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TECHNOLOGY FOR ENABLING: .

The implications for management science
of a hermeneutics of distinction

ROGER JOHN HARNDEN

(Doctor of Philosophy)

THE UNIVERSITY OF ASTON IN BIRMINGHAM

September 1989

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The University of Aston in Birmingham

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Thesis Summary

One way of describing this thesis, is to state that it attempts to explicate the context within which an application of Stafford Beer's Viable System Model (VSM) makes cybernetic sense. The thesis will attempt to explain how such a context is presently not clearly enunciated, and why such a lack hinders communication of the model together with its consequent effective take-up by the student or practitioner.

The epistemological grounding of the VSM will be described as concerning the ontology of the individuals who apply it and give witness to its application.

In describing a particular grounding for the Viable System Model, I am instantiating a methodology which I call a "hermeneutics of distinction". The final two chapters explicate such a methodology, and consider the implications for the design of a computer system.

This thesis is grounded in contemporary insights into the nervous system, and research into the biology of language and cognition. Its conclusions emerge from a synthesis of the twin discourses of Stafford Beer and Humberto Maturana.

Key words

cybernetics, hermeneutics, logic of distinctions, ontology, viable system model

DEDICATION

I would not have arrived at this juncture, without the foundations granted me by the School of Independent Studies, at Lancaster University. As far as I know, this is a unique educational facility in this country - Enabling Technology par excellence! The opportunity to take my first degree under the umbrella of the School, together with the support of its director Vernon Pratt, enabled me to commence to consolidate what would have otherwise have remained disparate strands of learning.

Stafford Beer has always given me support in my hour of need, and invaluable provided pointers which might else have remained overlooked.

At Aston University, my long-suffering supervisor Raul Espejo, has been a goad, a friend, and a constant source of encouragement when I have floundered along the way.

I consider myself to have been privileged witnessing in person Humberto Maturana's demonstration of how science might be an art, perhaps the critical lesson for our age.

Ursula tolerated my downs and encouraged my ups, while Simon distracted me. However, both the distractions and encouragement were necessary for me to complete the journey.

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I INTRODUCTION

1.1 First mark

I want to establish at the outset, the ambitions and limits of this thesis. I will make a "mark" (Spencer Brown 1972), an initial act of distinction making visible both content of and context for this piece of writing.

If my thesis had been produced within a philosophy department, it would have unfolded very differently. I would probably have attempted to "pack out" a particular intellectual tradition, which I would describe and define in order to comment upon. I'm not setting out to do that. What generates my discourse, is curiosity about the way consensual currents gain positivity in their historical locations. My concern is not to comment, but to lay down a particular domain of consensuality, and to "activate" the VSM according to my own understanding of it.

Situated in a management context (the Business School, Aston University), my preoccupation has been with the identity of social organisations. What are such things as social organisations, how do they function, what relationship do they have with the human individuals who fulfill their operational functions? These were the sort of questions I found myself asking.

However, as I asked these questions and considered the issues that they drew my attention towards, I found that the actual grounding of the subjects I thought I was focussing upon, lost its substantiality and dissolved. When I started out, I didn't at all question the existence of "social organisations" - the "fact" that they existed. I was intending to understand what was before my eyes, as it were. What I was saying was something like the following - "Here's an organisation - what I've to do now is find out how it works".

Gradually, my certainties abandoned me. My most difficult task has been a re-construction of my own grounding. This has entailed naming a category such as "certainty" in a novel manner. Initially, although I had lost hold of what it was that I intended by the use of such a phrase as "social organisation", I found that I was using such phrases all the time. I was using them in a manner that Nietzsche would have called "reactive". In other words, I wasn't bringing forth any coherent domain of speech and thought for the handling of social and other realities, but was merely antithetically hitting at or opposing existing forms in my conceptual repertoire, and thinking that such antitheses were novel.

I only became aware of the confusion that I was experiencing, and of the inconsistencies of my own discourse

and thinking, as I became more deeply hooked into the discourse of Humberto Maturana, notably his more recent writings on constitutive ontology. I will unfold this term in due course, but now it is merely presented as of historical interest in tracing my own development.

