

Lecture by Christopher Alexander at Harvard, presented on 27 October 1982

Host: Good evening everyone. Welcome and good evening. It's a very special pleasure for me tonight to welcome Christopher Alexander. I do so both in my capacity in the GSD, but also at a personal level having shared a friendship with him for many years. In fact, he is the only colleague I could boast about that I shared a jail cell with having chatted about architecture in the heroic days of People's Park.

Christopher Alexander is Professor of Architecture at Berkeley. He is an alumnus of the GSD. Having received his degrees in architecture and in mathematics at Cambridge, he came to Harvard and in 1963 received the PhD in architecture. I believe it is the only PhD degree in architecture this school ever granted. The program was initiated the year he arrived and phased out when he left.

[Audience laughing]

Host: He was also a Harvard Fellow and I researched it today and discovered that only two architects became Harvard Fellows for the entire history of this institution. His PhD dissertation became his first book, *Notes on Synthesis of Form*.

I think Christopher Alexander throughout his professional life has always been at the cutting edge radically reexamining the conventional wisdom of the time.

When in the 1950s the formula of housing projects, the kind of preconceived solution to how people should live, was kind of taken for granted, he wrote together with Serge Chermayeff, who is with us tonight, *Community and Privacy* challenging that conventional wisdom. Then later when little attention to understanding the design process in architecture was given and while other

disciplines where exploring this issue intensively, the entire issue of human-making decision he wrote as I mentioned *Notes On The Synthesis of Form*.

In the 1970s, when we tended to take for granted large-scale bureaucracies and impersonalized institutions, he carried out *The Oregon Experiment* again challenging the conventional way and pointing out radical solutions. He continued to search for the underlying framework, the fundamental qualities that give place its wellbeing in the *Pattern Language* and *The Timeless Way of Building*. And as he continued doing all these things, he always defied stereotyping. As people tended to stereotype him as a person primarily interested in the theoretical aspects of architecture, he set up his own construction company and now both designs and builds within a single organization.

And within all that diversity of activity, there has been one unity that has underlined it all and that is his basic humanism and his concern and affection for people. So for the first time in 19 years since he left Harvard, I have the pleasure of welcoming Chris Alexander.

[Applause]

Christopher Alexander: Oh, I've got a very, very difficult task tonight. Can everybody hear me, because I can't tell, is this thing working at the back? Yes, okay.

[Audience laughing]

Christopher Alexander: For many years, I thought and wrote about things that one could very crudely call functional aspects of architecture. That is I tried in many different ways to see whether it was possible by defining all of the minutiae, the small things that are happening in buildings, the small things that need to happen, what's really going on gradually to build up the form of a building from those kinds of considerations.

And of course, I'm still absolutely rooted in that attitude, but I'm saying that as a preface because the things that I want to talk about tonight are not of that nature. And without making it very, very firmly clear, that absolute thoroughgoing, day-to-day minute functionalism is at the basis of everything I believe in, the rest of what I'm going to say tonight might easily be misunderstood.

Now what I want to talk about is a huge subject. I can't really do more, I'm going to give kind of a progress report tonight I think, because I understand that I have about an hour, I don't know if I'll be able to hold to that, I'll try.

Essentially, what's happened is that in the course of thinking these matters through further and further, during the last five years, I've come to the conclusion that in order to set our ideas about architecture straight, and in order to really establish a clear picture of what we're doing when we build, it's necessary to make changes in our cosmology. That means in our conception of how the physical universe is put together. I'm using those terms in quite an ordinary sense. I'm talking about really essentially what is generally considered to be the business of physics. We have a certain picture of what's going on in the universe, what kind of a place it is. Largely that picture has been defined by the broad class of activities we call science, and essentially the world picture that we have at the moment has been growing for about 300 years, really since the time of Descartes. And we have a certain way of looking at the material world, which generally speaking we believe is a certain kind of place, that is, we believe it is a certain kind of structure. And it's very rarely discussed, I believe, the extent to which our beliefs about that structure enter into what we do as architects or builders. And very simply in a nutshell I have come to the conclusion — as I'm sure many others have, but it's rarely discussed explicitly — that we cannot get straight about building, without changing the picture of the material universe that we have inherited from the last 300 years since the time of Descartes.

