

The Falcondale Collection

Stafford Beer

Initiates an Audience into the World of
Systems and Managerial Cybernetics

Session 5

The Elemental Organisational Unit

Tell me what you have done about this grouping business.

Well we've grouped.

Tell me what are the areas, that's what I need to know.

Manufacturing.

Pardon.

Manufacturing.

Put your hands up so I can get some idea. Yes thank you there's three of you.

Retail well retail outlets in the end we put it under the title of retail and all hell broke loose.

Manufacturing, Retail.

Education.

Education, that's very broad.

We'll narrow it down.

Whose education, oh I see you. I should have said that you don't have to be one group necessarily you could be two. But I want to get some focus that's all.

Democratic Welsh Parliament.

That's not what it started out as.

Is this a viable system. It's a very good one.

Me and Claire British Rail or Transport

Gosh we've got five have we.

Yes.

Retailing, education, manufacturing, Welsh parliament and transport.

Right so now we are going to assault the whole problem of how you model a viable system given that we've got some tools in place now and some insights I hope and the first thing you'll realise is that we are not going to do any thing like the business of the family tree. Which is what you would find wherever you go and I would say that this thing and all my life I've gone into assignment and they've said proudly this is our Organisation Chart, the only use of this thing is to find out who you can blame, there is no other value and you see all this stuff and the sophisticated versions have things going across with funny coloured lines and dots and things pretending that somebody is somebody's cousin you know and oh dear me and what's more they rambled all over the place. Now what we are going to do is say OK I have a ??? in my viable system and it has components, these components are viable systems that's all. Unlike the Organisation chart which rambles on forever down the side of a building. So how can this possibly be. Well I'm going to take the example of defence because it is something that is readily understandable. I am going to model defence and partly because it didn't come up. I'm going to model defence, so that is the total system. Now what are the active components of this viable system ?

Threats.

No. No. No.

What? The different forces.

Yes what's its membership. Yes.

No its membership is quite clearly the army, navy, airforce, marines and perhaps something else. So that is what I call System One. System One is to be identified as what is going on that makes the viable system what it is. And you see I failed to get you to identify any systems just now which were not viable and I find that quite fascinating that you seem to willing to think of anything as a viable system. Well I think we should find out that some are not. But you see can certainly consider an army without an airforce, wouldn't be very effective you would get plastered. But there it is. Its an army brown jobs different uniform altogether. Navy, airforce, now that's all. Now supposing you are the commander in chief of the army. Then you may say 'Now look here Stafford, I'm the big shot, I'm running the bloody army and you've just got me down in this box'. I say, hold it General or Field Marshall, I'm coming to you in a minute eh forget the airforce forget the navy. Now we're talking about the army, what is the system one of the army.

Soldiers, Infantry.

Infantry.

Tanks.

Tanks.

Artillery.

Artillery.

Poor old engineers where are they, so these are... Now the system one's. Note the second level of recursion of defence. So if you are actually doing this job you will have to do several second level recursions because you will have defence with army, navy, airforce. Then you will have to do this is the army tanks etc. etc. This is the navy destroyers. This is the airforce, bombers, fighters. So that is how this thing is built up. Now let us take the artillery I am the MGRA as he is known the Major General of the Royal Artillery and I am now saying hey I am general don't treat me in that little box. Cool it general I am coming to you. This is the Royal Artillery. Now what is the system one.

10 inch Gun.

Mowser.

Very close.

Field artillery, anti-aircraft, heavy artillery, mounted artillery so you go on. And you will go on in these paired viable systems until you hit the deck, which is bound to be actual people because it always is. Which is very interesting. We are talking about organisations you don't have organisations of computers. You have organisations that end up with people. So in the case of lets say the infantry, you are coming down this line and you come to the regiment, and the component of a regiment and then, what are they ?

Battalions.

Caught myself out here, Pardon.

Battalions.

Battalions, thank you very much.

Battalions, its components are going to be, I guess companies by now, companies, platoons, platoons now you've hit the deck, got sections of men so your company is about 100 people divided into 3 platoons of 30 lets say. And your platoon is now going to be the platoon commander and the sections of soldiers. So that is how it works so its always in pairs and now you see the importance of the notion of recursion, because you've got the same model all the way through. Now this is very startling to people who have studied organisations because they expect them to be different and what is written on the side of IBM is not going to be the same

as what is written down the side of General Motors. In our case it is going to be the same until you look at the close print. Now this has an immense and immediate advantage that I would like to point out to you. You take trying to institute change in an Organisation. We've had in our lifetime some enormously universal example of that with the introduction of computers and automation. Now I got my first computer in 1956 because as I told you, I was in on the ground floor of this and I was determined to get one I had the seventh Pegasus and you know those were the days, this is now in the science museum for goodness sake. I was terribly proud of this thing.

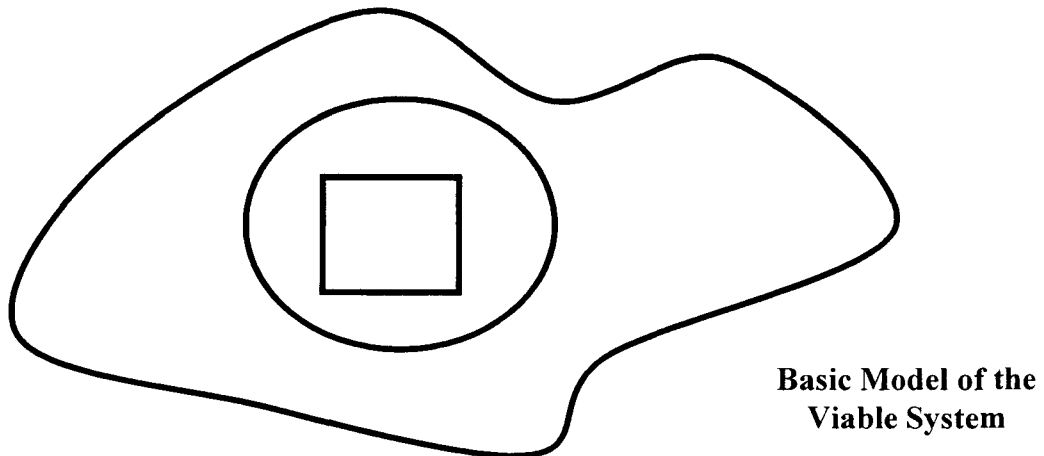
Terraced house in Basingstoke.