As I became more deeply enmeshed in Maturana's work, and more familiar with strands of constructivist thinking such as that of Ernst von Glasersfeld, my own task became more clearly discernable as concerning the bringing to light of just what my own "reality" might be, including among other things, just what the functioning of such consensual terms as "social organisation", indicated for myself. It was my own attitude and political reality that was at stake, not some Reality outside myself, "in" the social or natural worlds.

The realisation or "bringing forth" of this personal reality, was not to entail drifting into solipsism nor single-mindedly contemplating my navel. It was here that Stafford Beer's VSM was invaluable. Here was work that was explicitly setting out to get engaged with social reality (ie. that wasn't "academic philosophy" conducted in an ivory tower). Far from setting out to discover what "social" reality might be (eg. this firm, that nation), Beer appeared to myself to be seeking a way to enable the coherent interplay of distinct domains of reality. Not through the establishment of one absolute, enduring institutional

apparatus, but in making visible patterns of interaction which might provide "gates" that allowed communication and interaction across what might previously have been irreconcilable interests and boundaries.

My approach to Beer's work was via contemporary radical philosophy and Gordon Pask's discourse concerning "conversational" dynamics, rather than out of traditional management science or social theory. The discourse of Michel Foucault had made me deeply suspicious of the way that language, in its semantics, functions in the social domain. Foucault demonstrated how the everyday play of language and meaning is bound to political processes and the play of power. At the same time, other theorists, notably associated with the thinking of the Frankfurt School, demonstrated the myth of claims for the neutrality of technology. What I gradually discovered my own ambition to be, was to suggest an explicitly non-neutral technology that yet "said nothing" about the problematic of language as the latter was conventionally understood and debated.

Partly due to the influence of such people as Jurgen Habermas and Herbert Marcuse, there is a great deal of attention currently being focussed upon the notion of "empowerment". Empowerment attempts to come to grips with political issues in the social domain, by describing means by which individuals and minority groups are enabled to help

themselves to define their own problems, and determine their own solutions, given the constraints they are working within.

I was much taken by such writing, especially when it focussed upon the problem of learning in a social/political context (eg. Freire 1972). But partly because of the degree of cynicism imparted by Foucault, I was deeply suspicious of the emancipatory potential of social interaction per se. It wasn't that I was against efforts to empower, but that I felt there might be some more radical way forward, a path more intimately related to technological processes, without at all being "corrupted" or "tainted" by such processes.

Until very recently, writings on alternative technology, have tended to resolutely ignore technological developments as these have implications on mobility and communication. Under mobility, I class all consensual processes to do with exchange, whether ideas or goods. Mobility is becoming transparent in spite of hiccups such as recent events in China (June 1989). I found myself considering the sort of organisational processes that might emerge and ride on the back of such mobility or fluidity of exchange. Given that I had dismissed the emancipatory potential of consensus, and was not attracted to semantic analysis, what increasingly attracted me were the dynamics of mobility. What were the implications of increased interaction and communication in themselves, irrespective of what was being communicated, or with what intention?

What this was to lead towards, was the opening of a consensual space enabling me to describe a technological domain of "enabling" and "disengagement", and it is this domain that I will approach and attempt to communicate through this thesis. I adopt these two particular terms because I consider mobility to be a matter of breaking out of some existing recurrent pattern or mould, in a manner which enables the distinction of new patterns and the choice to indicate novel forms.

My course will involve explicating a methodology that is built upon a logic of indication and distinction as an effective tool to handle issues of complexity. The interest then becomes to identify the medium which might support such a field of distinction-making. I will be calling this field, an Enabling Network System.

1.2 Problems of constitution

My enterprise emerged as an attempt to braid together the discourse of Stafford Beer with that of Humberto Maturana. As it developed, there also arose insights into how the work in managerial cybernetics of Stafford Beer and Raul Espejo, might be more readily communicated and implemented. The thesis develops new insights and understanding of managerial cybernetics, in the process of opening a space of non-organisational social activity, thus marking both the scope and limits of management discourse, such as Beer's. This may be seen to concern the issue of constitution. In so far as some domain is constituted by another (eg. the family by its members), what is the quality of that which is constituted?

