physical and organizational communication lines open, are the motivational and reward aspects there.

MT Checklist # 7. Check the synenergy flows

Are the Rule Structures Developed and Known?

The next thing is to check whether the Rule Structures within the syston are developed and operating. Sometimes these are clearly apparent, as with a country-syston's jurisdiction, in other cases they may be unwritten.

Rule Structures are dealt with in Chapter 112 and mentioned in many places subsequently in this book.

MT Checklist # 8. Check the Rule Structures

Look at the Buffers

In the run-up to the 1992 US Presidential election, non-party candidate Ross Perot did not have clear policies, although he did advocate change. One radical suggestion which he did adopt and promote was the idea of dispensing with elected members of the legislature, and instead have arrangements for unlimited 'telephone referenda', in which the people could decide on issues themselves, instead of leaving it to their elected representative.

On the face of it, this is an attractive idea. Anything which allows people to have a greater say in the rules and regulations under which they live must be regarded as an increase in democracy.

However, an MT analysis of this proposal would probably give it the thumbs-down. The reason is nothing to do with preservation of the status quo, there is nothing in MT to support this. It is because the suggested telephone-referendum approach would lack buffer capacity (Proposition 119C), and hence might be less stable.

Making changes to the law can be a long-drawn out and tortuous process. We could say that it involves putting input (a 'concept-ball' or 'memon') into a large and complex infocap/ synenergy buffer (the legislation-vetting process), which it will take some time to work its way through. Many of the memons will be totally consumed in the buffer, and never work their way out at all. Of the ones which do survive and emerge, almost all will be appreciably beaten-about and modified in the process.

The Perot proposal would largely eliminate this buffer, it would be 'instant' legislation, perhaps done in the 'heat of the moment'.

MT Checklist # 9. Look at the buffers

Look at the Arms-lengthing

The importance of arms-lengthing has been covered in Chapter 120. There it was suggested that arms-lengthing reduces the possibilities for corruption and bias, eliminates the stress of difficult decisions or dilemmas, and forces the development and refinement of the existing Rule Structure.

MT Checklist # 10. Check on the arms-lengthing

The Four Questions of Government

The Four Axioms of Government and their associated Questions have been covered in Chapter 116. We will add these to our checklist all together.

MT Checklist # 11. Ask Question One: "Is the activity designed to directly achieve a threshold level of health or safety in the syston?"

MT Checklist # 12. Ask Question Two: "Is the activity designed to directly raise the level of infocap in the syston?"

MT Checklist # 13. Ask Question Three: "Is the activity a minimum taxing of syston synenergy needed to carry out Tier One or Tier Two activities by the syston?"

MT Checklist # 14. Ask Question Four: "Is the activity being organized in the narrowest possible syston government?"

As outlined in Chapter 116, the 'Government' of a syston has a meaning applicable over the whole range of systons, not just ones in the form of countries or states. In this sense, a government can be regarded as a specialized systel with special responsibility for the syston's Rule Structure.

In the same chapter, the fact that these Questions are in many ways competing was pointed out. We can illustrate this with another Matrix Cocoon model (Figure 121.1).
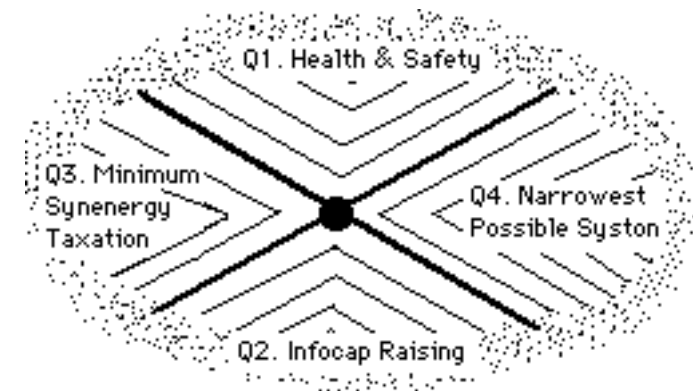

Fig. 121.1. The 'Four Questions' Matrix Cocoon

In this model, the conflicting demands of the Four Axioms are represented in the four divisions of the cocoon. Within each division, the 'contour stripes' represent increasing concern with the particular demand. As a physical representation, each division can be thought of as a roughly triangular hill, sloping down to valleys dividing it from the other divisions. For example, the tiny triangle above the word 'Infocap' in the Q2 division is the peak of the Q2 hill. As in other examples, the contours do have a link with infocap content.

For any particular scenario, we can get a visual grasp of the relationship of the syston involved with the Four Questions by superimposing the syston outline over part of the cocoon. All systons will overlap the central point, but the degree by which they extend up the four hills will vary with the individual syston.

We will see some examples of this in Chapter 125, Matrix Geography, mostly concerned with current nation-systons, and in Part II of this book. At this point, we can suggest a further property of syston skins which will be apparent in actual examples.

Proposition 121B*. Syston skins are elastic and pull in as if under tension

What this Proposition suggests is that the skin of a syston is like a rubber band, or perhaps the skin of an amoeba. The syston can extend out 'pseudopods', bulges in a particular direction, but these will tend to be rounded in outline, and the most common rest state will approach a circle. It might be helpful in grasping the model if the tension of the skin is thought of as due to the accumulated pressure of the infocap within the syston, like the air pressure in a balloon.