So, this filled the semi-detached house itself, yes, although I was in Sheffield not Basingstoke and it had a revolving drum for the short term memory with 1024 words on it. It was very exciting you had to keep it at the right temperature or it blew up, it really did.

So after the mid 50's - 60's people started going into organisations and saying you are going to be automated or computerised whatever, where is the Organisation Chart? Now we're back to this family tree bit. So in you come, you band of happy technologists and you say 'Chaps we are going to computerise you, kindly tell us what you all do'. And so you do all this and you go through that, and you put it all on computers. Now this is what I used to castigate as, em, automating the quill pen, you see. Because you didn't stop to wonder if things should be different now you've got the computer. You were writing that don't need to write it anymore old chap we can put it into the machine. And the result was that it took a year to do that department and then breathe a sigh of relief and hope the thing got debugged and went out the corridor and knocked on the door and said 'What do you do in here', and started all over again. Now you can see my approach, if you are in some kind of context like a manufacturing company or a retailing company or government or what ever it happens to be, you are likely to be able to build the same model at every level of recursion in terms of your computers. Because it is the same kind of stuff going on. And suddenly you've got great savings, because you are looking at things through the same pair of eyes. And when we build the model you can test that out and see what happens. But, this is the secret of what I did in Chile for President Allende, which is really quite famous and historical work because of what happened to him and to poor old Chile in the process of running foul of the CIA and Doctor Kissinger. In two years I had 75% of the social economy automated in this system. And all my critics said this is impossible it has got to be a ridiculous claim, you couldn't do it. Why because they are used to this approach of going in there and at 75% of the social economy you do the first department in the first 2 years. But, I had 11 levels, watch it, 11 levels of recursion through the thing, so, very exciting. If anyone is politically motivated to read that up, the second edition of the book Brain Of The Firm, the last 5 chapters tells the story of how this was applied in Chile and its very racy stuff I can tell you and a very exciting time. The most exciting time of my life. So.... So the notion of recursion, the notion of two stages at one go. Eh, now what are you going to do.

What is that?

Fig 1



That is the situation. Why does it look like it looks? Because as we have already said we have found it very hard to understand the boundaries of a system. And we are wise to think careful about just what we are including and just what we are not including. So I always draw this amorphous shape, I'll call it an amoeba. To remind ourselves that we are not very sure where this is. What we are much more sure of, is that embedded in this, is a circle and so I draw that as a proper circle, which is the process that you are managing, this is what you think you are running. You think you are running this if you have correctly identified it. I really softened that up yesterday didn't I. So don't be naive about it, that's what you think you are running and embedded in that is a square which is the management. Now I like to draw it like that, because obviously the management is supposed to be infusing across its own boundaries, by osmosis or whatever, the process it's supposed to control, and the process is infusing out into the environment, which in the case of manufacturing would be the market and this is the manufactory, the factory. So that is the basic model of the viable system. Now what we need to do is pull this apart in order to discuss it more fully. And what I am going to do is draw my circle there, my box there and my amoeboid shape there. And instead of all this woolly business about how this is to be disseminated, I am going to put a simple thing like that!, So I am saying the management will influence the process and the process will come back and influence the management and the process will effect the environment and the environment will effect the process. So that is our basic model.

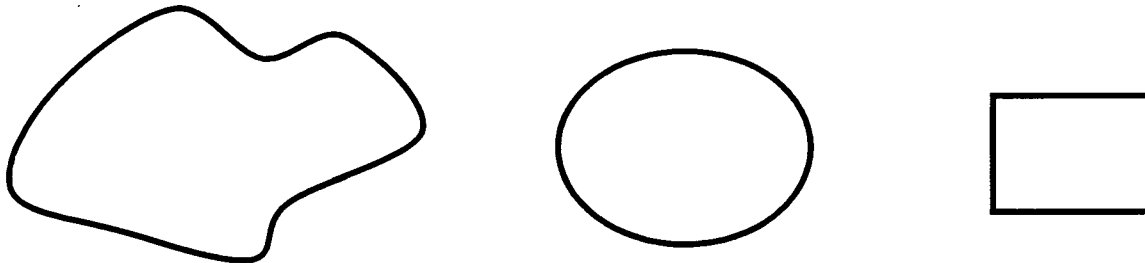


Figure 2

So these are the three things that are going to formulate the System One. So going back, if this is the whole thing we are dealing with is defence, now that is the army, that is also the navy that is also the airforce. It looks like that. Now, what can we say about this?

Now, I've tried very hard to rattle you about the question of variety, and there is a hell of a lot of variety milling around there that I have reduced to four arrows. Now can we think of anything to say about that variety that is depicted flowing on those four arrows. Apart from the fact that there are dozens and dozens of arrows which are encapsulated in one.

Are we assuming that they are matched.

Aha exactly. Well are they?

No but is that what we are to assume because there is one of each.

No. We are not to assume anything, we have written this model on the mirror. Now we are going to ask what we know about the variety? Have a go because there are some things we can say.

What goes in to something must come out.

Very true, yes, but that is not what I am after. No, do you remember I was saying to you, that its frightening to think that we have a measure of all these possible states, but you probably don't have to because do you remember the example: 'Who does this coat fit?'

Oh yes!

Now, if you think in those terms of relative variety, who has the bigger variety, the management box or the process ?

The process.

Obviously, isn't it. Obviously the management isn't going to note that you on machine number 6 have blue eyes, all though you have, no you haven't, I'm sorry, no offence. The management, all those details are in place and constitute part of the variety which may or may not become important for instance eyes suddenly become important if you start flashing, welding guns, oxyacetylene around. So you never know what is going to be relevant, but what you do know for sure is that surely the variety of the process is greater than the variety of the management. Now then requisite variety, problems. And what about the relationship between the process and the environment.

The environment is more complex.

