Now, we have a very rudimentary picture of what environmental structure means, what we have to talk about now i before we really start off on any serious infestigations is how this structure comes into being and how it is maintained. I'd just like to start with a slight decression about structures. It's more and more the taste if you like in the scientific community not to talk about structures in a static sense but if confronted an object with structure to say what processeses generate this structure and maintain it. In a way the maintenance is almost more important thatn the generation because unless a structure is being continuously repaired in such a way that it maintains its organisation generating it in the first place in kind of uninteresting and the structures which are merely generated by a process and then not maintained are what we think of as the dead structures. Living things even if the simpliest possible sense always have kxx what we might call rules of repair or maintenance prosesses to keep the structure going. There are lots of examples of this - some of them very simple. I suppose the simpliest example of all if just the flatness of a water surface in a dish of water. Of course you could ask how did it get to be flat. But what's more interesting if the fact that there are implicit processes there and the moment that that water begings to get off of flat those processes bring it back to being flat again.

Almost all systems of any interest can be viewed in this kind of way. So one's asking about the stabilizing processes. You can talk about stars this way, you can offices this way. I gave an example in an article about the sand waves, you know in sand dunes you have thése --- anyway you know you have these very beautiful patterns of sand ripples in dunes or on the dry part of the beach, I'm not talking about the part where the water is, and that's an example of this, a very very graphic kind of example. They may look stationary if your there on a calm day but in fact it kxxx turns oft that theres a series of processes which given together generate this pattern and maintain it. For example, for a particulat

wind velocity the wind will pick up sand grains and jump them a characteristic

distance, and that distance turns into the crest to crest distance on this pattern.

It's also the case in cross-section these things look like that and when the wind

is coming this way, the wind will pick up far more of them from this part here and

jump them and deposit them this far. So you get this kind of lumpy effect. Now

actually these waves are not perfectly static. In other words, they may shift

slightly over time but in general the structure of that situation is maintain

by these processes. So this is all of a digression but if we're going to talk

about structures of the environment we do have to understand it in a comprobable

kind of way. Now, what I'm going to try to communicate to you this morning is

perhaps the first controversial thing that I've said. I mean - and it will be just

a little hard to get it across clearly I think.

If we ask what are the processes that generate that spatial relational

structure that I described last time, it will be possible to give it a number of

different kinds of answers. You could give an answer for instance in purely functional

terms, we already agreed that each of the patterns we were interested in would be

a recurrent pattern and would be a functional pattern, so that in some sense you

could say that the function or the need actually generated the pattern. In that

sense you could say that the desire for a supermarket given a certain kind of

distribution of population that is the need, generates the fact that that super-

market will locate in such a way as to serve its population. And you could do

that for anyone of these patterns that we're talking about. You could say that

if you take x the characteristic use of i-beams in steel construction, and ask

why are those i-beams used and why this particular size of i-beam used. Again,

you could say it's the fact that you have to carry that much load, the need to

support load, which generates the presence of that pattern in that situation. That

would be one approach. I believe that this is quite wrong. Even though it may

be appealing. Now there's a second kind of approach which says that a lot of the

patterns which appear in the environment as there as a result of what one might
call rules and cultural regulations. Some of these them in legal form, some of
them insentive, organised kinds of processes. I'll give examples in a moment.
And that these processes generate patterns that is perhaps the closest analogy
to the physical sorts of k examples like the sand ripples. I'll give an example
quickly. In applying for urban renewal aid from the federal government, the
developer has to include in his application a land use map of the area which he
intends to develop. Now, its a fact about drawing maps that its much easier to
draw blobs, large blobs of functional use rather than to try and explain any more
intregate kind of interconnection interconnection kind of functions. So as a
result the developer submits a map which has very, very clearly articulated parcels
of land use on it such as recreation, office buildings, terrace kk housing, I mean
individual houses, what ever it may be and the result of these process which
sometimes takes place actually years before the design is done, is the fact
that in the finished object x you have these very, very grose articulation of
land use that a pattern - a characteristic pattern is produced - namely that you
do not for instance get substantial mixes of residential and office use. Because
this is very hard to put on a map, hard to apply for urban renewal money, and there
fore it doesn't occur. Now that is an example of a kind of blind process. One
might take the view that there are these processes which are almost blind that
are guiding the creation of patterns. I will give a number of other examples like
that but before I do it I want to make a xx point that I beleive that this is xxx
also an incorrect view of the way in which environmental structure gets generated
and maintained.