Where's the Clock?

The next item in the Checklist is to look at the pacemakers and clocks which are operating within the syston. These were covered in Chapter 118.

MT Checklist # 15. Look at the syston pacemakers

As mentioned, the pacemakers are those regulating particular processes within the syston. A syston can contain many pacemakers, but any process can be subject to only one, or else it is liable to break down.

Look for the Half-lives

Half-lives and cycle times were also dealt with in Chapter 118. These will figure largely in the analyses in Part II of this book, particularly in economic matters.

MT Checklist # 16. Look for the half-lives and cycle times

As mentioned, half-lives apply essentially to systons, cycle times to processes.

What's Doing the Pumping?

The suggestion was made in Proposition 118C that process cycles may be 'pumped' into completion, and that rituals, procedures, even Rule Structures, may bring about this pumping. Often successful completion of a cycle may depend on the right pumping action.

MT Checklist # 17. Look for the pumping

Where Can We Make a Buck?

The profit motive can be a powerful form of pumping. When we get to the economics section in Part II of this book, we will use the concept of margin-slack. This is the MT analogue of profit margins in conventional economics, but extended to cover all levels of syston operations.

MT Checklist # 18. Look for the margin-slack

As an example, if I was to work to introduce a new fruit to the marketplace, the fruit might cost me $10 per kilo to produce, while I might be able to sell it for $20 per kilo, if it had novelty value. The margin-slack would be large in this case, 100% on cost.

If the fruit was taken up successfully, I could expect competition to arise, and this might drive the margin down to $4 per kilo instead of $10, as the slack was taken up in the economic pressures. The decrease in the margin-slack would be balanced against the infocap investment needed to get the fruit to the marketable stage, which would itself have a relationship with the cycle time.

Look for the Specialist Systels

In Chapter 117 we looked at the role of specialist systels in successful syston operation, systels such as scapegoats, idols, and resonodes. Any syston scenario examination might well check on these.

MT Checklist # 19. Look for the specialist systels

Calming the Traffic

In common with many other cities, Perth has had a concern in the past about the speed of traffic in residential areas.

The early cries by residents focussed on imposing lower speed limits. The problem with this was the difficulty and expense in enforcing the limits. Instead, what has developed over the years is the technique of 'traffic calming' — inserting physical obstacles such as low-speed humps, twisting paths between traffic strips, and roundabouts instead of traffic lights.

From the MT viewpoint, these techniques are most desirable, as they are self-policing or need no overt policing. They represent a shift in the Rule Structure away from written

jurisdiction to unwritten physical laws, and in so doing allow a reduction in the synenergy taxation needed to maintain traffic order.

MT Checklist # 20. Look for 'traffic calming' rather than 'regulatory' techniques

Pigs, Wind, and Dirt

Finally, in the last item of our checklist, we will look outside the syston, rather than within it. A few years ago I did an analysis of why certain things happened in the plant world — such as why wind-pollinated trees tended to be self-infertile and be more common in dry areas, and why vast wild pig migrations occurred in Borneo [Noël, 1988]. The results were presented at a conference, and the paper was the first place in which I used the Proposition technique which appears in this book.

Out of this analysis came a Proposition, developed to suggest where mimosine-free sources of the fodder plant species *Leucaena* could be found — in places where the grazing-deterrent constituent would have no purpose, no answer to the question 'What is it for?'. That Proposition said "To solve a problem, look where it does not exist".

The modern tendency in trying to solve a problem is to look at the problem in more and more detail — to find a cure for cancer, look at people who have cancer. There is nothing wrong with this, but there is an alternative — look at the populations who do not have cancer, and ask why not. If you have a bad problem with fruit flies, instead of finding ways to kill those fruit flies, look at other places in the world which do not have the same bad problem. If you can find out why, you may have an answer to your own problem.

Internal analysis may detect the cause of a problem, but cannot detect the non-cause of a non-problem. The MT generalization of this is that the non-contents of a syston may be as important as the contents.
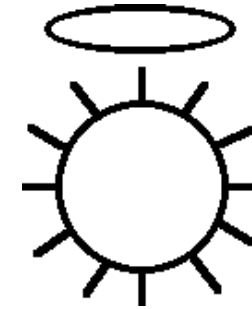
Proposition 121C*. What a syston does not contain may be as important as what it does*

And so, the end of our checklist, for now. Feel free to add your own!

MT Checklist # 21. Look at the infocap not present in the syston

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THE RIGHT THING TO DO —
Matrix Morality

"Patriotism is the last refuge of scoundrels"
— Dr Samuel Johnson

Politics and Other Crimes

Is there a moral aspect to Politics? I imagine that almost everyone would say that there is. What about Science, is there a moral side to that?

I suspect that those who think there is morality to science would not respond as readily as they would to the question on politics. The more thoughtful response might be to say, that it is not really science itself which has moral aspects, it is the *application* of science.

How about Mathematics? Well, no, hardly anyone would say there is a moral side to mathematics. Mathematics, traditionally the Queen and Servant of the Sciences, is viewed as a non-judgemental tool or techniques package. Valuable both as an analysis and as a synthesis and prediction tool, mathematics pervades the whole structure of modern society. But neither its existence nor its use is classed as moral. Mathematics is morality-neutral.

