

The Falcondale Collection

Stafford Beer

Initiates an Audience into the World of
Systems and Managerial Cybernetics

Session 9

Synte-gration

Will anybody care to suggest what it is that characterises 'life'?
How would you recognise 'life'?

Cathedral

Cathedral is sustained, not life

What is sustained, not 'life'?

Cathedral. Sustained but it isn't alive.
I don't think that sustained is going to work.
I'm hearing you, Lee

Burning oxygen

I see. What about plants, they burn oxygen.

They're alive

Yes.
You're not saying the thing that most people usually say, which is quite interesting to me. I wonder why not.

Change

That's not right either, you see.
Well, change, yes, but cathedrals fall down and that's a change.

Reproduction

Ah. That's the one. I'm sorry Jane I didn't hear you.
(laughter)

Most people say self-reproduction.

Well, the very very eminent Chilean biologist Humberto Maturana, who is also a very eminent cybernetician, examined this question and said it's nothing to do with self-reproduction.

It's to do with self-production.

And that's what autopoiesis, 'poie' is Greek the verb 'to make', so poeisis is 'to make' and autopoiesis is 'to make yourself'.

The reason I was reminded of this was, I was remarking earlier in another session on the fact that our bodies renew themselves every seven years, but we maintain the relationships between the cells and bits and pieces in general.

Well, what Maturana realised was that life is characterised by the ability to do just that, so if you're going to last seventy years you've got to renew all your stuff ten times.

Now that's a very odd thing to be able to do because it involves ... well DNA is in there pitching isn't it.

It's got to reproduce all the bits and pieces according to a blueprint.

And once you get that clear, you perceive that self-reproduction is a special case of autopoiesis, that one of the things you do to make yourself is to have offspring to take over once you've died.

So, the notion of autopoiesis is really much more fundamental and he makes a wonderful case for this.

Now, why am I offering this as something that should interest you in the context of this week.

Well, how much effort do you think a viable system should spend on autopoiesis? You can't do it for nothing. It's got to use energy and information and all sorts of things, and for years I thought there must be a magic number somewhere ... sort of 17% of the effort or something of this sort that would be required to produce this autopoietic effect and the I soon realised that that couldn't possibly be right because it depends on a lot of things.

Now, I have now got a solution to this. The element of the viable system which produces itself is system 1, and in support of that function are 2,3,4 and 5.

They are there to see System One carrying on doing its thing. From that arises a very interesting speculation.

Who has seen the computer department trying to be a viable system? or the engineering department or maintenance department?

All sorts of these things are not System Ones but try to be viable systems and seize the power by doing so, right?

We've seen it all the time, bureaucracies do this typically and so I invented the even worse term, and I would love a better one, of pathological autopoiesis which is a terrible great mouthful to stand for a viable system in which either or all of systems 2,3,4 and 5 were running amok trying to be viable systems, and you know enough about this now, that I realised I could offer this explanation in quite a short time, which I couldn't from cold

We have been talking about the pathology of organisations we haven't used the word a great deal ... we have said what goes wrong and why ...

Well, I like this explanation very much and it certainly accounts for an awful lot that's going wrong today I think in our kind of society because bureaucracy does get the upper hand and the changes in the health service, in the education service outstandingly seem to me to be pathologically autopoietic in a very big way and what a nice explanation instead of ...

You've got some explanatory power in this thought, instead of just saying "Oh, damn bureaucrats, they're at it again".

You can see why.

And we know from all our studies of bureaucracies, that is exactly what people are doing. They are preserving their future. They are giving themselves huge pensions, indexed linked, and God knows what.

Ministers can come and go and do, fortunately, and the dear old permanent civil service collects a 'K' (knighthood) and carries on as before.

Not his job to do that. His job is to help his Minister.

Seems as if that the last thing some of them are intending to be doing.

Find that interesting?
Moderately Chris?

These systems that think they are System Ones that are not System Ones ... don't they still need to renew themselves? But is it that they should be renewed in the process of helping the system ones to renew themselves?

That's right.
They renew themselves as far as required and not for their own sake.
That's the key.

In the process of renewing what their purpose is, to renew.

Right, right.
But that means that an awful lot of things that are set up by senior management, just to use an ordinary popular phrase, have built into them pathologic autopoiesis when what they ought to have built into them is destruct.
There are an awful lot of things that you set up that ought to have written in "I am going to self-destruct when I have done my job".
Like a specialised committee to do something, and some how or another these committees stay there for ever and get called quangos and everybody starts getting paid which wasn't the original idea at all. You know the sort of thing I mean?
Well, I'm sorry that this hasn't got much continuity to it.
I just wanted to add that to our last session.
This session really is to be devoted to this new invention which I call Syntegration and I am offering it to you.
It's a lot of things, but I'm offering it to you in the context of this week as a prime mechanism for pulling off this 3-4 homeostasis that is such a problem.
I hope I convinced you it's a problem and I haven't offered you any kind of solution because there really isn't one in the book anywhere.
All we can do is say, "Well, hold meetings" or "watch it!" or something of that sort with no actual technique.
Well Syntegration is such a technique which derives from this idea ...
We all know about flat management.
You don't?
(laughter)
Well it's one of these We certainly all know about the disappearance of middle management and the loss of hierarchy.
The idea that hierarchy is very old fashioned, we don't need it, so flat management means you go like this (Stafford puts his arms out sideways) but it's very hard to control and my favourite story about flat management is when I was called on by Ottawa, the Federal Government of Canada, to look at the plans for the new ... and they were one of the first countries in the world to do this ... a long time ago ... the new ministry of environment. That's right. And what they did was gather all the stuff in the Government that dealt with that and put it under one minister.
And they didn't like hierarchies as befits environmentalists.