Although situated in the tradition of management science rather than philosophy, I am not concerned theoretically with contemporary management practices, nor with problems as they are conventionally voiced concerning organisational norms. I conceive of such practices as for the most part conveying a false set of assumptions, notably as they concern the dynamics of systems "out there", and linked to this, suggest a constitutive relationship between the "human" individual (henceforth, the "observer") and the "social" group.

The prevailing conventional wisdom of much management science and social theory, suggests a continuum between the individual and social forms, a continuum in which individual and social group appear as two extremes of one particular systemic phenomenon. In such views, systemic domains give evidence of "emergence". The whole (eg. social system), is seen as more than the sum of its parts (eg. human individuals). This is essentially a logical problem, but it has concrete effects. These would be different if, for instance, the whole were to be considered as "other than" or "in a distinct domain from" the parts.

As it stands, the observer is encouraged to seek in the social domain "out there", a rich complex human process, and to forget that it is him or her self as an observer of such phenomena, who is constituting such a whole, by indicating its boundaries, naming its identity and behaviourally operating in a fashion leading to the confirmation or rejection of such indication. We often talk as if it is the actor in a situation who constitutes the "social system" which we are focussing upon. The only "actor" who is constitutive of anything, is ourself as an observer of it in our consensual coordinations of actions.

I am intent upon clarifying both the notion of "system", and also insight into the "constitutive" relationship between the observer and social processes. I

will be asking whether we might operate and converse about the social domain, without recourse to discourse which suggests that such a domain is an emergent, systemic property. This concerns an understanding of cognition and language, and their biological grounding. This is because it has to do with the braiding together of the domain of descriptions and explanations on the one hand, and the domain of operational coherences we experience in our actions on the other.

The notion of a constitutive continuum also lies behind "mirror image" theories of reflection and thought, and is closely bound to their dualistic implications (eg. see Rorty's critique of philosophy which takes thought and imagination as the "mirror of nature" - Rorty, 1980). Here, the constitutive continuum flows inwards. I mention this because Richard Rorty's insights had a strong impact on myself, and are consonant with my thesis.

The significant point is that both mirror of nature insights that Rorty criticises, and explicitly expressed notions that the human and social form one continuum, are grounded in assumptions that the individual is an information processor or "receiver" of data which arrive neutrally from outside, just as a computer receives input.

Where the phenomenon of emergence is witnessed as an objective phenomenon, it tends to find its grounding "out there", to be pointed at, discovered and commented upon, separate from the one doing the commenting or analysis. This is the case whether the systemic properties are attributed to eco-systems or to social systems. Such properties are imagined to reside outside the procedure of observing, and the knowing subject is presented as some neutral voyeur.

"Mirror image" approaches inhabit the same paradigm with a different set of imagery, presupposing a homunculus in the mind, perusing and commenting on a picture of external Reality. This merely shifts the problematic of cognition one remove, rather than granting an insight into the entailed processes (Maturana and Varela 1987: 129ff; von Foerster 1981a).

I will be treating the entailed issue of constitution as concerning a complementary play or dance which is the ontology of the observer. Such complementarities will not be described as actually existing "in" society or "in" nature. They are understood to emerge as a play of dimensions of distinctions in the course of languaging in the course of consensual coordinations of actions in a particular consensual domain. This play of cognition and actions is described in terms of the organisational closure of a nervous system which persists in the course of recurrent interactions

in both the domain of languaging and actions (the hermeneutic circle), rather than described as giving evidence of some domain of Objectivity "in here" (as mind) or "out there" (as extension).

When it is the nervous system that is considered as being organisationally closed, as is the case in the biology of cognition, particular consequences follow. Social, or indeed any other domains of human interaction, may be described by the observer as constituted by the individuals indicated as components of such a system. But this is a convention in the consensual field of the observer, rather than denoting a phenomenon outside such a constituted linguistic domain. To put it another way, the constitutive function of the observer is now better described as generating consensual categories and effecting of linguistic marks. I will write of this process as the activation of realities, in distinction to the discovery of Reality.

This is very different from the view that the individual, in constituting social phenomena is able to comment upon them from a privileged vantage. With the aid of the discourse of Humberto Maturana, I will demonstrate that such assumptions, whether implicit or explicit, are inaccurate and also unnecessary for the effective handling of complexity.