And just like mathematics, Matrix Thinking is also morality-neutral. The MT apparatus which we have developed here is intended to provide a powerful tool for analysis of human society and other social structures. It is also intended to provide a useful prediction and synthesis tool for possible changes to these societies. But it is not intended to give an answer to the question as to whether particular past, present, or future occurrences are Right or Wrong.

The Buck Stops Here

Here is the crunch. Matrix Thinking is non-judgemental, it is morality-neutral. This is not

a Proposition, I am defining it so. If instances may be pointed out where my application of MT does appear to be judgemental, then I will say that these instances are purely ones where I have been less successful, or even in error, in attempting to accomplish my main intention in building the MT intellectual engine.

It is true that, in what has gone before and what follows, terms as 'better than', 'advantaged', or 'successful' may have been used in the presentation of formal propositions. These terms clearly appear to have some judgemental bias.

I admit this, but say that the judgement is really one level removed. For lack of other acceptable terms, and to avoid increasing the semantic burden with non-essential new words, I am using these terms in the generally-accepted sense. For MT, 'better than' means accepted as better in that instance at that time, with nothing absolute about the 'better'. And, of course, like the Curate's Egg, MT recognizes that something may be 'good in some parts'.

What is Morality?

According to the usual dictionary definitions, Morality is concerned with the distinction between Right and Wrong. Whether Right and Wrong are absolute terms or not is a question with as many answers as there are people to respond. Moral behaviour is usually equated with 'right' behaviour, or, one step removed, conduct according to a set of rules which is accepted as right.

Matrix Thinking, as we have seen, has the formulation of rules as part of its basis. It does not say what is moral, but can yield a definition of what morality is. Let us present such a definition as a Proposition.

Proposition 122A**. Morality is recognition of the needs of wider systons

I imagine that such a definition can be regarded as acceptable at the level of individuals. Some would make it stronger, perhaps adding 'and response to' after 'recognition'. This MT definition allows the usual ideas of traits such as selfishness, violence against others, and intolerance being 'morally-negative'. More important, it brings out the concept that morality is a synenergy flow which is directed outwards, from a narrower syston to a wider one.

As always with MT, the intention is that contents of Propositions should be tested as applicable over the whole Matrix, over all levels of systons. Morality is usually applied at the level of individuals, but is sometimes seen at wider levels, particularly at country-syston levels.

Wars and Immigration

This is most clearly seen with wars. Wars at every level are usually viewed as high in moral content, particularly religious wars such as the Crusades. In most wars, the countries involved believe that they are in the right, that they are acting in a moral and justified manner — even if they are opposing a country acting directly oppositely, but with the same moral conviction.

It is of interest that Japan, as a country-syston, has officially apologized for its actions during World War II. Many would think that this is only right and proper — undoubtedly it

was the Japan-syston which was responsible for its acts, these were not just the sum of the acts of the individual soldiers and others involved — but what is interesting from the MT viewpoint is that the 'systonization' of Japan has reached such a level.

It has already been suggested that the syston skin around Japan is one of the most impermeable of any country in the world. In a real sense, Japan can be considered to have a 'national conscience', permitting it to give a national apology. The act of apology involved has very few parallels elsewhere — most other examples involve a head of state 'expressing regret on behalf of' the country's people.

Almost every 'moral' aspect of the individual has its parallel in other syston levels. These are most evident with systons with thick and obvious skins, such as countries, which in modern times have built up entry controls unparalleled in previous history — very thick skins. The equivalent of individual selfishness is national immigration restrictions. The equivalent of personal altruism is a country's foreign aid programme. The equivalents of personal jealously and personal pride are national jealousy and national pride.

To those who have a personal sense of morality — and who does not — the question from MT would be this: does your morality justify or rule out an action at a wider level, which it would not justify or rule out at a narrower one?

If your neighbour is poor and you would like to help him by buying the fruit he grows or the chairs he makes, should your country help its poorer neighbours by buying the fruit or furniture they produce, or should it impose entry and customs tariffs to stifle these imports off? If you have a morality, how far out does it extend? If your syston skin is a thick, impermeable one, bloated with SIOS, does this accord with your moral principles? Do you treat your neighbour as yourself?

MT does not say what is moral. But, in the usual spirit of generalization, Matrix Thinking can be applied to generalize about morality.

Proposition 122B**. Any morality applies equally at all syston levels

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Chapter 123
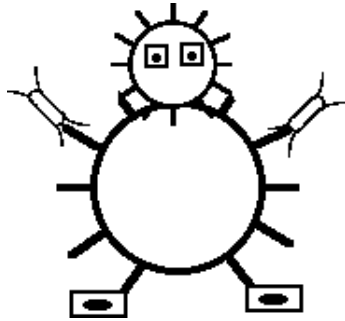
THE FACE OF THE FUTURE —
Matrix Machines

"The best way to predict the Future is to invent it"

— Dennis Gabor

Tomorrow is Almost Here

This is not a book about predictions. Nevertheless, there are three particular developments looming which I believe will have marked effects on human society in the years to come, and which are particularly appropriate for examination here. They are all what might be regarded as technological developments, but they are ones which work with the basic stuff of MT, they can be looked on as infocap/synenergy processors. I will call them Matrix Machines.

One such machine is already familiar to most of us — the computer. Modern computers are essentially information processors, they already have a myriad of uses, only some of which involve the sort of arithmetic operations which gave the machines their name. Computers have already been mentioned frequently in this book, they are already a part of our world.