So, I measured the room in which I knew I had to speak to the senior government people and I had a sheet ... a roll of paper like Bakri's, and I drew this organisation chart so that it just went from wall to wall and I said "This is your new organisation as proposed".

And I pinned it on there and I walked right across the room with it you see

Thirty six people directly responsible to the minister.

Now you see, you've only got to show this diagram and everybody's falling about and they say "We can't have suggested that". "Yes you have, that's what it comes down to".

So how can you get structure in a group of 30 people without hierarchy when you don't want people to pull rank or gender or anything. You want to treat them as human beings.

Well now, the answer to this would seem to be ... you close the system round in a three dimensional space so that you've got something like a ball. And you roll a ball along the ground, obviously there's no top to this ball, or sideways, or bottom or anything, it's just the ball.

Now, so we have something available to us that has that kind of character. The answer is the icosahedron. At least that's the answer I've picked. There are reasons for that.

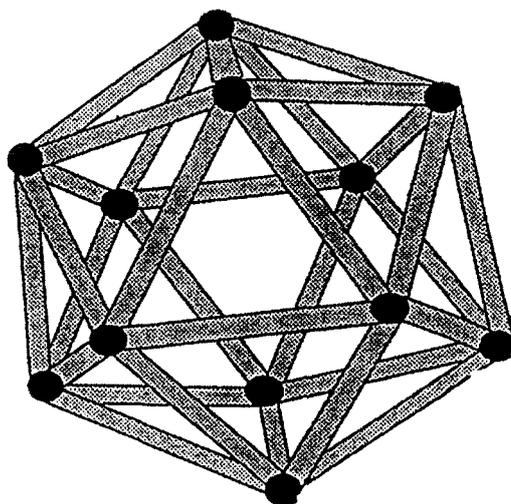
Now, who knows what an icosahedron is?

Twenty

Twenty. Greek 'icosa', yes.

You were going to say something Lindsey? Yes, well fair enough.

So what are these sides like.



The Icosahedron

Pentagons

Pentagons, no

Triangles

Triangles. They are equilateral triangles. That's nice you see because we want this concept of equality.

So, all the sides are the same, they've all got three lines round them, all of the same length.

Now, I find that immensely hard to talk about this because we were all brought up in the two dimensional culture when you think about it. Our notion of three dimensions is somebody teaching us perspective and saying the lamp posts get nearer together and this kind of stuff and we don't really have a feeling of space.

Now, I've just written this book which is hard going, you see.

So what I propose to do is to make you make an icosahedron each.

So that's what this is.

Now, this is your kit. Spread that around. Do not eat this yet.

An icosahedron has twenty faces. Do you reckon that you could make a ball like structure with twenty equal faces out of this?

Yes

You look dubious. Not easy you know.

Well now, the next question you see is;

how many edges does it have? It has twenty faces, those all black but they are delineated by edges, obviously.

So, how many of those have you got?

As many as there are cocktail sticks in there.

Very true.

There are thirty. There are thirty cocktail sticks, you see.

So, the next question is;

how many nodes, as we call them, has the system got; those are the points from which the thing radiates.

We've caught you there, because there are extras

(laughter)

There should be two extra gum drops and two extra sticks because sometimes sticks break (Allenna Leonard speaking)

People trying to force their way through life, you see.

Now, do you want to try and do this or do you want me to give you help?

Think of the principles.

Let me give you a clue. I told you there were thirty edges and there are twelve nodes.

So that tells you something.

What is the relationship between an edge and a node?. Well try and answer that.

We've got twelve nodes and thirty edges and the things regular, it's uniform.

You are getting there.

How many nodes?

Twelve.

Six ends to each node

Like a kitten fell straight into it.
Have you got the maths right now, Glen?.

That's five.

Have you done this before, Clare?

Yes, I suppose I have

I certainly thought it looked as if you had.

*Where did you learn something like that?
From my Dad
(laughter)*

Yes, some people are cheating, I should have thrown the people who knew how to do this, out.

We could be here all night.

Now, I think the time has come for those who're wrestling with it to show you how to do it.

We're dealing in fives you see, as you just said because there are twelve nodes between sixty connections which means five per node.

So, what you should do if you put five jellies on the floor as a pentagon and join them together.

That's the first thing you should do.

The angles will form themselves you see. The nice thing about the jellies is they're fairly elastic and you want five.

It's supposed to make a ring.

Oh, that's right I meant to show ... I'm sorry, I was looking at the one you've started.

Join those together. Join those together. That's right.

Now your problem is, you're stuck in a two dimensional space, Glen, see?.

That's it. That's it.

I see

Yes. Now you've made one of those, now you can make another, that's the trick.

I tried to do that, gets them sticky I'll have to eat these.

OK, I'm addressing myself to Catherine as she's definitely there and you take a jelly and hold it up in the air in the middle. That's right. Well, put the thing back on

the ground. Just suspend the jelly. That's right. And now you want five connections to the five other jellies. The thing looks a bit like a spider, you see.