The third view is that environmental structure gets generated and maintained
by images literally by pictures which people have in their heads. Culture-born images
of spatial patterns. Now, this is as I said a somewhat controversal view because

certain the people who have been hard-nosed about these questions so far, the

theorists in the planning field, havetaken the point of view that it is processes

that generate the environment in the second sense that I just gave and have

been able to show by constructing models which let these processes go that in

a sort of blind sense that these processes do generate patterns and one can really

account for the pattern formation in the environment. I believe strongly in the

point of view which I am going to present now and I think it's one that needs

a lot of argument. Now, my view concides very much with a view that's been

expressed in a different field by Gombrick. If you want to read this in a book

called "Art and Illusion" somewhere around the middle of the book Gombrick dis-

cusses at length the way in which realistic drawings are made. Now here again

I'm going into a degression, but it has the same character as the main point that

I'm trying to make. There has been in the theory of drawing at any rate, among

artists and among people who are interested in making drawings and paintings, the

idea that it is possible to draw realistically and in drawing realistically what

you do is to draw from reality, that is you go and sit in front of a tree and you

try to put down what you see, that is the sort of - in a lose way - the idea of

realistic drawing which is current.

Now, Gombrick showed very conclusively that this is not what happens.

What happens is that the person making the drawing, makes use of all kinds of

schemes of schmatic, x that he already has xxkindxofxxxxgxxx available to him in

his own mind and in his hands for that matter and he trys to put these preexisting

schemata together to form a drawing x which matches what he sees. Now this is

a very different kind of process from the first kind. And my argument this morning

is similar to it. It may be the case that urban renewal legislation has an effect,

a xk sort of driving force which creates patterns in one sense, but it is more true

to say that everyone of the patterns which gets created in the environment, gets
created there because some body, perhaps and usually many people had a picture of
the thing which was to be created and then created the thing according to the
image of the scheme that they had in their heads. Now in some cases this is very
obvious. Let's discuss cases first of all cases where it is quite clear. For
instance, The most obvious case of it comes about in the use of handbooks. Architects
planners and engineers make a much much more extensive use of handbooks than the
design school acknowledges. If you consulted a manual like the community builders
handbook which all track developers have on their shelve. You find almost complete
schemes given for the width of roads the treatment of planting the layout of houses
with respect to roads, the position of lights, the grading of the site, the provision
of community facilities. Everyone of these matters is actually dealt with by means
of physical diagrams which are used by the people who develop land. Another obvious
example is time safer standards. Time safer standards contains a fantastic wealth
of actual patterns which in 90% of the architectural offices are used almost literally
just straight out of that book and imbedded in what ever design is being made.

Most fields in the environmental sphere have manuals of these this kind which
they rely on very very heavily. The highway engineers make use of two manuals known
as the Asher manuals. And these manuals one of them deals with highways, the other
with urban highways, and these manuals between them contain just about the enixx
entire physical specification of highways as we now know them so that when a highway
engineer lays out a street pattern or a highway he is really drawing on these patterns
and simply putting them together. He is not designing in the sense that one is taught
to design in school.

Now a slightly less obvious example of the use of preformed schemata in
design occurs in cases like gas station layouts, supermarket layouts, motel layouts,
drive in layouts in occasional instances the companies responsible for

producing changes of buildings of this type, do actually produce little manuals

for their own company to work from. Some of the gas companies do this. The

manuals are rather hard to get hold of. Some of them don't but the fact is that

there are a tremondous number of quite specific images available to these designers

and they draw on these images when they put together a building, they don't design

it from scratch. You take the xkx case of the supermarket for instance there are

very, very few supermarkets that don't have glass doors in the front leading to

the parking lot, that don't have the check out stands arranged in a line, and that

that line of checkout stands is near the front; that don't havexixixxx aisles

running back from the line of checkout stands - so the line is like this and the

aisles are like that - that don't have characteristic cross-section for the shelving

in these aisles - the important characteristic being that the shelves at the bottom

are slightly wider than the shelves at the top so that the food that is put down

at the bottom is fairly easy to see and get a hold of. That don't have characteristicx

position for various kinds of goods - like xxxxx meats and butter and milk - on the

one hand they tend to be near the back of the store because those are the things

that the customer absolutely has to get and he's not likely to be lead into buying;

on the other hand things like cigaretts and razor blades are invariable at the

check out stand x for the opposite reason. So, now, these images of xxxx schemes

are or might - the best way to think of them is their shared culture-born images.