The three machines we will be looking at are not a flight of fancy, they are all already here. But at present they are at only the very earliest stages of their development, although some have a considerable history in fiction. We will look at each in turn, seeing what they can do now and extrapolating their potentials into what they may do in the future.

Matrix Machine 1 — The Detailer

Scenario 1.
It was time for harvest, but the great harvesting machines remained parked silent and rusting in their sheds. Instead, out onto the fields moved a huge swarm of detailers, intent on their task like a colony of soldier ants moving through the jungle.

The detailers were of varying shapes and sizes, each being fitted out with the handlers and movers appropriate for their roles in the day's activities. Some had legs, others wheels. But all were small, all weighed less than 5 kilograms. All had their own tiny 'brains', but all were linked together electronically as part of a greater composite machine, the Harvester.

At least, 'The Harvester' was what the composite machine called itself that day. Earlier in the season, using different programs, it had called itself 'The Ground Preparer', 'The Seed Setter', and 'The Pest Remover' at different times.

"Clever little critturs", mused Farmer Jones, looking up from his screengate into the State Agricultural Development Network. "It wasn't so long ago I would have had to have been out in the fields myself all day, driving that tractor. Now the detailers do the job, handling each grain individually, rejecting the bad ones. And they slip through the plants so light and quiet, leaving everything just right for the next job".

So the detailers are robots — but robots with a difference. Less than substitute human beings, more than programmed machines, the detailers are closer to the components of a termite colony, the parts of a greater whole.

They may appear anywhere. In Ray Bradbury's story *And There Shall Come Soft Rains*, the detailers are house-cleaning robots, scurrying round, cleaning, polishing, picking up particles of rubbish. No matter that the humans are long gone.

The essence of detailers is that they are many and small, working together as a composite, and able to handle objects individually rather than in bulk. I suspect that they will give a whole new feel to the objects they are applied to. Set to paint a house, for example, the result may be too bland, too perfect, for current human tastes. There could be a move to program some degree of randomness or purposeful imperfection in their work.

Detailers may also alter matters to an extent representing a difference in kind, rather than degree. They may, for example, be able to keep a house completely free of all sorts of bugs. Most would see this as a desirable thing, and it may be, but there could be a down side. Some bugs may be beneficial in an unrealized way, and the problems of children raised in a sterile environment when they need to enter the wider world are well known.

Matrix Machine 2 — The Waldo

Scenario 2.
It was panic time at the Antarctic base. Johnson's accident had been a particularly gruesome one. Dr Mills, the Station's resident physician, had left for the Outstation on an emergency two days earlier, and was now cut off by a blizzard.

Johnson might live — just. But unless a skilled microsurgical team was available, to sew back on his hands and feet, he would be a hopeless cripple. And there was the dread possibility that his head injury might involve a blood clot in his brain.

The Communications Team swung into action, and almost half a world away, Sir Joshua Wills Sweet, the prominent microsurgeon, was aroused from his slumbers in London. Dr Wilson Chang in Los Angeles and Dr Manuel García Ramis in Ecuador were still awake when called, watching television. And Betty Theodopoulos in Australia and Blanche Kingi in New Zealand were already on duty at their local hospitals.

Each of the medical team climbed into their suits, ready for another gruelling day. Out from the sterile cubicles around the sides of the Antarctic base operating theatre they came, each in their assigned waldo. Quickly the team swung into action, cutting, sewing, and even gluing poor Johnson back together.

Hours into the work, and overcome with fatigue, Wilson Chang signed out and was replaced in situ, or rather in suit, by Joshua M'Tombe in Pretoria. Things were going well, but the blood clot problem was beginning to look serious. Time to call on Olga Vernadskaya in Minsk. Deftly M'Tombe took out Olga's assigned microwaldo, and injected her into a vein. With her experience and competence, and using the simulated route display in her suit, she was able to reach the blood clot site in Johnson's brain in under a minute. Unhooking the slicer on her suit, she carved up the clot and put the pieces into the sack on her back. A few minutes later she was back at the temporary exit valve on Johnson's arm.

The idea of a remote handling device, actuated by a human connected via telecommunications, goes back at least to 1940, when the American science fiction writer Robert Heinlein published *Waldo — Genius in Orbit.*

This story was about about a brilliant character, Waldo, who suffered from a muscle-wasting disorder which left him with very little strength in his limbs. However, Waldo was a genius, and used this genius to overcome his disability. First he applied his talents to the stock market and the commercial world, and built up massive financial resources.

The story was set at a time when space travel was commonplace, and Waldo was able to use some of his money to set himself up in a space home, a living environment in orbit around the Earth. Under the weightless conditions in orbit, he could now move around freely in spite of his weak muscles.

Of course Waldo was in constant touch with Earth through telecommunications, but he was physically isolated, and needed to be able to handle physical things remotely — perhaps sign a document, or control a delicate operation in the assembly of one of his inventions. So he devised a pair of gloves, equipped with pressure sensors which could transmit the movements of his fingers to another similar pair of gloves elsewhere, and reproduce the responses back from those gloves to his own fingers. With a suitable television link, it was as if he could see, feel and manipulate an object thousands of kilometres away.