Did anyone here see the krypton factor?

Yes

Wicked group Catherine

Yes. Make another.

This is Carbon sixty isn't it?

Yes

(audience chattering)

Look what I did today

It's a fun thing isn't it?

You see why I like you to make it, experience of this sort of thing it's quite amazing that suddenly creates a stable structure in front of your eyes, out of this bag of chips.

I think it still delights me and I think you'll agree as a model of democracy you see we've got something here because every edge is a person.

That's a stick?

Yes. So I said there were thirty people and of course there they are and they're arranged in such a form that they have quite a lot of structure but nobody is better than anybody else. Obvious isn't it?. They're all absolutely equivalent.

Pardon?

Depends which you are on.

(laughter)

Well, I'm very attracted to that idea and so I started doing a whole lot of experiments with people and trying to work out how to make use of this, now in the context of the viable system model I've been talking about the 3-4 homeostat.

I'm sorry, I better get on because most people have finished

Talking about the 3-4 homeostat and we already discovered that System 3 and System 4 are really rather different beasts because one is certainly self perceived as being nitty gritty, getting on with the job, making profits whereas System 4 is spending the profits, that's System 3 version of System 4, the System 4 version is, we are the enlightened ones and you guys are all stuck in the mud doing this stuff.

So there is a huge disparity in the flavour of these two systems. Now we've got to get them together.

Now then suppose you get fifteen representatives of System 3 and fifteen representatives of System 4 put them in a pot and stir them up and create the structure.

Pretty nice?

But then we're left with the question of what we're going to do and besides do you hang them from the ceiling; how do you do this?

Now, you can very nearly hang them from the ceiling. One of our collaborators makes this thing with five foot sides and it fills the room of course if you think about it.

If one of the sides is five feet, it's quite a big structure and everyone gets inside it and gets their photograph taken in it. It's good fun.

So, now we ask the following question. If one person is a side, then that person is connected to two nodes. Now, the nodes are going to be the topics under discussion.

The topics we consider important. Twelve is a pretty convenient number because if you had fifty you never get to the bottom of the agenda.

Twelve you can just about handle. Less than twelve turns into a motherhood statement if you're not careful, of the kind 'we are going to make a profit' or something

You know, we were criticising those things earlier.

Twelve is pretty nice, don't worry that its arbitrary because of course it's a question of editing in order to get twelve decent statements so I'm going to talk in a minute about how you get them, but in the meantime I want you to understand the structure so we've got twelve statements and any one person is connected to two of those statements and is part of two teams therefore of five each. Look at it (the model built by the students), that's why you have got it.

So, if you hold one strut then you can see, if that's you, in Jane's case she's a member of green and a member of black and that means we are controlling variety already because she hasn't got to be on twelve committees, she's on two committees.

What's getting to you, Karen?

...front and back for an orange and I thought you meant of the structure and that was the one he was eating ... (laughter)

Well now, somebody mentioned Buckminster Fuller in the context of Carbon sixty, he didn't live to see the mention of that molecule you know, no, it was quite extraordinary what he did become famous for most notably?

Geodesic dome

Geodesic dome. Yes, geodesic construction. Let me explain that to you. Architecture has always been able to span about 160 feet and whatever the materials it tends to fall in, the dome falls in if it gets bigger. Both St Peters in Rome and St Paul's in London are about 160 feet and even they both have huge wrought iron chains round the bottom ... did you know that ... to stop them going splat.

So that has always been accepted as the limiting factor and Bucky bust that. You can build a Buckminster Fuller dome of any size, you could put one over London if you could afford it.

Now, how's it done? What's the trick? He had to invent a whole new mathematics to handle this and everybody said he was mad.

A most extraordinary fellow, and I was very happy to know him, and his thinking stuck very much in my mind.

So, to dispense with the Carbon atom, when the chemists realised that this was in fact a Buckminster Fuller type of construction, they named the carbon sixty atom ... ?

Fullerene

Buckminsterfullerene, all one word. Tremendous long word. Generally referred to as Bucky balls, right?

So, how did he do this?

Now there's a nice little secret in here that is a bit irrelevant to our managerial purposes but I want you to understand what you are dealing with here.

For some reason, architects have always understood the principles of compression, so they built things that stay in place because they push down, using gravity. So, you can build two pillars there and they don't fall over because the mass is directed by gravity downwards. Then how the hell do you build an arch? Well, it took a long time, if you look at Stonehenge and so on, it took a long time to get the principles of building the arch and oddly enough that's still compression, as you know. The key stone holds the arch together by pushing down oddly enough. So, practically all our building, all our structures come about because of compression and Buckminster Fuller realised that this isn't true in nature.

In nature, compression is always matched by something else.

What do you think that is?

tension

Tension, precisely. And we can see that with our arch because by the time it's been there two thousand years and it's beginning to fall down, splay out or something, you put a stainless steel rod across the top and hope nobody can see it and that sucks it in. That's tension.

So, Fuller said that everything in nature that I can see is a mixture of these two things and he looked at trees and he looked at all sorts of natural structures and you cannot falsify this.

Take a tug of war team both of whom are pulling like mad so this rope is in tension, well where is the compression there doesn't seem to be any? But you see, if before the team starts you wiggle your finger between the strands of the rope before they pull it, you'll soon find out where the compression is. It'll have your finger off. And that is a beautiful example of the way the natural system mixes it.