To communicate my own consensual processes, will entail describing a domain of social interaction that lies in the interstices of organisational norms and practices, as presently understood. If this is lost sight of, then the whole thrust of my discourse is likely to be misinterpreted.

1.3 Review of literature

This chapter has already suggested the background out of which my thesis has arisen, and the tradition in respect of which it stakes its claims to contribute. However, before embarking further on my project, I will more precisely indicate the writers whose work provided the foundations for my own, and indicate the contemporary literary context.

I will describe these foundations in three sections, considering three distinct strands of discourse. These are centred respectively around Stafford Beer, Michel Foucault and Humberto Maturana.

Both Beer and Maturana are concerned with organisational closure, in the context of a particular tradition of studies of the nervous system. Foucault, situated in the tradition of radical philosophy and history of science, is concerned with the play of power in contemporary western cultures, notably as power is linked with systems of signifiers and language, rather than as it is asserted as the threat of force in political systems.

1.3.1 Stafford Beer

Beer considers how one particular model of the structure of an organisationally closed system, might provide

the reference for a mapping exercise which would enable the more orderly conduct of human social affairs, notably in granting insight into notions such as viability and identity in the social domain (Beer 1966, 1979, 1981, 1984, 1985). He wants to bring forth functional (ie. useful) procedures, in order to influence the "body-politic" (including all social and economic forms). To put it somewhat crudely, he desires to transform society, and believes he can supply the means for the transformation - or at least to encourage such a transformation.

As I read and studied, it seemed to me that where Beer gave a cogent and clear description of a set of relations that might facilitate consensual interaction, he also allowed his readers to follow a false trail which might encourage them to believe that the consensual patterns he was suggesting, existed in Reality, and might be uncovered or discovered "out there" (ie. independent of their own specification or indication by the observer, including Beer).

It took me a long time to recognise my own difficulties for what they were. I "knew" that the VSM didn't say anything about Reality, yet I didn't know what it was that I myself intended by the notion of Reality. This was not, and as far as I know is not considered a issue by Beer himself, who sees it as a matter of interpretation. In seminal works such as "Decision and Control" (Beer 1966),

Beer had clearly spelt out the function of models, among other things. The problem is that few contemporary readers appear to go back beyond the standard "set texts" , "Brain of the Firm", "The Heart of Enterprise" and latterly, "Diagnosing the System for Organizations" (Beer 1979, 1981, 1985). Even those who do (such as myself), encounter problems to do with "plugging into" the actual significances being attributed to particular linguistic terms, such as "model", "organisational closure", "requisite variety" or "real-time".

As time passed, my own thoughts were to lead me to conclude that a problem situation is dissolved, through being brought forth by the involved actors according to consensual coordinations of actions which they understand (eg. a model that they conjointly construct). This is opposed to the idea that a problem situation is solved through a procedure in which it is seized or identified as an existing state of affairs, and commented on from the vantage of some model (2.2.2, 3.7).

This led me to feel that the confusions encountered in understanding the work of Beer and Espejo, and the difficulties voiced concerning putting the ideas into practice, arose because of a certain naivety towards the function of language in the exposition of the model they were attempting to communicate. To express what I mean, I'll briefly compare the method of Ross Ashby with that of Beer.

Ashby never explicitly took his task to be to dwell on the problem of the observer. He consistently placed the observer in brackets in order to concentrate on his own area of interest (logical relations given particular constraints, or more accurately, given the horizons of the operational coherences we operate in respect of). In the case of Beer's work, such bracketting becomes more crucial.

Beer is focussing upon what he sees as the implications of a particular set of logical relations in the human social domain. Difficulties of communication arise in his case and not Ashby's, because Beer's attention is specifically directed at human problems in the social domain, concerning praxis, not just the unfoldment of logic. In relation to Ashby's work, one might argue that it was unnecessary to bring the observer into the picture, even though in point of fact Ashby himself continually reminds the reader of his bracketting. But in taking his domain of interest to be the analysis of social interactions as these concern human beings, Beer's work explicitly concerns the observer in interactions with other observers.

The absence of rigorous explication of this point leads to a sense of incompleteness about Beer's discourse. Given the unfoldment of a social organisation into its functional elements, there is required some contact point (ie. some transducer) to explain the relation of such

functional relations with the cognitive beings giving witness to them. I believe this concerns what Maturana refers to as "languaging", and part of my ambition for this thesis, is to situate the VSM explicitly in terms of a constitutive ontology of the sort that Maturana unfolds.