Beginning in the 1950s, these Waldo Gloves, or waldos as they came to be known, started to be constructed in real life. Their first application was in the handling of radioactive materials, and the early models were fairly primitive, mechanically linked rather than electronically, and operated in line of sight.

With improvements in electronics, devices much closer to Heinlein's original concept can be built. A term which is sometimes used for this sort of remote operation by humans is Telepresence. Let us look at just a few possible examples of its use.

Don't Go Down the Mine, Daddy

In Chapter 16 we saw how emphasis on individual health and safety formed a basic part of the rules for running systons. Use of waldos in dangerous occupations like underground mining could completely transform current practices.

Three kilometres deep in the South African gold mines, conditions are both dangerous and extremely unpleasant. Temperatures rise progressively as you go down into the Earth, and cooling the air low enough for humans to work at these depths is an expensive problem. The tremendous rock pressures make gallery collapses an ever-present danger.

If waldos are used instead of in-position people, everything changes. No need to cool the air and test it for breathabilility, just engineer the remote handlers to cope with whatever is there. If human lives are no longer at stake, safety problems vanish, and loss of equipment through accidents becomes merely a factor in costing, or a pointer to improving ruggedness.

And for the human waldo operators, life becomes far more pleasant. No more long descents into the pit, no need for tightly-scheduled shift changes to keep things running, instead just switch out Bill and switch in Jill. And Bill and Jill don't even have to be at the minesite, after his stint Bill justs walks out of his lakeside cabin and gets on with his fishing.

Move Over, Gulliver

So waldos could do jobs too dangerous for humans on the spot. With scaled waldos, made much bigger or smaller than humans, things can be done which are impossible for humans because of their size. A tiny mining waldo, for example, could follow an individual vein of gold along without the need to excavate a human-sized tunnel. And a giant road-making waldo could cut out a new freeway 'manually', using a giant version of a domestic shovel.

There are practical and theoretical limitations to waldo scaling. Overcoming practical limitations is just a matter of engineering development. For example, in making very tiny waldos, there is a practical limit to the accuracy with which an engineer can work. But if a one-tenth scale waldo can be made, that waldo can be used to build another at one-tenth the size again, and so on.

Then there are the theoretical limits. In scaling, underlying units like the size of the wavelength of light are not scaled, and impose a limit on the fineness of detail ('the resolution') with which an object can be scanned. Nevertheless, scaling down to one-thousandth — a microwaldo 2 millimetres high — should be theoretically possible.

With scaling up, the limitations are in strengths of materials. Doubling the height of a machine, while keeping all its proportions constant, increases the cross-sectional areas of its components by four times, and its mass or weight by eight times. That is why all large land creatures, like elephants, have relatively thick legs, they have to be thicker to take the weight. It may be that such limitations would keep upward scaling of waldos to less than a factor of a hundred. Even so, seeing a 'man' 200 metres high treading the landscape would still be pretty impressive.

Riding a Bicycle on the Moon

Another theoretical limitation to the use of waldos comes in when the distance at which they are operated becomes large. The limitation is in the speed of light, or more strictly the speed of electromagnetic waves, including radio.

Moving at around 300,000 km/hour, light could travel round the equator seven times in a second, so for remote waldos on Earth, the limitation is not serious. If the signals travel via

geosynchronous satellites, about 40,000 km out, the delay is perceptible but not serious; you can notice it with some long-distance phone calls.

When you move out as far as the Moon, about 400,000 km away, that is about the practical limit for 'real-time' waldo operation. Signals take over a second to go from the Earth to the Moon, and the same to come back. It would be possible to dig out minerals with a Moon-based waldo, with the operator on Earth, but he would find the controls very 'sluggish'. Could you ride a bicycle, via a waldo, on the Moon? The balancing problems would be serious — a tricycle would be easier.

Of course there is a vast opportunity in this area, that of Waldo Tourism. Waldo tourists would be able to swim without danger, deep in the sea, going on as long as they wished. They could excavate sunken ships, pick up the best crayfish, climb the highest mountains. From the MT viewpoint, tourism is one of the most important human activities, involving as it does such a concentrated synenergy flow.

But the Moon is likely to be the limit for the Waldo Tourist. The nearest planets are several light-minutes away. To travel around these, we would need to fall back upon a mechanism which is acceptable, but would still seem rather second-class.

Making Love to Marilyn

Any information which can be transmitted can be recorded. Anything experienced remotely by the operator of a waldo suit could be recorded and played back to them or someone else at another time.

The most obvious use of such a facility is for entertainment or pleasure. In principle, it would be possible to hire a waldo tape of someone walking on the surface of Mars, or making the winning Olympic bobsleigh run, just as people now hire video tapes.

In Part 2 of this book we will look more closely at the major role of entertainment in the human-based Matrix. There is no doubt of the reality of this role, and for this reason recorded waldo entertainment tapes are likely to be at the forefront of commercial development of this field. But there are huge vistas of other human activities where waldo tapes could be used, and it is in these where the ultimate impact of the new technology could be greatest.

Matrix Machine 3 — Virtual Reality

Scenario 3.

Jason Wilsbury sighed. He generally enjoyed his time at Art School, and particularly the Wood Sculpture course he was presently spending most time on, but it was taking him some time to come to grips with the material he was using.

Resignedly he put back on his helmet and gloves, picked up the chisel and went back to work on the huge block of expensive Titapi Rosewood. He laboured on, and late in the morning, when the others were beginning to drift off to lunch, he felt the tingle in his hands which meant he was coming to terms with the wood.