Now this is a pretty heavy topic, and it would be ridiculous for me to attempt to spell it all out in the course of an hour. So that's why I say I'm really just giving a progress report. I'm going to touch very, very lightly on certain issues in the hope that I could build up at least a feeling of what I'm trying to say here.

I just want to say one further thing about Descartes.

The genius of Descartes was quite simple. He made the observation, of course with others, but it was principally due to him, around about 1600, that if we look at the world and pretend that various little bits of it, some piece of it, were a mechanism, then we can figure out how it works. That doesn't mean that it *is* a mechanism, it just means that *if* you pretend that a certain phenomenon that you're interested in is behaving like a little machine, or like a little gadget, you can figure out what is

tripping what hammer which is pulling what wire and so on and so forth, and gradually you will begin to understand how nature works. And Descartes actually said in the early 17th Century that if we go on doing this for several hundred years, we will gradually build up a completely coherent picture of how the physical universe works. Which was amazing, for him to be able to predict that in a sense — but anyway. So this was his genius, that that simple idea created the whole of what we know as science.

Now this idea is all very...

[Audience laughing]

Christopher Alexander: My goodness.

[Audience laughing]

Christopher Alexander: I didn't know what I was saying was *that* heavy.

[Audience laughing]

Christopher Alexander: This idea is all very well, but it has one rather strange consequence. Can we [Laughs] have some stability in the light system? It's quite disconcerting.

The consequence is this. If you ask what kind of order can be understood by these means that have been available to science and that are generally aspired to by science, the kind of order that one can understand thoroughly is, if I put it very, very crudely and stupidly perhaps, is the order of a Coke machine. In other words, I'm saying when you have a Coke machine you put in a quarter, click, click, click, various things get tripped and so forth, finally out comes the Coke bottle.

Now the order of that machine, that is, the way in which one thing leads to another, this causes that, and the overall structure of that machine permits it to behave in the way that it does. That is, all of that kind of order is thoroughly available to us given the mental attitude that we've inherited from these 300 years.

There are other kinds of order that are *not* available to us as legitimate "things". A simple example would be a Mozart symphony. Although I suppose most people admire that symphony, recognize it to be something valuable, within the cosmology that we have inherited it does not have a legitimate structure. What I

mean by that is that one would have to dismiss that symphony. If one says why does it work or what is wonderful about it, one would have to give rather silly kinds of answers. Well, it creates certain kind of harmony in the cognitive structure of the person who is hearing it and that sort of thing, but actually the order of the symphony itself is not describable within the canon that we have inherited. So essentially, although even a physicist of course may be a great lover of Mozart, in terms of cosmology, — that is, in terms of the picture of the world that we have — the Mozart thing does not fit into it. It's not describable or it's not legitimate within the universe of kinds of structures that our picture of the world allows us to have.

In the physical world exactly the same is true, that is, those kinds of order or structure which have a clear functional orientation, that is, where a certain thing is made the way it is because it has to perform certain functions. Or those cases in nature where we believe that we can describe a certain structure in terms of the reasons that led to its making. All of that is like the Coke machine and that is the stuff which is done, has been done indescribably well over these last 300 years. But, if one wants to say: well, what is the order of a particularly beautiful Chinese vase, which has a very subtle harmony in it, of course we may all say well it's a lovely thing. But again, within the picture of the physical universe that we currently have, that order is not a real phenomenon, that is, it's not describable within the model of the universe that we have inherited.