Thus for myself, Beer's imagery of the "yo-yo technique" (Beer 1966, 1984), is insightful as a description of the scientific method. However its power is only realised when it is taken up as ontology rather than epistemology. This means that one treats the exercise itself as the motor for a transformation on the part of the practitioner using it, rather than considering the methodology as allowing one to point towards some "outside" activity. The fact that such a technique is useful in concrete instances is neither here nor there. The point is that the effectiveness is a consequence of a recurrent consensual practice in a community of observers.

Beer himself remains firmly convinced that this is a problem of epistemology. Of course it can be validly described as such, but I feel that such a description misses the point. Understanding of Beer's intent, arises only when the student appreciates not merely that Beer's scientific method involves the orchestration of "fit" as a dance with whatever it is that is "out there", but that their own application of a model never escapes the boundary conditions

of their own cognitive and consensual horizons. For such an appreciation to evolve, further dimensions of discourse are required than those hitherto provided by Beer himself. Raul Espejo is currently exploring this avenue of thinking, in the course of developing his own cybernetic method, but this thesis aims explicitly and directly at the entailed issues.

What is required is understanding of the constitutive relation of language to all that we may specify as observers, and in addition the dynamics that braid this domain to all other dimensions of existence that we are structurally coupled to at any one moment. The phenomenon of constitution lies in the dynamics of language, not in the world "out there" (for example, see Section 1.2), and discussions concerning the VSM sometimes confuse this point.

1.3.2 Michel Foucault

It is not easy to indicate precisely what Foucault was concerned to bring forth, and where his discourse stands in the context of my own perspective. His writing is dense and the ideas difficult to appreciate. Perhaps one might summarise his endeavour, by stating that he became fascinated with the means by which logical categories become constituted, from the perspective of contemporary structures of power. Commencing with studies on madness, Foucault expanded his focus to medicine, and then to all of what he

called the "human" and "social" sciences (Foucault 1974, 1976, 1977, 1979, 1980, 1981). Unlike Thomas Kuhn, Foucault concentrated on these areas of knowledge because he believed that anomalies might be made more easily visible.

What Foucault was interested in, was the means by which in so-called modern democracies, "victims" constitute the consensual relays that they find themselves specified by. This is a crucial problem confronting revolutionary theorists of today. Why is it that those most victimised by the System, are frequently the most reluctant to activate processes in order to change their status? Foucault is cynical of answers to this question that revolve around issues of force or instance material or educational deprivation. He would see the latter as symptoms of something, rather than as pinpointing the actual problematic.

Foucault's insights took shape when his research revealed how the institutionalised "mad", and indeed the actual concept of "madness", arose historically as a consequence of political imperatives. He sharply rejected theories of historical development which claimed to trace an arrow of liberal emancipation in human affairs. He was profoundly cynical of notions that the human sciences such as medicine or psychiatry, emerged as neutral domains of enquiry, which through their objectivity might accurately and benevolently discover and categorize.

Not rejecting notions of whether there might be discerned evidence of progress in the social domain, Foucault's interest was to see just how the human sciences functioned in laying down domains of knowledge governing both concepts and practices, and how such knowledge concretely reverberated in the modern social domain.

He moved to the view that in mapping out their areas of concern (their own subject matter, which concerned the philosophically-named "subject" as its object - ie. the human individual), the human sciences fixed the human subject in a dense web of the play of power. He demonstrated that for such sciences, the human being emerges as the status of a "subject-object". The entailed discourses, unlike those of the pure sciences (for Foucault), were peculiar in that individuals described and analysed in their terms come to be regarded as constituted by them.

One of his conclusions was that "soul" has become physicalised as a political function in the modern world. Soul, in Foucault's interpretation, has become one more biological category among others, as a nexus for various dimensions of a grid of signifiers erupted from the human sciences, notably in this instance, psycho-analysis. Foucault situates psycho-analysis as the "queen" of such dubious "sciences", sciences characterised by marking out terrains of sublime ambiguity for their constituted subject-objects.