With growing excitement he cut and sawed, feeling the figure come alive in his hands. It was growing full of character, exaggerated and something of a caricature perhaps, but the figure was emerging with a breathtaking power to draw and hold the attention of a passer-by.

And then the inevitable happened. Working at a tricky angle near the neck, he overdid the force behind his hammer blow and the whole thing split in half. The wood was ruined.

Sighing once more, Jason called over his class supervisor. Mr Hansen plugged in his helmet, studied the ruined block of wood for a couple of minutes, then used his override key to wind the block back to where it was before the fatal blow.

"If you had put a rest on the shoulder, and used a power cutter from this sort of angle, it wouldn't have happened, Jason", said Mr Hansen. "You have a go like that now. It was a good job you weren't using real wood, eh, at two thousand dollars a block!".

Jason began to feel good. He knew that the log of his actions recorded by the simulator would be able to cut out a solid good enough to take him easily through the term's exams. And next year, or the year after, his skills would be developed enough for him to work live, on a real block of wood, drawing out the inner figure with an empathy which would never be possessed by a machine.

Virtual reality is already here. Wearing a helmet and pressure-sensitive gloves, you can today enter a world in which your vision and touch response are synthesized and delivered by computer. And you can interact with other real people.

In a recent television programme [Beyond, 1992], the presenter showed the stage of commercial development reached by a virtual reality entertainment system. Wearing a helmet, she could see a small helicopter flying around the virtual world set up the system, and if she reached up, she could touch and feel the helicopter with her pressure-sensor gloves. Taking off the helmet, she was visually back in the studio and could no longer see the virtual helicopter, but she could still reach up and feel it, in mid-air. "An uncanny feeling", she said.

This is an area about to enter a rush of development. It is likely that the huge infocap flows which can be generated by successful new entertainment systems will take this technique through a quantum leap. At first, cruder games will predominate — fighting opponents with simulated laser guns, for example. Then will come more sophisticated games, such as tennis practice, with a real or a simulated opponent (do you really want to play Simu/John McEnroe, complete with swearing?), then more and more complex applications in amusement, education and training.

We will look at some of the possible developments later, in the appropriate sections of the second part of this book. An incidental comment to add perspective — from the MT viewpoint, all entertainment, training, education, and perhaps even work are the same sort of infocap/synenergy entities. The distictions beween them are purely arbitrary.

So those are the three major Matrix Machines. Detailers, small automated devices linked as a composite; waldos, with which a human can react remotely with a real environment; and virtual reality, where a human or humans can interact within simulated environments, including ones with simulated humans.

We can move on now to look at another topic — the 'psychology' of systons.

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Chapter 124
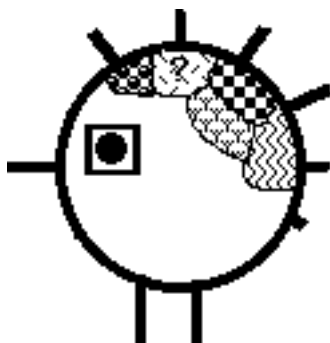
A MATTER OF MOTIVE —
Syston Psychology

"I wished, by treating Psychology like a natural science, to help her become one"
— *William Joyce*

About Psychology

In this chapter we will not really be looking at Psychology as it is presently understood, that is the workings of the individual human mind in its interaction with the outside world, but more on the analogues of these interactions taking place in wider systons. But the plan, as always, is to work from examples at a familiar scale and then extrapolate and generalize from those examples for the whole range of systons.

If current Psychology is a science, it is at best an uneasy one. It certainly lacks the deft power of prediction found in the hard sciences like physics and chemistry. But perhaps one of its weakest points is that its results cannot, in fact, be scaled up and applied with any precision to bigger aggregates of humans. The basic reason is that results from one syston are being applied to another syston of quite different character and size.

As an example, let us look at the field of opinion polls.

Galloping to Uncertainty

Opinion polls and all the allied areas of market research and consumer surveys have a simple goal, that of predicting the outcome of a projected or expected action. With a forthcoming election, for example, the hope is to be able to predict the outcome of the election by sampling the opinions of a selection of the voters.

Of course such polls and surveys are notorious for their inaccuracy when compared to the

actual results. We might ask why this should be so.

There is an inaccuracy in the very fact of sampling, rather than checking the whole, but this is not a strong point. The mathematics of probability give a sound basis for ensuring that a small sample, carefully chosen as representative, is as good as checking the whole. And in practice the results of surveys of large numbers of people are found to give virtually the same results as those for a much smaller, but statistically sufficient, number.

A more important point is that the expressed opinions of people surveyed are not necessarily their 'true' opinions. This aspect ranges through from instances where people prefer to give a 'tactful' response which they feel will be more acceptable to the surveyer, on to the case where the respondents have just not thought very much on the point surveyed, they have not yet crystallized their likely response to a real test.

And, of course, there is the point that the range of responses listed in a survey may be far less subtle than those actually available. In a compulsory election, for example, no opinion poll will pick up those who remain uncertain right up to the actual ballot paper, and so make somewhat ambiguous markings on them (perhaps even without conscious thought) which may cause the papers to be classed as invalid.