This may sound like a small thing. It may sound like kind of an esoteric thing, but the point is all of us here as makers of buildings are actually concerned with this matter every single day. And what's happened is that because of the cosmology that is current and because of the kind of picture of the universe which we believe to be the correct one, we are literally able to see only one-half of the order phenomenon. That is, we're quite capable of seeing the order phenomenon as it is related to function, but what I have just characterized as pure order or the order of the thing is not actually a graspable matter for us. Of course, we might all have intuitions about it. In fact, most of us do naturally if we're concerned with making things, but it's not a fit subject for discourse. There are no real models of what kind of a thing it is. We can't make sense of it to ourselves as a matter of fact. And furthermore, I mean it's my belief that because of all of that being missing, people who make buildings today are in an acute, almost one might say agonizing state of discomfort because at some very deep level basically what you are doing doesn't

quite make sense. The functional part of it you can make sense of. You can say: look, this is solar energy. This is the heating system. We have to get enough daylight in here. This is how the circulation works. All of that's fine and you can get more subtle about that too, as some of my own past work has tried to show.

But since you don't have a clear mental picture of this other stuff, of the *order* of the thing, it's almost as though that is not a fit subject for discussion. And in fact of course we live in a period of architectural thought where, I suppose one could crudely call it, everybody is free to do his thing. In other words, one person's values are these values, another person's values are those values. One design instructor will lead you to believe that a certain kind of building is the right thing, another one that another is the right thing. One professional architect will make one kind of building, another one will make another. And this is all regarded as being essentially in the realm of personal preference or sometimes cultural idiosyncrasy. And the idea that one might actually be talking about something substantial is really ruled out. In fact, it's even considered — I don't know if that's true in this particular school — but in most places that I know it's considered slightly obscene to propose that these matters might be of an objective sort, because it appears to be an infringement of each person's sacred personal individuality. And as a result, the whole vast area of order itself is essentially ruled out from our discussion.

When I said that in order to get straight about this and in order to try to get clear pictures of what I'm talking about, it will be necessary to revise one's picture of the physical universe. Of course, I'm not saying that anything about the physics, biology, chemistry, and so forth that we have built up is in itself wrong. I think most of those things are miraculous achievements, incredibly wonderful really that we have broken through so many barriers there. But, there are assumptions involved, which have carried forward that mechanism idea of Descartes, which actually force us to be blind to this phenomenon. I mean in fact the idiosyncratic nature of value is one of the things that comes with the 20th Century view of science. That is, it's not merely said that value is something that science will not deal with. But it's kind of explicitly become a dogma that it must be an individualistic, sometimes culturally relative thing which *cannot* be talked about in a coherent fashion, because that is actually needed to prop up the mechanistic notion of science that is being carried forward.

Now that's a very, very difficult subject and I don't think I can go into detail about it. But the point is that there is a real connection there and so the things which I am going to try to talk about tonight are very, very hairy in the sense that they will and do meet tremendous resistance because when one understands them thoroughly and when one begins to delve into the kind of truths that I'm going to sketch out, very, very hair-raising paradigm conflicts come into play, and the one thing is just not compatible with the other.

Oh, and I should say very quickly that of course the actual consequences of the kind of thoughts I'm expressing for design, that is, the physical nature and appearance of buildings that can be made or would be made within the world view which I'm going to try to sketch out, I mean they are quite different physically from the buildings that we are in the habit of building right now. So this is not idle talk. I mean this is not merely some nice intellectual thing. If what I am talking about turns out to be correct, it will radically alter the physical shape of buildings as we know them.

One little extra thing that I wanted to say which is kind of a cameo of the same idea but it catches it in a quite simple way. You know the famous Adolf Loos, my countryman, made his "ornament as a crime" statement about 80 years ago, and the role of ornament in building in these decades is highly peculiar. It's not comfortable. Many architects feel quite uncomfortable dealing with it at all. Now there's some sort of a movement which is beginning to deal with ornament but somehow in a very, very funny awkward way which has peculiar emotional overtones and sometimes almost a touch of nastiness.

And anyway, the point is that if I put ornament in one hand and function in the other, and you say to yourself well suppose let's try and make a building that has both these things in it. Or let's try and address both the kinds of issues that are involved. You're in a terrible bind, and deep down in your mind, because the two issues will be done for two entirely different reasons. In other words, if you do functional things you know that you're doing them for common sense reasons. You want to make this passage wide enough so that it's just pleasant to walk down and not too expensive. You want to make that window so that it brings the light in just the right way. That's one kind of argument, which makes sense to us. It's actually pretty straightforward and one can think about it very well.