And if an architect or anybody else gets pulled into design a supermarket he works

with those patterns. He may think he's doing more than that but he's not. So here

again we have an instance slightly less obvious than its actually written down and

drawn in time safer standards where preformed patterns are in fact the generators

of what is built. Now of course I'm not trying to exclude the two other sorts of

mgenerating processes that I described earlier. It is true to say that everyone

of those patterns is itself based on some kind of needs and it is also very likely

true to say that there are intermediate processes responsibile for making sure

that these patterns get implimented every time.

But underlying the whole thing there is this body, this stock of patterns

in the heads of the people who make the environment and that is where the environment

gets its organisation from. Nowx

Now, I want to give slightly more contraversaliy examples. I think here

I doubt if you could disagree with the two kinds of examples that I've given so far.

Now the kind of example that I'm going to give now you can disagree with. And

I'd like to get into that with you. These are the cases now where there are -

one might say the rules and regulations or processes of a non-spatial sort that

are generating spatial patterns - as a kind of end product or by-product. T Let's

take for example, the fact that in cities as they are being built today there are

no very small free standing dwellings mixed in with the dwellings of the usual size.

Now I'm talking about cottages that would be very very useful either for adults who

have not yet x created families or else for old xx people who don't have enough

money to live in a larger dwelling. So, why don't cottagesx of this kind existx

in Berkeley or Oakland or San Francisco, scattered in among the larger houses?

The most literal reasons are two: One of them is that in a residential, in an R-1

zone in Berkeley the minimum lot size is 5,000 square feet. So it would just from

that factor alone it would be kind of difficult or wasteful to go building a tiny

little cottage on a piece of land 5,000 sq. feet. So there's an economic pressure

there it's not a very good use of that much land. and this is obviously one of

the non-spatial processes that I mention. The second fact entering into it pointed

out to me by one of my students last year - the banks will not mortgage dwellings

where the -- unless the cost of the land is somewhere between 20 and 33% of the

cost of the whole package. That means obiouvly building has got to represent at

least two-thirds of the cost of the package has got to be at least twice expensive

as the land. In order to get a loan on that piece of property xxxxx coupled with

the fact that on a 5,000 square foot lot, which is lible to be a reasonably expensive

piece of land, you can't build even if you wanted to éven if you were satisfied

that it;was a sensible use of the land, you could not obtain a loan to build a tiny

cottage on that land. So here again is a very very in this case there are two different

by but cooperative a spatial processes which are generaxxxting the pattern of housing

that we know and excluding another possible pattern which might by the way have

very sound functional reasons for coming into being. Now what I'm arguing this

morning is, yes it is true that there are these aspatial processes at the back of

very many patterns driving them if you like - but psychologically speaking the

prime fac t is that the people that are making the decisions about making those

loans and about those zoning restrictions do not have in hheri heads a picture of

a small cottage on a xix small city lot together with the understanding that that

would have a good functional reason for existing. They do not have such an image

in their heads they do have an image of large houses on large lots. And that is

a ppatial image - that spatial image is what has actaally x created these - the

two processes which I have just described - and then in turn continue to produce

that same pattern that they had an image of in the first place.

Now I don't know how many examples its worth giving of this because

well - the argument I've just given in fairly good - I'ñl give a slightly more

well two slightly more dubious examples quickly. Just so you can hammer agay at

them. One of them is - I mentioned last time that there is a characteristic

density curve associated with cities and for reasons which have to do with the

interaction and the cost of land xxxx and the desireabllity of being central

you have high densities in the middle low densities at the outside an expotential

curve - relating these densities. Now, of course the economic fact which has generated

are aspatial processes in exactly the same sense of the examples that I've just

been using. Now I'm going to make the assertion ~~that~~ - this is a dubious one -

that even that pattern is actually being maintained by a picture which is culture

born and culture shared of a city with that characteristic density break-down.

And to make my point clear - if it became the case that a designer could find

a pattern of distribution of employment which would~~xxpxxxx~~ up set the economic

processes responsible for that central expotential curve and if he could suceed

in communicating this picture to the member of his culture - at that point they

would begin to be influenced by it and the various processes the economic would

follow suit. So in that sense it's really an ~~x~~ illusion to say that its the

economic processes that have produced that pattern. Now - there's no question

that argument is slightly dubious - please attack it. I get - a less dubvious

example has to do with the RCC daylighting code. London County Council - no

defunt - has a code and don't know if the GLC still has it which said in effect

that the building on either side of a street - ~~with~~ if there were buildings on

two dides of the street the reasons of daylight these buildings must obtain an

angle of 45 degrees to the center line of the street.