Well what this thing does, the structure as you have it is pretty well a compressive structure using the principles like the key stone in the arch to hold itself together but, if you put things inside it then you can produce tension for instance if you just lend me that you finally got there (to Jane)....

If I ran a wire between those two, it's already stable and pretty strong, but if I ran a wire across these obviously it would be a damn site stronger because the tension is going to suck in and you lean on top, it can't burst out sideways.

Now, Buckminster Fuller was confronted with the problem that if you put up a dome or a building full of wires inside it you would never use it. So, what he did ... he divided this, can you see this? There's another triangle there and that's going to be tension if you take this as your base point that going to create tension across that space and then he gave it a bit of a third dimension by treating this as a kind of a skin and just as you were building these things with the top the spider being up in the air you get the same effect here if you suspend the point where my finger is so that the wires come down a bit again you're increasing the tension now with that trick as repeat huge domes have been built and he always contended that he could build one over a city because there's nothing to stop you once you've got this principle right. Well, this is classic case of people saying the man's nuts and then being totally falsified.

Year's ago, he's been dead sometime when I knew him, there were 200,000 domes around the world. It's quite a lot for a nutter!
(laughter)

So, that was his principle. So, I said to myself now here's my organisation of 30 people held together primarily by compressive strength, what shall I do about the tension, because please there is tension among people and I don't mean anything aggressive you know.

I'm not saying that they are all having a bust up or fighting each other, but always in a human group there is a certain tension going on which is constructive which is helping.

Now, I have complicated reasons for not wanting to join these two and I don't think I'll bother you with trying to explain because that's pretty mathematical. What I joined together were these two ... now that is to say joining the next but one neighbour can you see how many such lines there are on here? See, I would be joining this, to that, to that, to that, to that by

How many are there going to be?

Three, three each level ... three. One, two now I'm lost

It's going to be five again. You see because that's your pentagon there and this is your pentagon here and it's so you've got five wires coming out of every node joining up. So that 60 again only there's only 30 for the reasons you discovered Glen when you were trying to work out the nodes. Each has got two ends you see.

Now, I said "OK" these connections must be recognised as tensile components of the system, so I called them critics.

So, lets go back to you who were this person I am hanging on to here is a member of two teams and will turn out to be a critic of two more. Now, there are reasons why in practice you can't be a critic of more than two others, it has to do with how meetings are held and so on if you

If you're a member of team that says that's two away from another one then you are automatically a critic of that one.

You are automatically a critic of two other teams, one in this capacity, you see

Yes

Now look at what's happening to the variety equation, that's quite interesting because you are now dealing with four of the nodes in two different capacities out of a total of 12 quite directly, two as team members, two as critics and as to the rest you're part of the whole show, maybe you can go and see what they are doing maybe that will tell you what you are doing.

So, what we need now is what I call a protocol that is to say a way of conducting affairs with this model which will enable all these things to happen.

Now, that's more difficult than it sounds. It took me some years to work this out.

It involves a succession of meetings with various different purposes that I will try to outline to you but you need to have the architecture in the back of your mind to understand the explanation.

Now, when we assemble, I call this the synteegrity model and I call the activity a synteegration because it is synergy building up the power between which means building up people you know that and integration which means its cohesive so a synteegration has got to begin, nobody knows who they are

Don't say it.

They don't know who they are in terms of this diagram and they don't know what the subjects are.

Now, look at the subjects issue. I have fought all my life against the standard way of running meetings because you have to choose an agenda, and when you've got the agenda you more or less determine the outcome of the meeting especially if you know all the people, you put all the agenda in a certain order and a good secretary can write the minutes before the meeting is held.

This is not very clever.

An experienced committee member will know all the tricks.

Sydney Webb used to put the same item down at the beginning and have all the row about it at the end, the first time, get it deferred then when everybody was tired out and people were leaving it would come up again and pass. So all kinds of trickery, besides there's a more compelling reason for not having an agenda namely we don't know what we should be discussing in the first place.

We're always discussing the same old things.

Now, suppose we are discussing the future of the world which some people here have tried to do using this model. What are you going to discuss?. Education, health, here we go again. It's all the usual stuff you see, and again you could almost write it in advance so that's not going to do.

So the idea is to discover out of them what it is going to be worth cracking it so we start with something that I call the filter of importance and the way this works is just imagine we were the 30 people, ... you're all schizophrenics, ... there'd be 30 of us just about.

I say to you OK before we go to bed everybody write down something that matters on a card; and if you are brilliant and had two ideas that matter have another card just a sentence you see ...

When I am doing this I say "Pray", ... not a bad idea but it's not the usual thing you meet on the agenda. Now, if you can be persuaded to get off your hobby horse and again I always say you may be the leading expert in sewage then do not say we need better sewage systems; we know about that you've been telling us this for years and you're boring the pants off us, try and think of something else for Gods sake than sewage you see so this way you try and capture ideas. Now, there's some very interesting numbers around here because these 30 people when you do this at night and you say do this before you go to bed tend to generate about 130 statements which means that people are averaging 4 point something each you know which is nice.

So, now we've got all these statements what are we going to

Now, requisite variety I mean you are in a good position to evaluate all this as we go along given the 120 important things to say that's quite a high variety arrangement given that they are not going to be boring, if you can persuade people to do that.