Now if you ask yourself why am I making ornament, it doesn't go down to the same root, that is, whatever reason there is for doing it doesn't come from the same place. I mean of course one can construct something about that it's a psychological need comparable to the other needs. But that really doesn't cut the mustard. I mean the fact is that if you do let's say formal things with a building (I'll stop calling it ornament for a moment), whatever your reasons are for doing that don't come from the same universe of discourse as your reasons for doing functional things. And that fact — very uncomfortable I think to a person who thinks seriously about these matters — comes from the same split or the same picture of the universe that I was describing a moment ago. So that one, a very, very simple way of formulating the problem that I want to explain tonight is to say, what would it be like to live in a mental world as an architect or as a builder where one's reasons for making something functionally and one's reasons for making something a certain shape or in a certain ornamental way are actually coming from precisely the same place in you. Precisely the same place. And we don't have a picture within which that is actually possible.

I'm going to suggest, well again just really sketching out a progress report. I have come to the conclusion for reasons that I'll only very partially be able to explain tonight, that actually the order of space is prior to the issue of function. That is in other words although functional issues are overwhelmingly important, the root matter has to do with order in space, and that there are ways of getting hold of that issue which are so deep that they cover the functional issues, that they turn out to be more fundamental and in fact they have the ornamental stuff and the formal stuff as byproducts of them. That's what I'm really getting at tonight, is the existence of a level of thought or a level of reality where order and space is such a deep phenomenon that it's capable of generating all our activities as architects or as builders and that function, ornament, and what have you will all come into play as byproducts of that level of observation and thought.

I'm going to show a few pictures now. These are examples from various different fields, I mean from various different kinds of artifacts of things which possess deep structure. And I want to show them simply because I would like to draw attention to the fact, first of all, that we are not making things like that at the moment and secondly, that there is a kind of structure that one can perceive in these things which is somehow common to all of them. Now that part is going to be very, very

hard for me to communicate really. I'm just going to whiz through a few slides and I'm going to ask you to pay attention to the possibility that somehow the same kind of structure is visible in all of them.

That structure by the way, this structure that I want to talk about is not very obscure. I mean I can easily put a name on it. I can call it wholeness if you want. We can call it many things. It's quite difficult to name it very well, but anyway, I'll just call it wholeness for the time being and I'm going to show some examples of physical things that have this deep kind of wholeness in them and then we'll just talk a little bit about what sort of structure they have.

So, Susan could I, yeah let's see. Okay, we'll just go through these. Where do I have control of this stuff? Is it the left hand one of these buttons? Okay.

I'm going to show these pictures without comment I think. This happens to be a Tantric painting.

Nothing happened. Did I press the right thing? Oh, I went backwards probably. Hold on. Okay.

This is a very famous tea bowl that was made in Korea.

Oh, wait a minute. Excuse me. Can I, could I just have the lights on again for a second? I forgot I wanted to say one thing about these. [Laughs] I think I better say this before I show the pictures.

There's a rather peculiar kind of test that one can apply to these, you know we live in a world so confused, and with so many different styles and attitudes and all of that, that somebody might easily on seeing a set of pictures — somebody could say, well what's so great about those, or anyway. Or you happen to like those and I happen to like these, and all that stuff. So I want to just mention an empirical criterion which happens to correlate with some of the artifacts that I've picked out here. This is a peculiar criterion.

If you like, it's a criterion of wholeness but it is intended to transcend personal likes and dislikes, attitudes, trips, and so forth.

What this test says is the following: If you are comparing a couple of objects — I mean they might be two buildings, they might be two doorknobs, two windows — ask yourself which one of them you would be more willing to take as a picture of

your own deepest self. Now again, I'm just going to say a word more about that. Of course, it's a peculiar kind of a question. It doesn't make a whole lot of sense on the face of it. But if I just say well, anyway, even though it doesn't make too much sense, just please do it. You can do it with very, very simple objects. I mean you can do it with a ketchup bottle and a saltshaker sitting on a table in the cafeteria. And you simply say okay, fine, which of these two objects, if I have to pick one of them as being a picture of my true self, which one will I pick?