Obviously again. Quite obviously, so without actually measuring anything, we know fine that this is the inequality that we are dealing with. There is a big V there, and a smaller V there, and a very small V there, and the mathematical symbolism for this is that, this is very much smaller than that and that is very much smaller than that. And that is the mathematical inequality that we have to deal with.

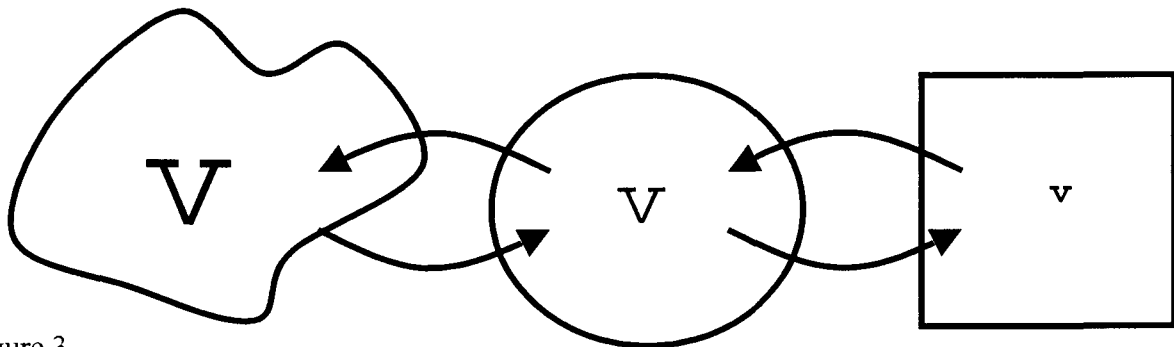


Figure 3

Now, so lets take it easy, calmly What can you do about that? You know from Ashby's law that that's no go. The environment is going to swamp the process and the process is going to swamp the management Now there are only two things that you can do, actually if you think about it in general terms. Now what can you possibly do ?

Reduce the variety ?

Yes, reduce the variety of what ?



Of the environment

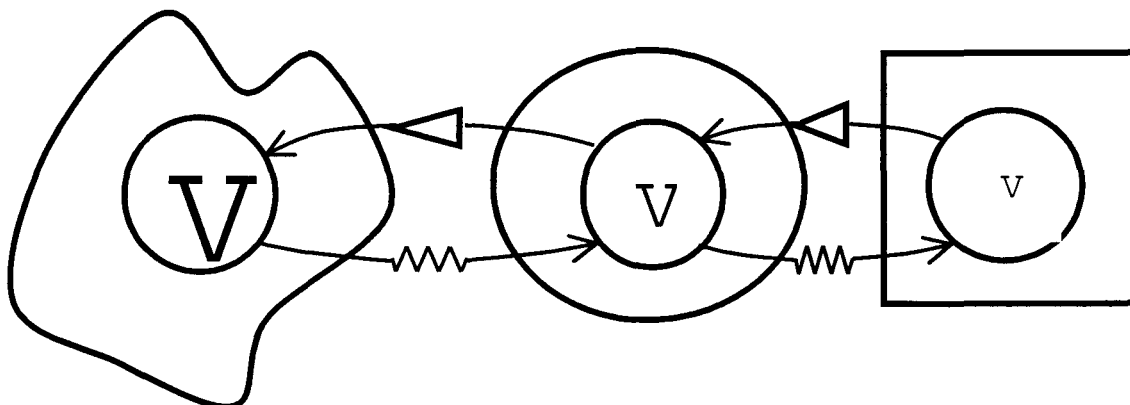
So you want to reduce that bottom arrow..

So that, so that the circle can...

Right and then you could reduce the one going to the management OK. What else can you do ?

Increase the variety ...

Increase the variety going out. Now we can easily amend our diagram to deal with that. This isn't going to work I can tell you; Now, there is very little symbolism required here but I would like you to get hold of it because it is useful to us. These symbols come from ordinary electrical engineering. This symbol is an attenuator , that means reduce variety, this symbol is also an attenuator and this symbol is an amplifier  now we've got the whole story in a nut shell very fast to and I submit that that will apply to anything that you care to analyse. [Picture 4] So the question is what management techniques are available to us to effect these amplifications and these attenuators.



Amplifications and Attenuations

Figure 4

Now, I have challenged audiences, particular the senior management audiences, for thirty years, to tell me a single management technique that isn't one of those four things. Nobody has ever succeeded. So I am asking you. Name a management technique, you know the sort of things that people buy by the bushel and run up the mast and everyone has to salute?

TQM. Total Quality Management

TQM. Right. Perfect example. Now, what is that supposed to be doing?
That's the problem that everybody has.

I'll say.

Especially. Making everybody involved in the company see that their input is important to the total quality end product.

Yes that's right. Well now put it in terms of our model.
What is it doing on this line, this bottom line here, which is the attenuation line. What is TQM doing there ?

It is making people more responsible for what they are doing so that they don't mess up.

Absolutely right, except that that is the next one.

Right

There is a process effecting the management you are making people more responsible. And on this side you are trying to convince your customers for example, that they come first that quality matters and all that jazz. Which is to attenuate their variety, because if you are successful you cut out complaints. Everything is sweetness and light you see. Now, you will know if the system is in balance because you will be in homeostasis. And the interesting thing about having to measure variety and so on is that if its working you don't have, because everything is sweet.

Now Ashby calls that situation a self-vetoing homeostat, by which he means, that the messages on all four of those lines are 'I'm OK'. Instead of 'Here is my balance sheet and here is my list of my this against that and this is how I've succeeded and failed', it just says 'I'm all right how about you?'

Black box sort of thing.

Absolutely, a black box precisely correct. Now this is very exciting because we can begin to see. I told you right early on that I see management as the process of coping with complexity and not managing their materials, machinery and money. Well here it comes you see, we are trying to handle complexity which will engulf us if we don't handle it. So lets take another example we have had TQM so what else do you do in management ?

JIT. Just in Time. Another one of those.

I've not heard it called JIT before, yes Just In Time management, well you mentioned it so tell me what it is here its so obvious isn't it ?