Now, I have a very special trick for trying to ensure that and I'm sure if we've mentioned this already in another context ...

Yes

We have, negate it right? Right?

So you are putting in your clever statement and you say "Hey, just a minute if I say 'not' it won't work". I remember now, I was giving you the example of there is a God, there is not a God, and so on. OK.

Now, while you are all asleep, the staff will have to do something with all this mass of material and will shove it all into computers and at breakfast time next morning you will have the complete list and before you start the next part of the programme you will have an idea of what everybody is saying and some of these things will be boring, some will be incomprehensible, some may trigger ideas and you say well I wonder so now we go into what is called the problem jostle.

And the problem jostle works like this. We have a single big room like this one with tables and chairs all over the place and you come in with your 130 statements and you may have had some more by this time you may have triggered you're not restricted; you may have triggered all sorts of other thoughts. So, after breakfast we're all in these.

Now, what you are invited to do is seize a table on which there is a kind of flag pole and suppose you are dead keen on one of these statements maybe your own or maybe somebody else's. You write on the flag "pray" or whatever it is. You know; "Ban men".

Various things come up quite uniformly.

Then you sit at the table and invite business. So, somebody says Oh Karen is wishing to discuss this, I like Karen, she's bright, interesting subject, I'll go and join her.

Now, you see its very important that you can see all this because other people are setting up other tables and there is only one rule about the problem jostle, that is to say there is no politeness that it's understood that you will walk around and leave groups and you don't have to make excuses and say "I guess I have to make a phone call", or something.

So, if you are in a group here and it's getting boring and you can see somebody else with an interesting looking group, and they are hammering the table and so on, you say "I think I'll join that", and if nothing is interesting you start a new one.

Now, what I would say to people about this is if you are bored in a syntegegration it's your own stupid fault because nobody is telling you what to do.

Have you ever been to a meeting where everything is interesting. Because, here it must be, everything that's happening to you is interesting because it's your own fault if it isn't.

Now, out of this we try to get what we call agglomerated statements of importance.

Now these are more like paragraphs than sentences.

We are beginning to massage out thoughts into shape and by the way, we know we've got to end up with 12 but we're not trying to force things at this stage but we're trying to shrink the variety and contain variety in more comprehensive topics which are going to be the 12 topics.

Then that usually ends up with about 25 ... somewhere between 20 and 30 so the variety is being attenuated, it's coming down from the 130 to 30 but we still want to get to 12.

So, after that we go into various other processes and I don't think there's time tonight to ... you don't need it to get into all the details but what we've got to do is to bring that number down to 12 and then to allocate the position on the icosahedron and then to allocate the struts.

Now, you can see this is a very high variety problem, now my doctoral student in Swansea who attacked this problem of how to do this last reduction which is called the hexadic reduction; hexadic means six because this thing has six polar axes ... these pairs ... you see the 12 nodes ... six ... right?

How are you going to do it?

Now, as soon as she started this she made [""'] did the mathematics there are four million ways of allocating the subjects round this and factorial 30 times four million ways of allocating the people.

In other words the variety we have to deal with on this model is 30 times 29 times 28 times ... down to ... times four million.

It's unbelievably difficult, so obviously things have to be taken into consideration here.

And we have voting procedures we say well now folks these are the topics will you rank them.

What do you most want to discuss?; and so forth and all of this now Josephine has developed an algorithm which runs on the computer and the last time we did this it ... thanks to the programming problems we'd got an hour to work this out that's the lunchtime after the problem jostle and before we start getting on with it all and her algorithm made ... I think I am right in saying ... 18 thousand tests in the course of the lunch hour looking it's a heuristic you know looking for the best fit and typically she's getting 95 or 93 percent of the desirable outcome which we can measure because you put your performance down, so if you don't get any of them you're going to be pissed off, and if you get them all you're going to be very happy so we can measure that and good for her and all this technology is developing all the time but now we know you know who you are now if you are this person you are Ms or Mr black/green and you have a label with black/green on it and you also know you are a

critic of this and this (Stafford pointing to the model) so you've got four colours up here and the last time they did it they made a bracelet with these beads on it which is quite sweet you haven't seen that.

Yes, now we come eventually to what we call the outcome resolve where we are going to have a set of meetings now it's these two teams that I'm holding meet simultaneously. We can save a bit of variety because all the members of this team and all its critics are not members of this team or its critics which is jolly convenient so what we can do is hold six meetings I mean six sessions each with two meetings in separate rooms ... Oh gracias ... Thank you

Denis brought it (Allenna)

Look, Denis brought it, thank you Denis.

Yes, now we've got the fully played up model, it's got all the critics lines in it as you can see and there are the colours, so this is Ms silver/black and so on ... this is Mr orange/yellow and so on ... and now we know who the critics are going to be and you now have an identity expressed in these four dimensions of team membership critic membership.

So, I was saying that what we are going to do is six double sessions and in that time we are going to get through all the possible meetings.

So, if you think of it if you allow an hour for a meeting which you can't afford to probably ... as you'll find out, it takes a day to run through this, quite conveniently. I'm just trying to give you the feel for it. You have six hours of work, coffee breaks, lunch, dinner ... quite a heavy day and you'll have got through what I call an iteration so that's one complete cycle now what happens if you do it again, and again, and again, and again, ... do you all go mad?.