And when I say a picture of myself, I mean *all* of you. I mean your bad parts and your good parts. The past and the present. The funny side of you and the horrendous side of you. The whole thing. And one of these two is supposed to be a better picture of that whole thing than the other one. And then please pick one. Now the empirical fact, which is rather remarkable, is that to an overwhelming degree people agree about the answer to that question. That is why it is capable of cutting through issues about I like this, I'm a fan of Mies van der Rohe, I'm this and that and so forth. All of that is irrelevant because if you ask this question truly the agreement is extremely strong and it also is cross-cultural, surprisingly. It's very surprising that the agreement is high even within a culture, it's even more surprising that the agreement is high cross culturally, but that is so. So that already tells us that we're dealing with a phenomenon, a very profound phenomenon, deeply rooted in human nature. Whether it's rooted in anything outside human nature, we'll discuss in a minute.

But anyway, the pictures that I'm going to show you now, these few pictures, are things which come very, very far in terms of being that kind of thing. That is, they, if put side-by-side with other things, will tend to almost, I mean immensely often turn out to be the better picture of your whole self. Let me just go back now to showing some of these pictures.

Can I have the lights please? Do I control the lights too? No, okay.

All of these examples that I'm showing are essentially from traditional or historical society.

Is that in focus? I can't even tell.

This is a *North African tile work*.

Part of a small *Romanesque church in Switzerland*.

It is a *brick tower in Afghanistan*.

This is the *Alaeddin Mosque in Konya, Turkey*.

This is a *Turkish prayer rug*. I'm very fond of ancient carpets. I've learned an immense amount from them about this kind of structure that I'm speaking about.

The inside of a *Persian bowl*. I think from the 9th Century.

Shaker cabinet, chest of drawers.

It is an *illuminated manuscript*. I don't know when it was made. Probably about the 10th Century in Ireland or somewhere.

Japanese tea stand. That's a tiny thing. Just a few inches across. I think that's the last one in that series. Yep, okay.

Of course it's very easy to recognize that these are all wonderful things and each one of them a great work in its own way. Kind of peculiar that we don't know how to do this now. And it's an unusual period of history where we have not been able to take our place in this thousands-of-years-long sequence of human creation, because I think I can say rather categorically that the objects that we are making at the moment do not have this structure. In order to just drum that point home, I'm going to show a few more pictures like this side-by-side with comparable — these are all examples of buildings now — but side-by-side with examples of contemporary building. Again, I mean it's far too short of time to really argue the point. But anyway, I will state categorically that the works of our time simply do not belong to that family of things that I've just shown, in the sense of penetrating deep into the human person in the sense that I tried to describe.

Are you all set up with the split slides? Okay. Can we have the lights please? Now if you can, can you operate the left projector until the first slide comes up there?
Okay.

This is a small part of a *garden in Nara, Japan*. This is *Barragán's Towers in Mexico*.

Now I am making the statement in each case what I'll show that the structure that I'm talking about exists in the left-hand object and does not exist in the right-hand object, no matter how much this object may be revered in our immediate decade.

That is *Tunga City Hall* and over on the left a part of *the cathedral complex in Pisa*.

If in case you find yourself in any sort of doubt and you're wondering whether I'm just showing, whether I'm just romantically showing nice old things on the left and 20th Century things on the right, and I'm just on some kind of historical kick, please ask yourself this question that I mentioned. That is, to what extent would you be willing to take that as a picture of your own truest self and to what extent would you be willing to take this as a picture of your own truest self? And please ask yourself that question with each pair of slides, and I think you'll get my point very, very fast.

That is one of the *Temples at Paestum* and this is *a construction by Robert Stern*.

[Audience laughing]

Christopher Alexander: I believe based on a Doric column. I'm not sure it's the right way up, I think it is.

[Audience laughing]

Christopher Alexander: That's an ordinary *house somewhere in Cumberland in England*, I think, and this is *one of Gwathmey's houses*.