There is this restriction which makes it necessary that these builings

down the street ____tain an angule of 45 on the center line. This is all very

well, it happens to be quite different from the characteristic cross-section on

a London street - the famous streets that give London the character that its

well known for have a cross-section approximately that where this angle somewhere

between 60 and 66 and there is some feeling among certain designers that this

is much more desirable I think they may be right - but I don't want to get into

that for the moment. The important point is that here again this physical pattern

is now being generated by an aspatial decision - well sort of relatively - it starts

out with - it could be thought of as a spatial one - I mean the fact that of its having

to _____ 45 degrees but what is not clearly present in the code as stated is this cross-section and what I am maintaining is that the people that invented that code had that cross-section in their minds and that that cross-section is actually at the bottom of the whole process. So you start with a certain kind of cross-section, you then formulize it and express it in some in terms a which have to do with daylight, it then goes out in the form of day lighting code and regenerates over and over again this same a spatial pattern. So my argument as a whole is that the spatial structures of the environment is being generated processes but that these processes are not lined processes, they are in fact processes that are themselves organized by images or spatial patterns or spatial schemes. In the heads of all the members of the culture at large and that this overall picture of what a city ought to be is what generates what a city becomes.

I just want to emphasize the fact that whereas in physics, astromony, biology, ecology the varies processes which are chosen or which are picked out by the scientists as being the processes which generate and maintain a certain kind of stable structure, as blind processes in the sense that they do not know what they are producing. In the case of the city it is quite different because it is human being that carry the generation of the city in their heads and because they are capable of having images in their heads, in this case the generative properties are not blind but directed.

Ok - now I would like to have you attack - particularyy the more dubvious parts of what I said.

Question:

Repyy: Yes, I'm very glad that question has been brought up because what I said sounded as though I meant designer's images. Now I don't at all. I quite

I completely share your view. The designer's plan almost no part in determining

the organization of the environment. Most of the examples I have given, are mostly

examples of that. I think it is naive to think that people in general do not have

images in their heads. Now, in other words, I making - let's take a banker all right.

A banker has a particular idea what he wants his bank to be like. And obviously

his idea of what he wants his bank to be like and what he knows a bank has to be

is what guides any architect or developer or anybody else who goes into help him.

That banker has got spatial schemes in his head. Now he may not be capable of

drawing, and he may not talk about images or about spatial patterns like̶x like designers

do. I think this is all very true, but as to - I mean the assertion a̶s̶s̶t̶a̶x̶p̶e̶o̶p̶l̶e̶x̶w̶h̶o

that lots of people don't have images in their heads, I think is -- I wonder if

we can put this to a emphirical testing in som e way. This is a crucial issue.

Question:

Reply: I haven't so far a̶ said anything about language nor about verbal

language.   Did I say that today. Yes, I want to come to the question of whether

it must be. Sorry. That's when I was sketching out the seven̶ points about the

whole organisation, of course. We really sort - you've g̶o caught me off, w̶e bec̶ause

you've jumped ahead to something - to a point that I'm going to try to make - but

so far - I definitely agree that what I've talked about today - that those images

are not explicit. The guy who knows how to build a supermarket and that has all

these patterns at his finger tips would very possible - I mean he'd stare at you

if you said please tell me what are the patterns in your head about supermarkets.

But he has them neverthe less.

Question:

Reply: x̶ If somebody could propose an experiment it would be very helpful.

This is a controversal matter. Now, for instance, Onhiem, a x̶ psychologist at

Sarah Lawrence, is at this moment writing a book called Visual Thinking, trying to

make the argument that actually all thought is at some conscious or pre-conscious

stage visual or spatial at least - not visual - visual is really the wrong word -

spatial. Then gets transformed into all other kinds of other modes. xxxx See

it's really, really touchy. I remember having a discussion with one of the guys

that came up with the chemical structure for the cormosome and he described a

story about how x he and his co-worker had sat in a room with a barrell of beer

for something like ten days and finally came out with the helix at the end of

it and x we were talking - it was interesting - I don't know we were talking

about a number of things like this and x then he said he went to an exhibition of

art and he said he didn't get the point of xhxx - you know. And I said well actually
it

I think it was A_____ and Mondrian and some things like that - he had not liked

or he had not seen the point of. So I said well actually those people are playing

with things which are xxx quite similar to what you were playing with when you

come up with that helix - maybe you didn't realize it. Noxxxxxhixx and he siad

no-no this is quite wrong. Well we did - we wrote down certain equations and

x we just kept manipulating these equations xxx until they finally produced the

helix. And see - there's really a controversal issue about how thought happens.