You realise that all the time you move through this process you are adding to your information because you are going to the other meetings and people are swapping ideas and something that I call reverberation builds up in this thing.

Information reverberates ... ideas reverberate ... ethos it's quite strange and in short something that looks a bit like a group consciousness emerges. Now, by this I do not mean we've all been locked here for ages to get there and therefore we know who we are like this meeting.

I mean something more than that. I mean some higher level perception is emerging that we've generated and that all share in and if you want a 3-4 homeostat you see this is just what you are trying for very very exciting.

Now, how many iterations?.

This is where the mathematics gets high powered and I think I asked somebody if they knew what an eigenvalue was so I knew whether I could use the word but I don't think anybody does so lets leave the mathematics.

An eigenvalue is a measure of the extent to which this machine can compute itself.

How about that for a definition?. And that's what it's trying to do because self consciousness has to do with computing yourself observing yourself.

Isn't it?.

Anyway, that's why I had to write this whole book because it's rather a big subject.

However, by computing the eigenvalues in this actually computing what they are I can demonstrate that 90% of information will have been shared after 3 iterations; after 4 it's about 92%; after 5 it's 95%; and the thing is an asymptotic curve. You see, you

never actually get to 100% obviously, becoming more and more boring for less and less payoff.

So, I cut it at 3 because that's the formal mathematical statement that 90% of it has happened and that's a theory about this now given that all the people are real people, and talking and having lunch and so on I think we make up the extra 10% fairly easily in practice.

So, that the outcome resolve and at the end of each iteration you've got 12 statements and they change the next iteration the same topics but now the content changes you see until you end up with the optimal statement at the end. Now, my ideal for this is to take a day over each iteration which is three days and you have to add a day for the problem jostle and then all the hexadic reduction staff and then a day at the end to deal with it all.

Then you've got a week.

Now managers won't do it.

They'll go for a week of golf somewhere at the drop of a hat but not to do anything serious like playing the future of the company.

And the extraordinary thing is you see that they would rather adhere to the old ways which means setting up 17 committees all of whom are trying to meet once a month for the next 6 years and arrive at no conclusion at all and cost the absolute earth in opportunity cost which nobody knows how to measure so you pretend it doesn't exist. You pay my company to do this; it's going to cost you because you've got to put all that stuff in place, you have to have facilitators and so on but it's a fraction of what you would be spending in the orthodox ways and not recognising so that's what it is. This is pretty new.

I don't know how many have been held by now something like 40 all round the world, it seems to work in every ethnic context and gradually we are trying to build up a recognition that this is a good thing to do.

Now, obviously I have had to take an enormous number of decisions all the way through this piece about you know arbitrary decisions but well informed as I can make them as a scientist but all sorts of things could be varied.

There's about a thousand doctoral theses lined up in here.

If anyone wants one, we've got several running already where's Bakri got to?

That's syntegegration in a nutshell.

How's the time. That wasn't bad, we've got about got through this in an hour.

Do you use it all the time like ... I can't remember what you called it from the first day and then you have the 3 days of working in the meetings and everything and then a day would you do that every week or is it just when you are planning?

Oh good gracious that depends why you are using it. I think if the company does that in the 3-4 homeostat that's going to kick the company off on a new track and then you've got to monitor that behaviour and then you say it's time for another.

Well we haven't had it long enough to know what that will be but I shouldn't think more than once a year is makes any sense at all.

You might want to do it because you might just want more than 30 people to do it like in a bigger organisation what if your numbers don't fit?

Well that is a major problem. Now another group of doctoral students are trying to deal with using other platonic solids than the icosahedron but unfortunately the mathematics isn't nearly as satisfying.

I've done this with a cube and an octahedron, a tetrahedron which is the smallest of them and a dodecahedron. Now, I've got them all listed.

Interestingly, the reason that Bucky Fuller gave to me and to others too, as to how he began working on this when he was a child he was darn nearly blind and nobody knew it. Now, those of you who have worked with handicapped children know that this sort of phenomenon is quite common; deaf children don't realise that they're deaf; parents think that they're stupid or something ... they can't hear ... so Bucky was nearly blind and they didn't find out until he was four and then started wearing these huge pebble glasses and said "My God, it's different out there".

Now, when he was at infant school, before this was discovered, the teacher gave the class lumps of plastercene and sticks reminiscent of anything and said "Make something".

Now, guess what the children all make if you tell them to do that at the age of four? Sorry too many people spoke at once.

Spiders

Spiders. I don't think so.

Horses

That's too complicated at that age.

They built a house. See, if they live in a kind of box with a roof and they try and build a house.

Now, this is about as unstable a structure as you can possibly have of course, you make a cube and push it, it goes ... instantly, very unstable and Buckminster Fuller's trying to make something with his hands, you see, can't actually see, doesn't know much about houses and he built a tetrahedron.

Now, you know what this is?.

That's four sides each of which is a triangle. So, it's like a pyramid only the base is triangular, not square. Now, you can push the hell out of this thing and it doesn't collapse, it's extremely sturdy.

The teacher is totally amazed and that's what set him off on these explanations of 3 dimensional structures.

Very fascinating.

So, getting back to your question, Clare, the variants are just enormous. Now those are smaller numbers if you get to about 25 we cannot prove what happens if some of these struts are missing but it seems to be very robust because sometimes people get the flu and go home. It doesn't seem to matter but this is not very scientific. This is just our impression.