That is the *Great Mosque in Isfahan* on the left and this is the *Salk Institute*.

The *Boboli Garden* on the left and the *Piazza d'Italia* on the right.

This one I think the right-hand thing, the *Ford Foundation Building*, is actually of all of these slides probably the most pleasant in the sense that one could say well actually that's rather nice place. It's quite okay there, why are you putting that up there? But again, I want to draw attention to the fact that my intent here is not merely the question about whether it's pleasant and is it quite a habitable space and so forth. My intent is, can you address what you see there and say is that a picture of myself, and can you do it with the object on the left?

Which is a *Romanian farmhouse*.

This is an interesting case, this is *Kresge College in Santa Cruz* on the right here, and I'm showing it because what they would have us believe is that this is sort of like that. But it isn't.

Another case, rather similar, I think Palladio's building here is actually not, does not score particularly high on the dimension that I'm mentioning. I mean it's alright, but it certainly scores one helluva a lot higher than this, which I believe is intended to resemble Palladio's work in some fashion.

This is another one of Barragán's works on the right called amazingly, the *Fountain of the Lovers*, and the other building, the other thing is the *Rialto Bridge in Venice*.

That's one of *Mies's early buildings in Detroit* and actually I don't know about the date, I'm not quite sure, and that is one of *the monasteries in Mount Athos in Greece*.

Okay, I think we've gone far enough with all that. Now these two cases, both do have this structure, and I put them up here just because I want to talk about them for a moment. This is *the plan of the Alhambra* and this is *a plan of one of the great masonry barns in Europe*. And, actually I think I'll switch those off and just talk for a moment and then we perhaps just switch them on again.

My point, and I want to be really clear about this, because if I'm not clear about this point then this whole lecture is going to just go up in smoke. I mean, please believe after all of these years of intellectual effort which I have exercised, much of it public, that I am just not kind of romantically just showing nice pictures here and claiming something about it. The point is that there are certain deep structures, which are present in the stuff that I've been putting over on the left, and these deep structures are just not present in the stuff that I've been putting up on the right. Now of course it remains to be discussed and argued whether these deep structures are important or not, but I think even just from going through the series of pictures, if you turn your mind in that direction you can see that there is a structural issue involved.

Of course the next question is, can we say anything about what these structures are? Can we be explicit about it at all? And the answer to that is yes, I believe we can. Again, time is too short here for me to do an adequate job of explaining this, but after thinking carefully about this for a number of years, I've been able to identify somewhere around about a dozen, something between a dozen and 15 different structural properties that repeatedly exist in all the kinds of objects that I've shown on the left. And they happen to be largely or almost entirely missing, of

course not always totally missing, but largely missing in the kind of objects on the right, which I'm just using what's on the right here as a sort of a quick cartoon way of saying "our own time", and that is the stuff we are in the habit of building or designing.

These structural features are not very obscure. They include — I'll just give a couple of examples very, very quick ones. One of them is that whenever there is an entity it (I should say this cautiously, this is statistical, I mean not whenever but much of the time), when there's an entity it will be surrounded by a boundary that is large compared with the size of the entity which it bounds. Let me give an example, I used to give a series of examples of that. For instance, I'm just going to give ordinary functional examples from architecture now. Let's say a courtyard which is bounded by an arcade that is a deepish structure roughly compared with the size of the courtyard. A window which is bounded by a frame, very, very substantially forms a transition between the wall in which the window is set and the actual sash of the window or the glass frame. Those kinds of things are...

Could you just put up the two slides that are in the projector right now?

You see it in the Alhambra quite repeatedly in the plan. I mean for instance if you look at the great tower up there, at the top of the drawing, you see the immense walls and the very, very deeply set window niches in it. That thing is a boundary to that space in precisely that way. Or if you look at the sequence of small rooms that surround each of these two great courtyards — well, in this particular one, there are arcades, in that one, there aren't. But even behind the arcades, there are rooms, a whole structure of rooms which function as a boundary to that courtyard in the way that I'm meaning.