In other words, such subjects become the motor for the systems of power that oppress them in their everyday actions. Notably they become relays enabling the activation and passage of "power/knowledge". The last signals the functioning of a "disciplinary society", a society in which specification of the significance and indeed being of individual traits or characteristics, becomes the prerogative of the expert from the vantage of some discipline (the psychiatrist, the doctor, the lawyer, the sociologist and so on). For Foucault, this is seen to be the genius of contemporary structures of power. Their victims are seduced by systems of signifiers into victimizing themselves. The actual play of entailed power remains invisible, as the victims themselves constitute the relations of power which determine their concepts and actions.

One of the major interpretations of Foucault's work is by Herbert Dreyfus and Paul Rabinow, and is titled "Michel Foucault: Beyond Structuralism and Hermeneutics" (Dreyfus and Rabinow 1982). As suggested by the title, Foucault was attempting to disassociate himself from structuralism and hermeneutics. What he attempted to locate or bring forth in his own discourse, were the concrete mechanisms which constitute the play of power in the modern world. He cast doubt on both the neutrality of the sciences and also the impartiality of interpretation.

As mentioned, Foucault's preoccupation was the play of power in the modern world. He considered power to be a logical category which evades explicit description. That is why it is power. His analysis led him to develop the notion of "power/knowledge" and the "microphysics of power" (Foucault 1979, 1980), and both these phenomena can be seen to be intimately associated with systems' discourse.

For Foucault, "disciplinary thought" arose around the turn of the nineteenth century, with the political intention of making visible all deviations from defined norms. Whereas previous to this period the Sovereign was the apotheosis of individuality, after this time individuality became increasingly sanctioned as "abnormal", as something somehow standing out from the norm about which might be gathered some system of rationality.

What Foucault appears to be saying, is that to the degree that the individual embraces systems' discourse (whatever the ilk), the s/he surrenders individuality to the status "subject-object", and not merely subject-object in abstraction, but as defined and determined physically down to the innermost detail (by physiology, biology, chemistry etc.). The difference between the confessional and psycho-analysis, is precisely that psycho-analysis claimed the body as the soul.

So Modern Man (Foucault), finds himself transfixed by a series of analytical procedures which refuse exception from the norm except to label it "deviance". Not just that. Even the most "normal" individual, discovers him or her self "normalized" according to their place on some grid or metric (eg. the normal distribution curve). Thus, the phenomenon that no person is Mr. Average, in spite of the fact that all statistical procedures depend on such a category. And regardless of the protest by the statistical expert that this is precisely all that statistics do (ie. they are logical procedures), Foucault traced the concrete effects of a conflation of categories and types consequent on the grids of rationality fixing the individual's own conceptual space in the name of some norm or other, as effects of the claims made by the human sciences.

After my reading of Foucault, which preceded my introduction to cybernetics and constructivism, I myself was left adrift. I had deep insights into power (or so I believed), but few weapons to enact a defense against or launch an attack on such power. The problem with Foucault's sort of discourse, as perhaps with a figure such as Nietzsche, is what positive thing to do with it (hence they are often labelled "nihilist"). My gradual shift towards cybernetics came partly as a result of this felt frustration.

Foucault had implied that the intellectual battle is always reactive, a never-ending rearguard action to make visible existing webs of power relations. For myself at the time, cybernetics appeared to beckon towards an understanding of the domain of action in a more positive or optimistic light, as the bringing forth of conceptual fields. I wedded insights such as David Bohm's "natural intelligence" and Gilles Deleuze's "acategorical thought" (Bohm 1968; Foucault 1977), into the tool required to push me away from philosophy and social theory, towards an engagement with areas of thought more specifically bound to technology and the pure sciences. I was, unknown to myself, rebelling against ever more abstract patterns of thinking, and yearning to find my boots on the ground in the domain of action. At the same time, because of my immersion in Foucault, I was myself profoundly suspicious of any claims for system. This tension has strongly influenced the way I have developed my own discourse. My way out of the impasse, came in large part due to Maturana's brand of ontology.