I think that k guy was just plain wrong. I don't think he knew what he had been

doing and there's a literacy in sociology about this question. It is very difficult

to be certain about it. I'm just wondering now whether we could propose some sort

of simple experiment that would - that could possible resolve this issue.

Question:

Reply: Well, I quite agreed. Obviously, the moment you begin to take this

point of view seriously that xxx becomes the prime issue in environmental design.

And we're going to have to discuss that at length. Yes, that's the right conclusion

to draw.

Question:

Reply: In spatial form as opposed to - any of the processes that I gave

examples of are in the mind in obvious a non-spatial form right. Like the desire

to maximise some economic function right. Or the desire to get enough, I've forgotten

the examples already. Or it might be argued that a highway engineer is x operating

basically in terms of processes which have to do with insuring traffic safety and

that he is building a design out of those demands. Now that id different from

saying that he already has in his head a stock of physical patterns which he is then

going to combine and overlay in order to come up with a finished highway. If those

two ideas or conceptions are not clear or not distinguished - we must work at dis-

tinguishing them. I'd like questions only about that distinguon for a minute. I

want to make quite sure that its understood..

Question:

Reply: Now you really are using the word to mean everything. I suppose that's

the way it came across - the way I said it. I mean - yes, in one sense that's true.

But the - let's suppose that somebody has in mind the idea that he wants to build

a road which a vehicle can travel around at least 5 miles an hour without sliding.

Now, what I've just said is first of all verbal. Secondly, it is quite true that

he might have in his head a picture of a car going around a curve and sliding and

in that sense there might be a sort of spatial image in the guy's mind. I'm not

talking about that. What I'm talking about is the fact that we have as one of the

stock items in our minds a picture of a road bed which is superelevated. Now that

cross secbion of that road bed we know that that kind of thing when that cross-section

is taken around a curve stops vehicles from sliding on the curve. Of course, the

exact amount of the super-elevation has got to be right for the speed, so we may have

a table to home us in on the exact right value. But fundamental to it there is a
picture of a solution there. And that picture of the solution is what I'm talking
about. When I say that the environment gets its organisation from the shared
pictures of what xhxnkx people think cities ought to be like is what I mean. Now
if its still - I really want to make quite quite sure that this is distinct from
the other sort of conception. I'd like to persue this until it does become quite
clear.

Question:

Reply: Sorry, that was just a red herring. I was just saying there's a
guy at Sarah Lawrence that's trying to prove that all thought processes has their
origin in what we described as spatial thoughts. But I'm not making that argumen
here. I just gave some examples of things that are quite clearly verbal. And there
are lots of others.

Question:

Reply: Has a picture in his head of houses sitting back from the streets.
Oh those - yes quite certainly I would say. In fact, there's quite a curious process
that goes on here and sometimes it goes around a couple of times. You know - at the
time that that restriction is written the people that wrote it may have some slightly
simplier form in mind. And then it actually - ------- right and then what happens
is another picture immeidately becomes culture-shared and then for sometime to come
a lot of people interpret that restriction as a step thing, and they have that picture.

Question:

Answer: It's interesting - I'm ashamed slightly - just the other evening I was
                              in
asking somebody exactly what form that restriction was written and I couldn't find out.
Does anybody in the room know. Just how was it actually written into the New York code.

Student talking:

I know it's based on lighting. Do you mean it was actually written in the form of after you got ten _____ you must accept that. But its actually written step wise. Well, if th its actually written step wise then theres no question.

Student talking:

In both - which ever of those cases it is - those are both physical already. There both spatial already.

What reason does he need it? Well, I mean these codes are all solutions to problems. Sorry, I'm completely lost for a second. I mean like that one is a solution to daylight problem or another kind of set-back is a solution to a fire hazard problem.

No wait, no, no, sorry I see what's going on here. No k in this case lets get at the fact - xhexexaxexxextaixxkixdexefx certain kinds of street buildings need more
light - I think its usually understood that that's the issue in this case. What I am saying is - it is incorrect to think that that need generates a the forms - what generates the forms is a solution to that need that has been invisioned by the people who wrote the code. That's the point I'm trying to make. I think it's probably 1:00. It is.

What generztes the pattern is not the need.