Now, what do you do if you've got 150 people.

I've done that; you try and hold 5 syntegrations. You see then you've got the problem of how do you put them together.

Now you're all familiar with the idea of recursion by now.

Suppose each one of these is an icosahedron (Stafford holds up a strut) imagine an icosahedron on here, one on these, the next level of recursion ... when you've held it, you've got 12 statements.

Suppose you pull this icosahedron apart until it becomes a thin line and align the statements as best you may so 5 statements get amalgamated here and 7 get amalgamated here (pointing to the two ends of the strut), lets say.

Ideally, six and six I suppose; and then that becomes a strut at the next level of recursion

You do that 4 times and you involve two and a half million people.

How to run a country? It becomes plausible, doesn't it? Instead of sending delegates and all the chicanery that's involved in that pretty interesting?

So we've started various experiments on these lines.

The thing about this presumably is that not only do they come up with a set of policies and plans to take them through the following year, but I presume they understand each other a lot better and a lot better together during

Yes. That's the biggest payoff of all and this is what I was talking about infosetic consciousness as I call it ...

Oh, I haven't introduced the word 'Infoset'; that's an information set so the 30 people are assumed to start with a certain sharing of knowledge if they work for the same company obviously, if they are members of the same political party they've got a similar thrust, and motivation and party platform, and so on.

So, the infoset is supposed to have a certain cohesion before you start. Out of this comes infosetic consciousness which is the consciousness of the totality if this means anything.

As I said ... there's a whole the book is in 5 parts and part 4 is a discussion of this problem and I can't really go into that now.

But it really is damnably interesting and very very exciting to me.

You are talking about this for the level 3 ... level 4 ...

Homeostat

.... system would it not be quite valuable and quite useful for the level 3 ... between level 3 and level 1 management?

I should have thought so. You see, the reason I mentioned the 3-4 homeostat was that I have been asked the question very often "How do you pull off this massive important ...". I have always emphasised the importance of the 3-4 homeostat, then I'm asked how to pull it off. I'd really no answer, you see.

But now I have.

There are answers. Many kinds to how you do the 3-1 thing because it's much more established but I would rather do it like this, of course I would and then what about your customers; you see, I mean going out this way of the model. Take the system 1, it goes to it's environment and says "Let's have a syntegration". We'll have 5 suppliers, 5 clients, 5 customers, 5 of the manufacturers from our own process and so on.

Why not do that?

Now, I haven't had a chance to do this, I mean good heavens, there's so much that could be done.

The trouble is that they take an awful lot of arranging you know.

You've got to get 30 people and I mentioned 5 days and people not liking it. We've managed to reduce it to 3 days but it means that you have to hold a meeting in 40 minutes and you'd better move and you have to beat gongs and we've had a lot of fun out of that because people can see the problem they join in , you know, suddenly somebody has got a saucepan and a great spoon and is whacking it. Blowing whistles, we've had it all.

The difficulty with that you've still got to take 30 people out of the business environment for 3 days.

That's now you're talking like a good solid old fashioned manager, that's exactly what they say.

But the business has got to keep going

Absolutely so, but as I say they'll all go off for a golf tournament. I mean much of this is hoo ha isn't it?. Much of it.

If you are using this as a meeting technique for business you've got smaller variety of problem or issues to address than when Stafford's first was exclaimed you are not going to have someone come in and say "pray" ... well, maybe if the company is about to go down the pan but you're going to have every company most companies have ideas of issues they need to address, especially if they are trying ... whether they know it or not they are trying to develop this system 3-4 homeostat ... it may be their market ... it may be their company structure ... it may be I don't know ... I can think of plenty of things .. but if to start out with you could get these ideas or problems and issues sorted out it would save you time. Is that something you've done when you've gone have you taken this to companies?

Yes, but I don't want to do that, if you don't mind me saying so, because this is like drawing up the agenda in advance, you see, you are pre-judging all sorts of things. I want to start with my statements of importance and the problem jostle and see what emerges, you see. My rule all the time in my mind is never do anything that is going to impose something that we can't be sure is a good idea.

I think that with traditional companies this will be the worst problem.

I think it is.

You say to 30 people, look, we want you to come away for 3 days but we are not going to tell you what we're going to talk about

It's a devil of a problem, that's why we can't sell it

You've got to come on faith

But this is true you see of all new ideas if you just think about it. There's nothing novel about that it's the proof that this is an innovation that that happens, it always does. Einstein announces the theory of relativity he's thirty years on and people are still saying he's nuts.

The president of the Royal Society in 1900 said heavier than air flight was impossible with all the authority of the president of the Royal Society, he also said by the way that X-rays would prove to be a hoax, it's just charming.

If you really have an innovation, you are going to be in dead shnook and one has to face that it's no use getting put down you're only hope is that if you can make it stick in a few places, get it talked about then it spreads like measles.

But how long this takes is anybody's guess. I mean I started publishing the VSM 30 years ago. It's fairly widespread now, but nothing like it's potential ... nothing like it is realised anywhere.

Did you say that there ... in you're early books I know you said this concept it hadn't ... come forward yet ... it hadn't developed yet, is there anything written down about this?

My new book

Your new book

Sold to the lady for twenty four pounds ninety five pence.
(laughter)

This thing about cohesion.