1.3.3 Humberto Maturana

What interests and inspires Maturana, is a "passion for explaining" (address at Felton 1988). One could say that he sees himself as an artist or poet, whose subject-matter is explanation. He wants to explain explanation, and in doing so to encourage what Gregory Bateson called "deutero learning",

or learning to learn (Bateson 1972). And he wants to do this from the basis of an insight into the nervous system as organisationally closed. In other words, his question is: given that the nervous system is organisationally closed, together with all the consequences thereof, how is it that I can explain, and explain my explanation?

The epistemological question of how it is that I may know, doesn't preoccupy Maturana. Knowledge is of no interest to him. He is excited by the beauty of consensual processes, given the consensual braiding of the two nonintersecting phenomenal domains of explanations and experience. Out of such braiding are different realities brought forth, witnessed as such and particular actions repeated or avoided. The ideological or political question for Maturana, is how to encourage such a "multiverse" and avoid the tyranny of one Universe, which dictates Reason and Truth by its singular Authority.

Maturana passed from posing questions about the functioning of the nervous system (the "biology of cognition" - Maturana 1970), to posing questions about the fundamental mechanism of life ("autopoiesis" - Maturana and Varela 1973). He then found himself asking questions which arose as a consequence of adopting an answer to the question of the fundamental mechanism of life (the "biology of language" - Maturana 1978).

What Maturana had come to realise, was that questions and explanations never escape language, even when one is involved in scientific practice and procedures. Any conclusions reached are linguistic constructs, recognisable as communicative enterprises only given a congruent community of observers willing to give witness to them. This applies equally to the experiment as to the theory. No experiment surfaces neutrally in its "experimentalness", but gains its significance as it is grounded in a particular field of understanding and expectations. This in turn is inextricably bound in its rationality, to the recurrent actions and interactions taking place "in its name" as confirmation or denial - consensual coordinations of consensual coordinations of actions. Thus did Maturana converge upon the modern tradition of hermeneutics (Gadamer 1975), and Heidegger's brand of ontology (Heidegger 1978).

In his more recent writings and expositions, Maturana has been focussing upon the implications of his insights into the biology of language and cognition, arriving at a model for a constitutive ontology in distinction from a transcendental one (Maturana 1988a onwards). Such an ontology is significant in making no claims for objectivity or truth. Objectivity and truth are both bracketted, and functional effectiveness described in a manner consonant with the organisational closure of any and every nervous system.

Maturana demonstrates how the generation of multiversa or a multiplicity of realities in a community of observers, is compatible with what we know about our engagement with whatever domains of existence might lie outside our own nervous system (including our knowledge of such nervous systems). In other words, whatsoever one can achieve with insights into one Objective Reality (such as going to the moon, or constructing ball-bearings), can be explained just as satisfactorily without any recourse of objectivity whatsoever. In either case, we can still roll the ball-bearings or fire the rocket engines.

Maturana's own "model", is a model for explanations, or what he calls "the ontological diagram" (Maturana 1988c). In effect, this indicates the transference from the explanatory domain of Objectivity, to that of objectivity-in-parenthesis. It was with the aid of this "model", that I was finally able to fit Beer's VSM to a satisfactory conceptual model of my own, in the process of putting to rest some of the anxieties that Foucault had thrown in my way.

1.4 Summary

I have used Beer and Maturana as the launch pad for my own discourse, rather than presenting them as opponents to fence with. I wasn't always sure that this would be the case, nor am I certain that it will still be applicable six months from now. There are aspects of the discourse of both writers that I am not fully cognisant of, and dimensions where I feel unease, but these will be mentioned in passing, rather than serving the focus for some critique.

What I gradually realised, was that the whole of Stafford Beer's model might be bracketted and distanced from any implications of pointing at or mirroring some social or other Reality. It might then be understood as a linguistic term in the context of Maturana's biology of cognition. This changes the model's own status. In addition, it perhaps "situates" a novel explanatory technique or exercise (ie. the VSM), as an orienting tool for ontology. Beer's VSM becomes properly understood as a generating mechanism for different realities, rather than appearing a method that describes or otherwise captures the variety of things by fitting them to one Reality.

II CONTEXT FOR CONTEXT

2.1 Foundations for ontology

My research has concerned the development of a theory, rather than postulating a hypothesis, gathering data and finally testing the validity of the hypothesis. I have arrived at a conclusion and can now proceed to tell the story of how I got there. That story will be my thesis; it will describe a particular understanding of the social domain in the light of some contemporary technological tools, and explain why such a perspective makes sense.