I didn't really expect you to say that. I thought you would tell me. Here again it comes in the problem you mentioned it in TQM, the two are interlinked but it is effectively people taking responsibility to minimise.,

Well there is more to the responsibility this time. Because you are dealing with the flood of variety that would otherwise engulf you if you ordered everything randomly in advance. And you are saying 'I am not going to order this until I need it', so it's a huge attenuator on this one is Just In Time management.

On which time is that. The amoeba this one.

Isn't it also the amplifier management to process.

Ah, we haven't had an amplifier yet, so go on.

Isn't it the fact that you're increasing the variety of the management, by, in a way making the job, I don't know, slightly, well more complicated, but increasing the variety of management isn't it an amplifier on the management of, to the process arrow?

I'm not sure, you see, look here, there is no school book answer to this. Because what you find is that because these are real life techniques, that they appear all over the place. The only point of trying to identify them is to understand the machinery. Now, I don't think that Just In Time management is usefully described on the amplifier loops. I think it is very much about cutting down the variety of all the capital investment and 'hoo ha ha' that's involved in the purchasing system. I'm talking now about the manufacturing company. We have to bear in mind our other things as well. I don't think schools work on the Just In Time management except that the whole thing is just in time.

How about, erm, project management, would that be an amplifier? Because you are dealing with, you are looking at a complex situation and you are having to cope with the people, equipment and you make it more complex and you try to manage that complex project.

Yes, I think that that's right Jane. So you are looking at that amplifier from the square to the circle right, I think, and you are saying, 'Well I am going to focus something in order to amplify me as a manager, I will have a project team with this task'. And that goes round that loop of course because they are reporting back the other way. I think so, don't you ?

Well you are just trying to find out the best use of the terminology...

I agree that its an amplifier but I think I would have said from the process, the circle is the process isn't it? To the environment.

Well it depends what sort of project it is. It could easily be. The one that I think that Jane had in mind was, if you sent the production engineer out from the management, the square to the process to improve the process its nothing to do with the environment. But if you send out the project team into the environment. To do for instance, to do market research, then you are out there. Yes, absolutely. Now market research is a very interesting example. Who wants to risk saying where that belongs on this diagram ?

Market research is going from the amoeba into the circle

Yes on the attenuating link then..

On the..

Now you are a very bright lot. Most people think that.

I can't get the words right.

Just get used to it, they are technical terms. This thing is an attenuator, which means its cutting down variety and the arrow is an amplifier.

Now most people fall into the trap and I'm very glad you haven't, because it shows that you are thinking of, assuming that the purpose of market research is to amplify something to get more knowledge. But of course it isn't, it is to cut down the variety of everything that is out there in order to locate you targets, otherwise your just preaching to the heathen, nobody knows how the heathen is structured. You find out how the heathen is structured, you can target them. So it's a very, very strong attenuator. Now some of this stuff is however an amplifier. What is that when we interact with the market, that's an amplifier?

Advertising.

Pardon.

Advertising.

Advertising, of course and that is an attempt to say that we are much better than you think we are.

Though it is much better to know we are.

So there you go with advertising.

So, its fun isn't it, because this gives you a uniform way of assessing all this. Now I think I should have brought that actually. There is a page in my book Brain of the Firm, a double page

which isolates, Golly! I've totally forgotten what this precisely does! Its got almost every management technique I could think of on it. It classifies them under these heads, I think we must make a note to.. I can bring it down from the cottage and get it photocopied for you. it really is quite fascinating to see that everything you do can be reduced to this.

Now, one of the consequences of that for a manager, many management's drive themselves and their folk insane by .. Because of, a bigoted view of what is correct. And they say 'we obviously have to deal with this situation' and the way that we are going to do it is payment by incentives or management by objectives or something. Now, supposing that the situation is that is very nearly impossible thing to do because maybe the unions are as bigoted as the management is the other way around. Would you believe you could get a rail strike like that. Now, if you are quite clear as a manager or as a union for that matter, that you know that what you are trying to do is actually to reduce or amplify variety on this arrow, and you know that this way of doing it is objectionable, then you choose another. Because you are now classifying your alternatives under these headings. And there is no reason why you should plump for one thing rather than another if its going to have the same sort of effect of producing amplification where you want it, or the reverse.

Now, I find this absolutely incredibly exciting because it looks such a simple little model and we haven't done with it yet by the way. We are already finding out that we can use this in any conceivable circumstances and we have already wrapped up the whole theoretical management, takes you three years to learn this in a business school.

Now, so much for formal techniques, but supposing you just want to do something and you wake up in the morning and you say 'Why don't I do this?' Now you analyse this by this chart and say just a minute but what am I actually doing and how am I disrupting the homeostasis you go 'wow'. You may decide that you better think again.

So you see what I am really trying to say about homeostasis, is that, think about the self-vetoing homeostat. That most things run themselves if they're left alone and the idea of the manager leaping around and trying to control everything is not only silly, but impossible because he doesn't have requisite variety. And yet many managers have this image of themselves. Hitler did you see, look where it got him he was trying to run everything, you can't do that I mean you can't do it its not whether it is a very good idea or not, its not possible. So you mess around with your generals, Churchill was nearly as bad of course, messing around with your generals who are supposed to be running the thing.

Now what I am saying then is that the variety balance of homeostasis will take care of most things. And the managers real job is to put the fine tuning on, depending on his perception of the fifth system he thinks he is controlling. Basically, the variety will absorb itself, and this is no where more obvious than in the gross case of a manufacturing company. There is the management, the manufacturing is going on in the circle. It is in tune with its environment. Now what is going to happen on that loop? Somebody says 'this is too expensive', so the

orders start drying up. So you say 'our markets been attenuated why is this'. We'll relax the price structure and see what happens. OK the amplifying message goes out saying 'Well there is more than one way of skinning a cat fellas, you can have a different bunch of tricks to pay for this, like instalment plans or something like that. And suddenly the thing comes back again into balance.