The phenomenon, the only thing that's interesting about these properties, because as I say they're rather simple and obvious, in order to understand the property, you have to understand that they are happening at every scale. They're not just happening once for instance, at the scale I just described them. I mean they are happening to the bricks. They're happening to the roof tiles. They're happening to the edge of the roof. They're happening to the doorknobs. They're happening to the window sills. They're happening to the pieces of whatever tile that the floor is made out of. Everywhere you look, the structures that exist have boundaries following the kind of rule that I've just said. You can see just from thinking about

that for a moment, that that one simple rule suddenly generates a colossal amount of structure.

In these particular cases you might say well, the structure is there for functional reasons. Certainly, when I say it's an arcade surrounding a courtyard, that's kind of like that. This phenomenon though has nothing to do with function especially. It does occur repeatedly in functional contexts. I mean another example — let's just switch to biology for a moment — a cell has a very, very thick cell wall physically in dimension. The reason is that an enormous amount of chemical interactions are going on between the cell and the fluid that the cell is working in, and these interactions take a terrific amount of space, which needs the volume of that very, very fat boundary as a structure in order to allow it to happen. There are many, many functional examples like that. Obviously, let's say any river has at its edge a zone, well there are a series of zones. I mean there is a zone for instance where the viscosity of the water and the turbulent flow start to change. So you have a kind of boundary layer in the water itself and then the riverbank, ecologically speaking, has a series of zones and the whole of that constitutes a very, very fat boundary to the main stream of the river.

So the kind of thing that I'm talking about does occur repeatedly both in architecture and in nature, but the point is that it also occurs in structures that have no apparent connection with function whatsoever. I don't know if you can remember back in the first series of pictures I showed for instance in the Tantric painting that I showed at the very beginning. I think it's too hard to go back to it, but anyway, those simple rectangles remember, the three simple rectangles, were surrounded by a series of lines that formed enormously complex boundary layers. Or in the picture of a carpet that I showed, the prayer rug, again I mean boundaries are just repeatedly present, not only the main boundary of the carpet itself, but at every level of structure there are these complex imbricated boundaries.

Okay, so there are about a dozen of those kinds of properties. Another one, I'll just mention very briefly, not the same, is a thing that I call alternating repetition, which is different from just simple repetition. We're very familiar with simple repetition. It occurs all the time, especially in industrially made buildings. Alternating repetition, one might describe as two sets of repetition alternating with

each other, so that not just the thing is repeating, but the space between the thing is repeating, or some other structure is repeating interlocked with the first.

For instance, there's a simple example of it here in this, in the outside wall of this barn where you see the windows and the buttresses alternating in that way. So you've got two kinds of repetition that are alternating and interlocking with each other. It's not a particularly good example, but I have it up there for the moment anyway, so. Again, it turns out that that alternating repetition is a highly pervasive phenomenon. It exists throughout these kinds of structures. Now remember please that the things that I'm mentioning, I have essentially if you want to call it catalogued them or identified them, largely by studying structures of the type that I showed in the first set of slides that seem to have very, very deep qualities of this mirror of the self type.

Now we're entering into somewhat heavier water. I'm asking you to go along with me and assume that what I'm saying is true, and of course you won't, can't ultimately assume it, but just for the sake of argument. If we find that there's a class of structures with a relatively small number of properties that appear when those properties congregate, they appear to have this very, very deep unity or anyway the thing that I've so far called, they allow you to say yes this is a very good picture of my deepest self. But if the phenomena in question crop up not merely in works of art where one might expect a direct connection with the human self, but if they also crop up for apparently quite functional reasons, like the ones that I've given in the case of the courtyard, the arcade, and so on and so forth, or if they also occur in natural systems like the cell and the river, then you suddenly don't quite know how to categorize this phenomenon.

In other words, the order that I'm describing, if you think about it long enough, will suddenly appear to exist in a realm that is not very accessible to description. I mean that is, you say to yourself, well, why should these structural properties and why should this particular kind of structure recur under these circumstances or what is it that is profound about this kind of structure? And actually, we don't have really good answers to this. It appears to be both out in the world and also here inside the human self. When I said that some of the conclusions that need to be drawn from all of this, will make it necessary to challenge or revise our pictures of

what's going on in the physical universe, this is certainly one of the ways in which we are currently quite trapped.