It seems to me that the most likely reason for the inaccuracy of such polls and surveys is a simple one. That is, that the surveys do not, in fact, survey the same entities as those which actually vote or respond in real life.

A Case of Mistaken Identity

The point which I am trying to make is this. From the MT viewpoint, an event like an election is not just a process which occurs at a single point in time. Instead, it is a cycle, a process which extends over days, weeks, months, years. The actual ballot day is only the most visible and obvious part of the cycle, the peak of the mountain. It is all the time, effort, and worry expended by the climbing team in the weeks before which determines whether they actually get to the top — booking up the ten best climbers is not, in itself, enough to ensure success.

What actually seems to happen in such a cycle is that as it advances, a new, temporary syston forms. It is the attributes of that syston, as an individual syston, exercised and summed over the life of the cycle, which determine the outcome of the cycle.

If the cycle is an election, it is tempting to label the systons involved with the names of the the participating political parties. But the actual systons are far more extensive, far more diffuse, than these. Even in a local government election, the threads may extend around the world. Was one of the candidates born in America, does he represent some subtle unstated dominance factor? Does the candidate support the local soccer club, rather than Australian Rules football, would he be closer in feeling to the 'ethnics' from around the Mediterranean?

In Chapter 114 the Proposition was advanced that matrix quantities are not additive through systons. I suggest that this is the essence of the inaccuracy of conventional opinion polls. The individual people-systons surveyed do not simply add together to give the same response as does the temporary event-cycle syston in which they participate.

Proposition 124A*. For any event cycle, a temporary event-cycle syston will be formed with responses which may not match the aggregate responses of its constituents

Mob Law

A very powerful expression of this situation can be found in the occurrence of mobs. These are very temporary, rapidly-formed systons which react in a way quite uncharacteristic of the individuals making it up. "The mood of the crowd suddenly turned ugly".

Anyone who has been caught up in a true mob can testify that it can be a terrifying experience. It is like having to deal with a suddenly-erupting ferocious wild animal, completely unexpected, and with great but uncertain powers.

Mobs can do terrible and wonderful things. Individual feelings, logic, restraint, are lost in the formation of the greater syston, which, as a syston, can roar on and storm the barricades in a manner which has regard only for its own aims.

Similar, but milder, examples are to be found throughout the Matrix. Team supporters at a sports arena, for example, meld together during a match and can project great masses of empathy, huge synergy flows, at the players and other supporter groups. That is why it is easier to win a game played at home rather than away. And the temporary systons formed can actually degenerate into mobs on occasion.

Man, Woman or Chile — Ella is de Most!

As a fan of Ella Fitzgerald, I used to buy and play her records a lot when I was younger. In 1956 I was in Berlin with the British Army, when a concert was arranged there for her. Morale was an important factor for the Allied Powers, and Berlin used to get quite a lot of special treatment. Naturally I took the opportunity to see and hear her 'in the flesh' for the first time.

The experience was electrifying, fully justifying Louis Armstrong's assessment of Ella. It was also illuminating. For the first time I understood why people actually bothered to attend live concerts, concerts made up of items which could be far more conveniently heard on records, recorded under technically far superior records.

The difference was this. The concert had what is called 'atmosphere'. By virtue of the actions of the performers, and the resonance of these with the audience, everybody there was merged together into a composite, performers and audience both. There was a powerful synergy flow, amplified by the resonoding ability of the performers which was mentioned in Chapter 117.

This is nothing new. Peter Ustinov, among others, has pointed out how important the audience is to live actors, to live performers of every sort. Even with films, where the actors are not present in person, there is a difference between watching a film in the cinema, and watching it on a video. I have seen films, such as *Withnail and I*, which were so funny that I was 'rolling around in the aisle', tears streaming from my eyes, unable to hear or see what was going on. That never happens at home.

In MT terms, we might say that every live performance, if successful, sees the creation of a temporary 'performance' syston, one which is created through performer/audience synenergy flows and synenergy resonances, one which is born, grows up, enjoys a flourishing and rewarding period of maturity, and finally goes to a well-earned and applauded rest. All in two or three hours.

Synenergy is All

In Chapter 106, where the concept of synenergy was first developed, the suggestion was put forward (Proposition 106E) that synenergy flow was the major need and desire of all human systons.

The concept of synenergy flows is the key, in my view, to understanding the operation of human societies. Synenergy is the force that powers human systons, just as energy is the force that powers physical systems.

Again, this is nothing new. 'Love makes the World Go Round'. This, and a host of other sayings, can easily be seen as specific examples of the generalization embodied in Proposition 106E. Let us look at some other facets of this matter.

Look at Me, Mum!

Everybody needs attention. Small children, it is well known, desire a continuing, responding, audience. They cannot get too much attention.

Of course this demand for attention is part of growing up, it is part of a pattern of producing actions and seeing whether they are approved, tolerated, or punished, as the case may be. A pattern of developing a personal Rule Structure to carry the individual through later life.

Kittens, puppies, any young creatures brought up in a social context, all go through such a process. With kittens, the bulk of the process is gone through in a few weeks or months. With humans, it takes years.

And because humans live in a continually changing society, especially in recent centuries, it has become important for them that they retain some ability in this direction, even in their later years. In conventional terms, this adaptability is seen as a survival characteristic in changing circumstances — adaptability is good.