So the messages you are going to get, the messages you should be screaming for, are the messages that tell you that the self-vetoing homeostat is getting unstable. Now that has all sorts of consequences, once you can see that that's the point, it has all sorts of consequences in the way you organise you information system. Now, I was trying to argue earlier, that people have computerised the quill pen. What we should be thinking is 'now I've got this extraordinary powerful tool called the computer, how do I rethink the process of managing given that I have this capability'. And you don't end up with anything like what you used to do, why should you. The limits on what you used to do where the limits imposed by how much a person could write with a quill pen in a given amount of time. That's irrelevant now. So what is the thing you want to do with the information, what you want to do is monitor these homeostat's.

Now, if you are going to do that, you better do it in real time. Why not. We have all the technologies to do that, but again we have copied the old things. So we use all these computers and end up saying 'Here on the second Tuesday of this month, we are proud to present the results for last month'. And that's a big update on what it used to be, it used to be two months out of date, now its only a month, oh great. Now, what can you do with these results. I have now been on a large number of boards and people come up with all this data and say 'look there it is'. All you do is cry into the beer and say 'oh god' and the best you can do is to say 'learn from this fellas, don't lets do that again'. But sure as hell its too late for the stuff that has already happened. Now, you use real time and you say 'there is nothing to stop me finding out what is happening now over there', because I've got it all wired up. Now what is the good of that, because you see, instead of being the second Tuesday of the month, you were actually, yesterday, it sounds good, its a big improvement and all that, but you still can't do anything about yesterday. So what am I fishing for can anybody tell me?

You want a very short feedback loop.

Yes I do. But for what reason?

Response.

I've been talking about whether you can do anything about it.

You can find out about it when it's happening.

Right, what can you look for that you can change before its too late. One word covers it all can anybody think of a suitable word?

Adaptive, adaptiveness, closed systems.

No, I'm asking you what you are measuring.

Complexity.

Yes complexity, that's good its something that is complex anyway. What is it about the complexity.

Its variation.

What is it about the complexity that we are after in this circumstance?

The variety of it.

Lets push it.

Yeah, but we are talking about whether we can do anything about it. We are talking about this time and delay.

How complex is it.

Yes, but that is going to be there all the time.

What is happening now. What can we measure now, that means we can do something about it before it happens?

I'm nearly giving it to you.

Its the variation from your set conditions.

Right that's getting nearer it.

Change.

Change good.

Stability.

Stability. phew thank goodness. Actually it's instability that you are trying to measure and you are picking up something that says 'hold it fellas, this is going unstable'. Now you have a chance to do something. You can move in and say 'hold it, that's getting unstable, don't let it happen'. Now all my reporting systems that were in the viable system theory are in real time aimed at that. To hell with history its pointless you go in and you try and pick up instability before it gets damaging. Now all this is possible to you see because something going on nicely doesn't normally just crash its starts wobbling you're after the wobble. Now can we do that? Of course we can do it. The theories of mathematical statistics are immensely powerful but you can't talk to a manager about theories of mathematical statistics. But that's what you need and then again what are you going to measure. Now we've already had a bit of a go at that yesterday. If you start measuring all the routine things they will wobble as they will always do and therefore will not get any new information and you will say, yes, the stockmarkets doing this, it usually does on Tuesdays. The information, what is it you see. Now all sorts of people have a vested interest in information. Trying to sell you newsletters, trying to sell you all sorts of things. I'll give you a definition, my definition of information is 'what changes us'. Up to then the stuff is data. Data is useless, until its transmogrified into something that changes you. And companies, hospitals, dear god the health service spend millions and millions of pound equipping themselves with useless data that they can't transmogrify, to use the word I use. Nobody has asked me what that meant, so I guess you found out.

No Just didn't realise.

Convert will do, you know. It means to change the form of into action and that's the only thing that matters. The rest is post-mortems, and crying into your beer and all this. You don't need it.

So that's what I've always trying to say to set up and I'm always trying to find things which you can measure that will give you some information. Now all this, I mentioned vested interests here you see accountancy and economics, have huge investment in saying this is what we measure. The fact that it is no good to you is neither here nor there we're going to measure it and its going to cost you an absolute fortune to do it, and I say what can I measure that would detect instability. Now I want to tell you a little anecdote here which is a true one. All my stories are true unless I advertise that they're not.

A few years ago Allenna and I were appointed by the United Nations as consultants to the President of Uruguay. This is a dear delightful man, a lawyer whose name is Dr. Julio Sanganeti, who is no longer President because they are now working on a constitutional basis and last a few years and then replaced. He was replacing a military hunta, which had been in there for 12 years and committed mayhem. And he had all these problems about amnesties. Everywhere you go you get this problem in the third world. If everybody in this room has had a loved one tortured and killed the first thing you want to do, is wreak vengeance on the bastards who did it. But you see, the military are sitting there waiting to take over again at a drop of a hat. So you can't suddenly start trying all the generals and hang them. Its an awfully

difficult situation, I've seen this over and over again. Well Sanganeti was faced with that, but that's another story. What I was getting to is what can you measure. Now, I looked for things that I could pick up in real time that can be totally instability, I was explaining this. I was in Sanganeti's office explaining this to him, Allenna by my side, and he said 'Well I think I've got a pretty good team in the presidential office, I would like you to look at this'. And he went over and got a book and he showed me this book. And he said 'This isn't out of date Stafford, you can see that this is this week'. And it shows the main indicators. Now that's the word that everybody uses you see, the indicators, the PE ratio in business, the rate of foreign exchange and these kind of things in Government. And I said, 'Well yes this is very good,' And I was honest, I said 'I don't think I've seen a better set of Government statistics geared to the point where the president can actually read it, rather than masses of bumph'. 'But you see,' I said 'I'm looking for something more sensitive than these standard indexes'. And he looked at me and said, 'I'm going to risk this,' he said, 'Turn to the back of the book.' And I turned to the back of the book. He said, 'These figures I ask for every day, and everybody thinks I'm mad. But I've got a hunch you won't'. The sale of bus tickets, the sale of milk, I could have kissed him I mean this is exactly what I am talking about. If the sale of bus tickets fall off from the norm it means that people aren't going to work. If the bus tickets fall off you.. Ah I thought its wonderful.