I mean the idea that a phenomenon could be objective, that is, could be objectively true as a structural fact about things out there, but could at the same time have some kind of connection with the inner self of the human soul, is a very, very peculiar kind of situation. I don't mean it's actually peculiar, I just mean it's peculiar within the model or within the worldview that we currently have. It's actually prohibited, if you want to put it quite boldly. In other words, it's not an acceptable concept.

So this is hairy water. I believe that it's true. But you can see anyway that we are getting into very, very deep water. Of course, when one discovers 12, 15 properties of a certain sort which are structural properties that appear to characterize a class of structures, then you say to yourself, well what is going on? What are these properties? I mean where do they come from? What's the meaning of them?

And quite simply, the conclusion that I've come to (I don't know if it's the right way to explain it), is that they are essentially the different ways in which space can be glued together to become whole. In other words, space is not a neutral medium. See again, what we've been taught by physics is that space is essentially a neutral medium, of course value doesn't enter into physics, and so forth. But suppose that it is the case that space in an absolute sense can be either more whole or less whole, and that there are certain kinds of structural features that can appear in space which have the capacity to bring harmony or wholeness into the space, that is, to glue the space together. Then what you have is when structures have these kinds of properties, you can get a progressively more and more profound gluing together and that that's the thing that we recognize in these great works that we've just been looking at a few examples.

But then it suddenly becomes an entirely different matter. I mean this now, if what I'm saying is even approaching the truth, this is an entirely different matter from simply saying: "well you know this is, I mean here's some nice historical examples, we're just doing our thing because this is the 20th Century now and we can't be bothered with this stuff like that, or anyway, it's impossible. I mean we can't make things like that anymore." All of that would suddenly become totally unacceptable if what I have just said were true. Because if it's true that space has the capacity to

be more whole or less whole, and there are real structural properties that have the capacity to glue it together more or less, both in a functional sense *and* in a deep sense. I mean then of course in some way one would start to confront a kind of moral imperative that that is what we're supposed to be doing when we make something: to glue space together like that.

Please remember what I said at the beginning. I'm not discussing functional issues tonight hardly at all, because I, well anyway, there just isn't time. I'm sketching over this thing so fast as it is, but please understand I'm not talking about this in a formal sense. It includes the formal things, but it also includes all the functional things. But it's simply that within the framework I'm talking about there's a way of looking at the functional things where you see them as gluing space together as well. They're not outside stuff where you do all these functional things or you meet all these goals, and therefore you produce this kind of form. Your main purpose is in this gluing together of space and if you succeed in it and if you understand it correctly, all of the functional issues fall into place correctly.

So that of course also excludes completely any attempt to do pure formalism and so forth, which is something we're unfortunately very familiar with in these decades.

Now, suppose you want to do something about all of this. Of course, another very important question that you ask is, well how do you produce something which has this unity of space or this kind of wholeness or this glued together quality? How do you actually go about making something like that?

It turns out that the kinds of things that you have to do in order to make something like that are not like the kinds of things that are permitted in present day professional architecture. I mean it's as bold as that. It's quite simple.

For example, when you're making a building there's a very, very subtle process of fine tuning that is going on constantly throughout the making of the building, and there is no way of accomplishing that subtle fine tuning by making a set of drawings and then whizzing them down the street to the contractor, because he's not going to do that. And if you're not doing it, no one's going to do it and the thing that you've handed over in the form of a set of drawings is basically a lifeless object. It cannot have this structure in it.

I'm saying, again I'm skating so fast and I'm sorry not to be able to go into this in more detail, but anyway when you examine it closely it turns out that you simply cannot produce these structures in that way. It takes enormous concentration, constant attention, and you do actually have to make the thing. This is one of the reasons why several years ago I became a general contractor, because I realized that there was absolutely no way to get anywhere close to this by functioning in the normal framework of professional architecture. And that's been a very, I mean I'm sort of making a quick transition now into just practical things...