The MT view would be rather more complex. If adaptability is important, then a range of adaptabilities is better for the containing systons. If ability to build up Rule Structures is important in young systons (an ability in direct conflict with adaptability), then the oversyston will benefit by having some set in their ways in their youth, others able to adapt and expand on into older years.

In addition, it is important to remember that the value of any syston characteristic depends very strongly on the stage that the syston has reached in its own development cycle. The child is open and uncritical, the youth is rebellious and idealistic, the man is tenacious and strong, the old person mellowed and conservative. The individual idiosyston benefits from the change in characteristics, while the wider syston benefits from the diversity, not only that inherent in individual variation, but also that stemming from the variation in a systel's characteristics as it ages.

In the Pilbara area of Western Australia, there are a number of 'new' mining towns, built

especially to mine a particular iron ore deposit. Some are quite large, with high schools, sports arenas, television broadcasting towers, all the trappings of civilization. But because these are towns newly settled from scratch, they have a great missing segment in their makeup. There are no grandparents.

So the working wife cannot call on 'Mum' to look after young Tristan when he is sick, the kids cannot rollerskate over to Grandpa's to see his rabbits or get help with their stamp collection. There are no retired people in the town, no mature, unhurried experience to call on for some of the more subtle needs of life. These towns are systons with whole segments omitted.

The Synenergy Urge and Synenergy Conversion

It appears that the need for attention is just one form of the Synenergy Urge felt by all systons. As we progress in this book we will find other expressions of this urge everywhere.

What is interesting, is that if a syston is deprived of a preferred form of synenergy, it will seek another, substitute form.

This tendency is sometimes called sublimation. Sublimation is a term with moral overtones which make it unsuitable for use in an MT framework, but the concept is in accord with the suggestion, back in Proposition 106A, that all forms of synergy are capable of interconversion

Proposition 124B****. All systons are subject to a Synenergy Urge, an urge for synenergy flows to and from itself

Proposition 124C**. A syston starved of the flow of a preferred form of synenergy will seek to compensate with another form

There is a point worth emphasizing as regards synenergy flows and urges. These urges run both ways. Perhaps the strongest direction is to receive, to learn — getting enough to keep alive and thrive must be a fundamental feature of syston survival. But it would be remiss to leave the other flow out of consideration — the urge to teach, to give, to help the wider syston.

Why Bother? It Isn't Worth It

A regrettably more and more common example of synenergy conversion is seen with teenagers leaving school at the age where once they would expect to start working. Increasing unemployment, especially marked for school leavers in the western world, has dropped huge numbers of these young adults into a synenergy vacuum where they are, very understandably, 'at a loose end'.

Bored and listless, these teenagers have suddenly been cut off at the knees as regards synenergy flow. The continuous flow provided up to that time by their school system has stopped, and they have nothing to replace it. It is no wonder that as they cast around for other forms of synenergy to compensate, they may turn to extravagant dress and behaviour to attract attention flow, or spend their time in video game arcades for their interaction with computer simulations, or drift into petty crime as a source of money, a most potent form of infocap.

The overt complaint of the unemployed young is their lack of money flow. That their real lack is of synenergy generally, rather than its specific form as money flow, is shown by the fact that this complaint largely disappears if they move on to further education or training. In such a case, or even if they move into an unpaid job, perhaps as an overseas aid volunteer, they will then satisfy their Synenergy Urge and the money becomes less important. To the unemployed, money in actual fact may be important more for its use in gaining synenergy flow, rather than overt reasons such as food supply.

From the viewpoint of the wider syston, it would be very clearly advantageous to channel these unsatisfied synenergy urges into productive, or at least non-destructive, directions. The Matrix Machines described in the previous chapter offer one way of achieving this. It is irrelevant if these are presented initially as entertainment, entertainment is the same thing ultimately as education, and education is a major route to infocap accumulation.

What stops the rapid implementation of this idea? The point is, the syston must already possess the infocap needed to implement it. While young Mark Jones would be delighted to put aside his racing car video game to spend time operating a mining waldo, competing with others to get the highest production with minimum damage to the remote, the capital cost of the equipment may well be prohibitively high.

But if money makes money, our generalization here is that infocap breeds infocap. The challenge to the syston, as always, is to plough back as much as possible of its infocap dividends into research and investment, rather than using them as a living wage.

Taking the General View

Psychologists deal with the whole gamut of human emotions and attitudes — pride, anger, love, envy, humility, self-sacrifice, urge to learn — the list is endless and intricate. If the basis behind the Matrix Thinking approach is valid, then all these emotions and attitudes will have their analogues in wider systons.

Proposition 124D***. All human emotions and attitudes have analogues in wider systons

Nowadays, the seat of these emotions and attitudes is regarded as the brain, although by western tradition the seat of love is in the heart (in Malaysia, it is the liver!). It is convenient to have an assigned site for syston control activities — in MT symbology we assigned this site to have the 'government' symbol. And we used the syston boundary or skin idea to include functions such as immune reaction processes, even though they might take place elsewhere.

In practice all such functions in systons are more or less spread around, 'distributed' is the technical term. In animals the brain is obviously a major site, but the glandular system, distributed throughout the head and torso, is also very important. In a termite-nest syston, where the queen is not much more than an ovary, and syston communication is more chemical than electrical, this distributed control is very obvious.

And in a complex tree, or even more so in a tree-species community which might extend