Allenna, would you mind getting it, I meant to bring it,. forgive me.
Pardon

The thing about cohesion. I am interested in because I've taken part in two of these things ... synteegrations ... one was with the extreme ... group and it absolutely fantastic, it was just extraordinary. The second time was with a totally uncohesive group. There was nothing, absolutely nothing that they could get together and it didn't work very well.

How did the group get together

Jo, a graduate student and me, just desperately tried to get anyone we could think of and other people together

To join in.

Now, what I am wondering is I am sorry to give you these examples of where we have politics we wanted to get all the opposition parties in Wales together so maybe you had 8 Plaid people, you would have 12 Labour people, 4 Lib-Dems however many I've got left ... Greens ... you may have had Tories as well whatever

*....
(laughter)*

then what you've got, you've got the cohesion that all these people are likely to be terribly tedious political hacks. That the only thing they've got in common

(laughter)

but apart from that they spend their lives sloggng each other off and I was

I was disappointed

I was too.

You'd better bring Guy Fawkes in on the act early. Let him come.

Yes, I do agree with you.

We've all sorts of plans like this.

You take criminal justice. One of our colleagues in Toronto is a QC and he is passionately of the opinion that something needs to be done ... aren't we all but he knows some people you know hob nobs with judges. So our idea is the same sort of thing, you see ... 5 judges, 5 jurors, 5 ordinary citizens, 5 people out of jail, stir them up and see what will come out of it.

The capacity of this thing to create new ideas is unbelievable.

Isn't there a danger though ... you know how you were saying about the problem jostle you were saying that you get all the possible problems together and then they talk about the ones that they feel strongly about. Isn't there a danger that you'll end up with some of the may be less important things because they are more interested and there may be a really big problem that no one wants to tackle.

Yes. There is a danger, but on the other hand we are trying to assume that these people are really serious managers in the case of the company, and what you're not taking account of is facilitation. Now, all these meetings have professional facilitators and this is a subject that you may not know anything about.

There are now people who completely specialise in facilitating a meeting. Now we are training our own facilitators, they are getting certified.

(laughter)

Perhaps 'certificated' would be a better word.

And they are being trained to do this job. Now, here's the book. Thanks to Allenna.

It's come.

Recognise the front cover, this time?.

You see this fellow and this has 4 critic lines drawn in. (Stafford pointing to the diagram of the icosahedron on the front cover of the book)

It's topological murder, here ...

I thought I should like to read you the dedication which comes from the book of Proverbs, and I've given it in Latin because I love Biblical Latin ... but on the expectation that people won't be able to follow that, I'll give it to you in the King James version as we know it

He that answereth a matter before he heareth it, it is a folly and shame unto him (Book of Proverbs 18:13 (King James))

I'm pleased with that.

I mean I've said it in the preface .. this particularly applies to the idea of infosetic consciousness because everybody instantly says "I'm a psychologist and I'm telling you this thing ..."

So, there it is. Well now, what did I set out to do?.

There are a number of appendices here. One gives the full mathematics of the eigenvalue stuff although it will only be understood by a graduate mathematician. In the book itself I have tried to explain this for someone who probably has done only 'O' level maths which I think is probably everybody nowadays, pretty nearly.

It's really simplified, now what I set out to tell you was what these extra chapters are at the end.

The first one is the latest design for doing this, by the managing director of our company, known as the president being Canadian. The third is by Josephine Hancock and is the ... deals with this question of algorithms and why it's factorial thirty by four million and what you do about it. Now the next one you see is our chief facilitator, the subtitle of which is 'A Facilitator' Perspective', and his title is 'You Drive for Show But You Put for Dough'.

Some golfers here?. I didn't understand it either, so that's all right.

He explains it.

The second facilitator is also a director of the company. It's called ... sub-title 'Another Facilitators Perspective', which I thought was funny.

(laughter)

and that's called 'One Man's Signal is Another Man's Noise', which I like. And then comes the president again, talking about how you can turn the results of a syntegegration into workable plans which is very nice idea. And the final one is Allenna here giving a very brief explanation of what the VSM is, in order to make the point about the 3-4 homeostat stick, because this book doesn't talk about the VSM at all.

So, there it is and it's just come out. I haven't seen a review yet, very few people have got it.

Yes. Well, it arrived right in the middle of this meeting; don't you remember, I read a bit

(audience speaks)

Oh yes. I don't but Wiley's does.

(laughter)

Well right, I don't see why that shouldn't work between ourselves. It will go to all the obvious publications like all the systems magazines and so on. Nina has offered to review it because she reviews for The New Statesman.

Did you know?.

She's likely to do that which would be quite nice, wouldn't it?.

So, there are all the books, and this is the

I don't know if anybody has consulted this.

This is the leaflet about all the paperbacks and so on. I would like you to ... if you are likely to be interested to take one as I ...

I think I brought four copies.

You can consult all the books here if you wish and see what they look like, ... probably put you off, of course but there it is.

Thank you all so much for this, because tomorrow's meeting is going to be yours. So this is probably the moment to thank you.

I think you've been a wonderful group and you've helped me to get through this explanation.

It's probably the last time I'm going to do this because I'm fed up with it.

(laughter)

The students will have to watch you grappling, instead and then I will talk with them afterwards over a jar.

That's my plan.

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