Now then, the conclusion of this story is, I went again with Allenna, into his office one day. And he was more or less leaping around waving newspapers and he said, 'Have you seen the newspapers?' 'Yes, we've seen the newspapers'. Now the newspapers said, I forget exactly how long he had been in office. It might have been 9 months or a year. Perhaps. it was a year. The newspapers reviewing the year had discovered that his policies were working, so there are all the indicators of the foreign exchange, and deficit was better, the trade gap is better and all this jazz. And he said, 'Well it shows you, this media thing that we have often talked about. I knew that we were on the right course nine months ago, and now they have finally caught up, and they are telling the people that it's worked'. And I said, 'Yes, well that's the usual lag, but well done Mr. President'. And we were sort of drinking to that when Allenna, who had been thinking a bit in the background said 'excuse me president, if you knew this nine months ago, why didn't everybody else? And it can't just be that it hasn't seeped through the media'. And he said to her, 'Oh I knew, because of one of my special things in the back of the book', and he went and got it. What do you think that it was? The consumption of electricity on a daily basis, after three months, phee. It meant that everybody was getting back to work. And he said, 'I knew that when I saw this huge thing, that it was working. But nobody thinks it out for another....' And he said to me, he said to us, 'Do you realise that my Government could have fallen a dozen times in the last 9 months, because nobody knew this except me'. Now, these are very telling arguments aren't they. You see what it means is that you've got to change the whole style of management. This is why we don't get anywhere. Because, you call in consultants and they do their thing and they paste over the cracks and you've had some. Obviously, I can see by the smirk on your face.

You've got all the pet nostrums. You've got the firms of consultants, who increasingly you notice, are accountants. Accounting firms with management spin off and they have a huge interest in what they say. After all, if you can tell a company that it is going bust and it better merge with another, then you've earned all your consulting money. And your other division, which is called mergers and acquisitions, is now going to cream off the rest. I'm dreadfully cynical about this. I'm really quite bitter because I've watched this happen in England, United States and Canada, which are the rich countries that I know. Just as I have watched the deprivations of the World Bank and the I.M.F. destroying the poor countries that I know. I'm in the middle leaping around in the middle saying, 'My God, what can I do about this?' Well, all I can do, is try and promote this kind of thinking.

Now then, requisite variety. So far the whole of this session is devoted to this very silly little diagram. I hope I am going to convince you that it's not so silly and it's not so little. We have already got quite a lot out of this and you wouldn't think there was much more, but there is.

So far we have been talking about requisite variety in terms of the blocks of available variety in the square, the circle and the amoeba. But now, we have only considered the arrows as means of redistributing their basic variety. Now I want you to think about the arrow. That is called the channel, and as I said before the single arrow sums up a whole lot of channels.

Now use Ashby's law to think about the channel itself. What do you come up with?

Variety absorbs variety.

Well yes that is Ashby's law, put some flesh on it.

Would you want the arrows coming out to be the same variety as the arrows coming back in?

Well, now put the amplifiers and attenuators on to deal with that, I'm talking about the channel itself. What are these channels in real life?

They've got to be big enough to handle communication.

Spot on.

The channel itself has to have requisite variety. It's not enough to say 'I've connected this to this and somebody is waving a flag.' It's got to have enough. The word information theory is channel capacity and it's the perfect word. Why don't we use it?

Now, an awful lot of things that go on which are supposed to work, fail because they don't have channel capacity. You know the famous poem Not waving but drowning.

(Stafford waves in the air) Its doing this!

It's not enough.

It hasn't got enough channel capacity. Poke around in that and see what you come up with about channel capacity itself.

What about advertising, you mentioned that. You take a page in the Times or somewhere and you could practically write the Bible in this page and you could say this is very high variety channel. Do you think anybody is going to read it? Where does all this white space come from on advertisements? It is an attempt to work out what the channel capacity is of the reader, because that is the guy who counts. We established that yesterday. That the perceiver is the one who counts in these systems it's not what you think you've done but what the receiver gets. Now if the receiver sees a page of print like that he isn't even going to look at it. So alleged channel capacity in practice is nil. So you put a huge white page and in the middle of that you add 'Hair'. Do you remember that? No, too young. When the opera, musical, my favourite, Hair came out. The advance publicity was exactly that. All over London there were hordings that just said Hair, and nobody knew what it meant. That's very clever. Now the channel capacity is being used in a most extraordinary way with all this white space and this one word on it that doesn't mean anything. Now, I don't think advertising boys are seeking these optima of channel capacity without understanding any theory. They are doing it by hunch. So they're walking around in purple trousers and call each other ducky and have these inspirations. They would be much better to try and measure a few things around the air and see exactly what amount of information you are going to get across. Look at all the stuff about small print for instance, it's just incredible. The insurance policy, you say read the small print, you can't, nobody does and it's become a joke. On the other hand it's a con trick.

Come on, more about channel capacity. Look at the management end of this.

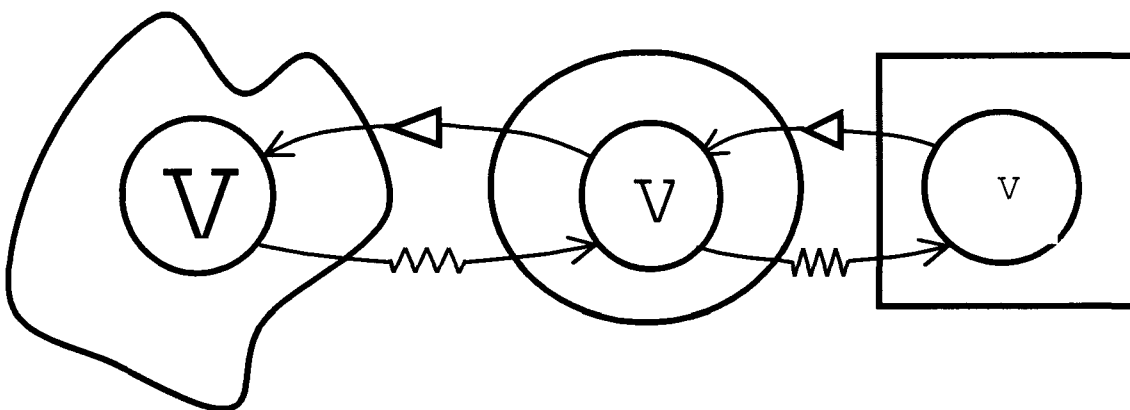


Figure 5

I'm the big white chief, I'm the boss and I say 'this is my policy, what happens to that'.

