analysis. Now answers to "why" questions are called explanations, and the product of explanations is understanding. And what we became aware of in the 1950s was: science produces no understanding, it produces knowledge; because the product of analysis is how things work: never why they work the way they do. We needed a new way of thinking to provide explanations and therefore understanding.

[Louder 1:48]

Explanations always lie outside the system; never inside. Analysis takes you into the system and how it works, and provides knowledge but not understanding. We need another way of thinking, which not surprisingly is called synthesis: it provides explanations of the behaviour of the system.

Synthetic thinking consists of 3 steps, which are exactly the opposite of analysis, each one.

In the first step of analysis you take whatever it is that you want to understand, and you take it apart; in the first step of synthesis you take the thing you want to understand, and say "what is this a part of?". You identify a containing whole, of which this is a part. So when I want to understand an automobile, I say it is part of the transportation system, first. If I want to understand a university - it's a part of the educational system. A corporation is a part of the economic system, and so on.

In the second step of analysis, I try to identify the properties and behaviour of the parts taken separately. In the second step of synthesis, I try to explain the behaviour of the containing whole: what's the educational system? What's the transportation system?

In the third step of synthesis [*analysis*], I try to aggregate understanding of the parts into an understanding of the whole; in the third step of synthetic thinking, I disaggregate the understanding of the containing whole by identifying a role or function of what I'm trying to explain in that whole.

[Softer 3:32]

The system as a whole (spelled with a w) is defined by its function in the larger system of which it's a part. Every system is contained in a larger system, and its role or function in that system is what defines it. So if you take the automobile, coming back to that again, it's defined by the fact it's an instrument for carrying people from one place to another, on the ground, under their control, and in privacy. So you describe the function: what it does, you don't describe how it does it. If you want to define a computer you don't talk about how it works, you talk about what it does: what functions it performs; data processing, calculation and so on.

All systems are part of larger systems. Every system then is defined by its part in a larger system. In order to perform that function, it requires essential parts: these are parts which are necessary for the performance of the function, but not sufficient. So for example: the motor is necessary for an automobile; it can't run without a motor. It doesn't need a windshield wiper to run; it doesn't

need a door handle; doesn't need a cigarette lighter, or rugs on the floor. But the motor, the battery, the fuel pump are all essential. Well, that means then, that an essential property of a system is that it cannot be divided into independent parts: that its properties derive out of the interaction of its parts, and not the actions of its parts taken separately.

Therefore, if we apply analysis to a system, what's the first thing you do: take it apart; but when you take it apart, what happens? It loses all its essential properties, and so do its parts.

You see if we brought an automobile in here (it's big enough to take one) and disassembled it and kept every part in this room we would not have an automobile - we'd have the parts of an automobile. A system is never the sum of its parts: it is the product of their interactions. So when I take a car apart it is no longer an automobile. But even more critical: the fact is a motor, which is necessary to move a car, when removed from a car, can't move anything, not even itself; it just sits there.

You cannot think without a brain; but if a surgeon removes your brain and puts it on a table, it doesn't sit there and think. It's necessary for your thinking: you think, the brain does not think. When separated from the system of which it is a part, it loses its essential function as an instrument for producing thought.

Now think of the implications of that simple property of a system to start with. You go to a business school to learn how to manage and organise activity. And you look at the course structure: what are the courses on? They are on the parts of a business taken separately: so you study Marketing as a separate subject, Production as a separate subject, Finance as a separate subject and so on.

The net result is at the end of the business school you have no understanding of what a business is; and not even an understanding of the parts. Because you can't study the motor of an automobile independently of the way it interacts with other parts. You can't study production independently of how it interacts with marketing, finance and personnel and so on.

But the way universities are structured these are silos of inquiry, where each one claims complete autonomy and independence of the others. To the extent that they succeed, they emasculate the subject: take all of the content out.