There is all the work force in the circle.

Memo. Pardon. Memo.

Memo, yes that sums it all up doesn't it

That's not going to work is it. No one reads those things, and anyway it will be put in the most God awful gobbledegook. Which managers think is impressive writing and no one can understand it.

Don't they try and get the Mission Statements out?

I'm glad you mentioned this Jane. Would you like to give us the disposition about Mission Statements?

Well I've seen a lot of company's and they're all into this Mission Statement. And I reckon you could write a book on just the ..., I think you might have 20 sort of statements which most of them have chosen from, 'Oh well, I like that one, I think that will do'. And then what happens is they get these little cards, you know this calling cards you get, with your name on, which has your mission statement on the back, and you get these out. And then what happens is that these get printed out on all the notice boards, and everybody's supposed to read it. They then stand up and say, 'our Mission is this'. And people go, 'right'. The manager goes, 'yes, our Mission is this'. He's just said it and then on the shop floor its 'yes our Mission is this'. And nobody is the wiser.

What sort of thing is it, like 'we shine it better?'

Well like Rover 'We are committed to giving a quality car, become world class'.

World class applied to erm...

You ran into this obviously.

To the benefit of our shareholders.

It's usually sentences.

I've got one in my room if you want to look at it.

Yes, you've got one in the car!

It states the obvious.

That's right, Mr. Major institutionalised this you know, with the Customer, what's it called? Charters. Have you read any of them? Charter for health is to say - we will make you better, or something. It's just ludicrous.

Don't they, look at the hot lines on the motorway?

Exactly.

When you really look at this you know it's well intentioned but look at the cost and what it does to this variety equation is nothing.

I'm so glad you said that Jane. You, you put it very nicely. I've seen hundreds of these things and they are unbelievably banal and dreadful.

That's what I mean and you could write a book and they could pick out of the book.

Absolutely.

Children's nursery rhymes.

I will give you a tip about those things, which you can use in a much wider scenario.

Now, I used to study logic and I stumbled, I suppose stumbled, on the following: You take a sentence and negate it.

What's that?

Say - not - somewhere. To say the opposite. Now, if you can't argue the opposite it is not worth saying.

Now, 'God exists'.

Oh no he doesn't.

'There is no God.!'

Wow, we could burn each other at the stake, it's been done for hundreds of years, over that issue.

That is a real issue.

But if you say, and I saw this in a Mission Statement Jane. 'We will act within the law'.

Now, you can't possibly publish a statement that says, 'We will get round law if we possibly can'.

It's meaningless.

And why I said it was much more use to you than the mission statement. If you are in a book shop and your trying to decide whether you want to buy this book. Negate sentences at random. See if they are worth it, and you soon find that practically everything in the book is meaningless. Because you couldn't possibly say the opposite. It's a very good test, I really commend it to you.

And of course, politicians speeches.

I was applying this the other day to Mr. Blair and he didn't get very high marks.

Anything he said was the same either way.

He couldn't negate it.

Did I tell you about the anagram?

Yes.

So, some of these methods we were looking at, let me remind you. We were looking at the variety on the channel and people don't, in the short they don't, analyse it. And do so yourselves and ask yourself whether this good intention of the management telling the work force something actually worked, and whether the work forces attempt of coming back to the management really works, because that is likely to be written off, as 'oh they're belly aching again', and it has no content.

I really have had an extraordinary life in dealing with this management union clash. As I said to you yesterday, 'It's totally unnecessary' as far as I can see.

There can be a tendency with those communication links, where management may have good intention and they communicate those good intentions, but in actual fact the policies and methods for getting them into fruition aren't good enough. So it doesn't happen. There's a basic attitude of what the management say they never do anyway, so the whole communication link breaks down.

Are you saying that it's falling on deaf ears?

It does eventually, if it doesn't get successfully achieved.

You are discussing my next point before I've made it, you two.

This is great.

Can we just back pedal a minute and then I'll let you loose.

Simple diagram, I said. Now, I repeat. Blocks of requisite variety you've got to have in place. We've discussed that.

Channel capacity.

What's the other thing, that's actually on that diagram that we have to attend to in terms of requisite variety.?

It's there but I bet you haven't see it.

Try and answer what you think it might be?

Is it the flow around, the direction of the...?

Well you're getting nearer.

Direction of the amplifier perhaps?

Well that's clear.

The response to the flow of the information, either its success or its failure being fed back, not necessarily as an indirect response, as a direct response. I don't know?

(Laughter)

You're very close.

Try and analyse it.

We've got a message coming to deal with the requisite variety of the blocks.

We've got a channel in place that we think is adequate.

What can go wrong?

If it doesn't flow through the channel properly.

Yes you're very close to it.

Come on Lindsay.

The Receptor.

Receptor, that's the word.

Our technical word for this, and I'm only giving you a minimum of technical words.

It's here, there, there, there and there. What is happening at all those points.?

For the whole diagram. What characterises the things?

The transducer.

It's the transducer, and that's the technical word, well done.

I can go home.

Transducer - Latin - transduceraī - lead across.

So, what have they in common, these points, these eight points.

There borders.

They cross the boundary. Exactly, they cross the boundary.

So wherever you cross the boundary, you have to have requisite variety.

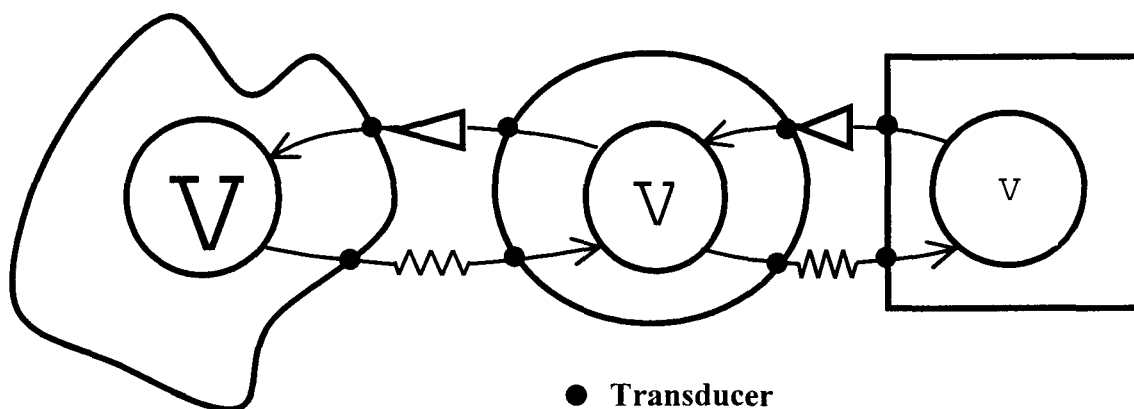


Figure 6

If I was Chinese and I understood everything. And I've got an enormous vocabulary and I'm come and tell you the secrets of the universe and none of you speak Chinese, too bad.

That's because there is no transducer.

Now, you can get some of this stuff in place and now you can see why I said you're getting ahead of the story, because both of you were talking about transduction. Eventually.

So, if the President of ... was it Uganda?

No it wasn't, Uruguay.

Well I was close.

Only the other side of the world. Interesting definition of close.

But.. It's all perception.

But the reason why he.. He would fit in the square, his government would fit in the circle or his country would fit in the circle, maybe and the amoeba is everything else.

And he hadn't actually communicated that things were on the up after three months, whatever. So even if the ears were open in the rest of the country, why didn't he communicate that then?

Well he did you see. But nobody heard him because there was no transducer.

The press is the transducer, and they are busy rabbiting on about their own concerns and photographing people in the nude and so on. If they can catch them.

But how do you make those receptive?

Ah, you have to analyse them, you see. So if you are doing this kind of analysis you go in and say have I got requisite variety in the box, have I got the channels, now have I got the receptors.

Now I want to tell you because I want to wrap this session up.

Now I'm going to tell you a little story that illustrates this quite well.

When I went into steel I had to try and train myself in the whole business as I knew nothing about it and there was a guy who, his name was Tom. Who was widely regarded as the best salesman they had. Now selling the heavy steel business is not knocking on peoples doors, well it is actually but you know what I mean, it's very high level stuff. So I set out with him. I

spent a week with him, to try and find out how he operated. I learned an enormous amount. It began when we called on a buyer in Sheffield and we were just leaving after a very satisfactory talk. I was just introduced as a trainee. Listened how Tom handled this buyer, got everything signed up. Was just going out the door and just like Columbo, I think that's a marvellous gesture, he said, 'Excuse me, we have to go to, and he named a street, to so and so?' How do we get there from here?

'Oh' says the buyer, 'please', He takes us to the elevator, comes down with us. Goes into the street and says, 'See that Boots sign, turn left' and so on.

Now, I knew precisely where this place was and I'd only just got to Sheffield and certainly, as Hell, Tom knew where it was.

So I said to him as we marched off, 'What was all that about?'

'Oh' he said he has helped me. Now he is in my power.

Anyway, that's just a bit of psychology. I don't know what it's got to do with cybernetics but so, the point of this story is that the company had had the following revelation.

They realised that they had all these highly specialised salesmen, who had these intimate relationships with clients and the only information they were getting were the orders.

So, they said, 'why don't we ask our representatives to give us an estimate of the reliability of the company and the future of the order book, etc.' and there's a lot more jazz here than just saying here's an order for 20 tonnes of something. So they went into discussion with the Salesmen. And the Salesmen said, 'wait a minute if you want us to do all this'. This is a whole new ballpark and if you want us to do all this we need more time etc. etc. And so no unions involved, but effectively a union. These are very senior men. And so roughly what happened was that they put the sales force up by 20% in order to create time for this new system to work.

Now, what you realise here is that you are increasing the channel capacity. Good idea.

Now, I went off with Tom to the East Coast somewhere near Hornsey, I think, between Hull and Hornsey and we interviewed the right number of clients in the morning. Then he says 'it's a lovely day. Let's go for a swim'. And we spent the afternoon lying on the beach, which I thought was jolly nice. 'How can we get away with this Tom', I said. Tom says, 'It's the new system, you see, we've done enough for today!' So, yes I said, but you have to fill in all these forms and you haven't. 'Oh. we'll deal with that'. So this guy, in these swimming trunks, on the beach pulls his briefcase across, and starts writing figures all over the place. I was looking and I said 'How do you know this?' He laughed and said 'I'm just making it up'.

Now I was very fascinated about this. Now, I didn't know as much then, as I do now about cybernetics, but I was very actively trying to construct models.

Now what's happening here is that the Company put in this system, arranged to receive the information and punch it onto Hollerith cards. Do you remember these things? That's how you stored information, cards with punched holes in. All these hollerith cards were on shelves. The salesmen very rapidly found out that nobody knew what to do with them.

Now this is quite precisely a failure in the transducer, isn't it ? Because all this information is arriving, potential information, I should correct myself. Data at this stage, which could become information, is sitting on shelves in punched cards.

There is more to it, really because, after I got that put right and got the system to work. Nobody believed it, because by now the salesmen knew, in several sets of inverted commas, 'That nobody did anything,' therefore, what was coming through, was by now, garbage. And nobody knew.

Then they tried to change the system, and here we have something that is absolutely typical of the human nervous system. If you overload a transducer it has what is called a refractory period. A neurone, a nerve cell fires, and then goes [***] and needs a rest. And the refractory period is the time it takes to charge itself up, and get its chemicals right to fire again. Exactly this is going wrong because all the transducers in this system are out of their refractory period and there's no way of telling anybody that the new system will work, because they know it doesn't. Now you're told it does, but the new system is not through its refractory period yet. It's going to take years to sort out this bloody mess. Very interesting isn't it?

So, out of this little tiny diagram blocks of requisite variety, requisite variety on the channels, requisite variety on the transducers.

A hell of an assignment, you know.

But carrying on with this breakdown of the transducers in the company. What do you do, because you are saying it may take years.

Well, why don't we take a break and talk about that later.