I will present this process as an exercise in ontology - as the bringing forth of a particular reality.

The difficulties I have experienced in developing my discourse, have concerned my confusion as I was "discovering" just what it was that I was setting out to explain. This was because I was increasingly influenced by Maturana's constitutive ontology, and attempted to develop conversational tools compatible with it.

In this approach to language and reality, consensual congruence is understood as a process or flow, entailing costructural change through recurrent interactions (language and all other actions). This is distinct from the normal way of treating communication and understanding as reaching some agreement about an external Reality, by the "batting" back and forth of ideas, and thence demonstrating the validity of such a Reality by means of superior logic.

From my present perspective, communication and understanding concern consensual coordinations of actions, rather than the presentation and discussion of Reality, or the search for Truth. Technology is understood as one dimension serving for consensual orienting, or perhaps better as one particular grounding for linguistic terms. The whole complex web of language, thought, emotion and actions that constitutes a community of observers, is a braided fabric of ongoing "flow" of recursive orders of distinctions as these erupt in action or behaviour. The instant that the flow is arrested or frozen by an act of distinction in whatever the domain (eg. a step, a thought, a word), becomes a consensual "marker" packing out a consensual space, rather than signifying the discovery of an Objective criterion for separating out phenomena, or establishing their identity.

As far as the observer is concerned, any separation or cleavage of the blank face of things - whether recognition

of a particular aroma, or an association between attended words or perceived shapes - is brought forth in the moment of its indication. This can be described as a consequence of a self-referential play of cognition, language and consensuality, as they interact orthogonally according to the structural dynamics of the nervous system, itself structurally embedded in the domain of behavioural interactions (dodging bullets or dancing rock-and-roll).

The entailed process of orthogonal intersection, can perhaps be suggested by considering the example of metabolism and cognition, where physiological interactions along one dimension have neighbourhood or contiguous effects along other distinct dimensions (ie. orthogonally). For instance, when we ascend a mountain and the atmosphere becomes less dense, our take-up of oxygen is less-efficient. When the effectiveness of conversion falls below a certain level, the individual experiences secondary effects such as light-headedness or hallucinations.

Such hallucinations, experienced as cognitive phenomena, are not a direct consequence of the ascent of the mountain, but are a result of the orthogonal interactions taking place in the dynamics of the cell. Any number of phenomena might have decreased the availability of oxygen, for example placing the individual in a sealed container. What causes the hallucination is not the mountain nor the

container, but the contiguous cellular relations of the involved organism.

The structural dynamics of the nervous system which ground such intersections, form the actual biological horizons of any cognitive event. This is the reason why Maturana refers to the cognitive domain as the effective reality of the observer, and why he talks of the "biology" of both language and cognition (Maturana 1970, 1978, 1983, 1988b, 1988c). What language enables, is higher orders of recursion of such orthogonal intersections to take place.

To express this another way: whether or not it makes any sense to describe distinctions, identity or form as existing in the "natural" order of things independent of their indication, the orientation of the observer in respect of an environment is necessarily in correspondence with that observer's cognitive space. The structural dynamics of the nervous system, form the horizons for the dimensions of distinct phenomenal interactions enabled to intersect in the course of the organism's natural drift (Maturana and Varela 1987). Thus, whatever "actual" distinctions exist "out there", for the observer they remain opaque.

In the context of a constitutive ontology, efforts to communicate (ie. languaging) do not consist of striving to accurately portray or denote either what is "in here" (eg.

ideas), or "out there" (eg. buttercups). Language has a connotative rather than denotive function (see Section 2.5). The observer is braided into a coherent fabric of consensuality (ie. meaning as it arises in a community of observers), in the course of effecting a play of recursive orders of distinctions in the flow of recurrent interactions (Maturana and Varela 1987; Maturana 1988b, 1988c, 1988d).

The distinctions available emerge in the course of interactions of bodyhood structural dynamics, where language and consensuality enable dimensions of intersections of phenomenal domains which may or may not be otherwise intersecting. For example, the association of telephone with my aunt Sally (two otherwise nonintersecting phenomenal domains), is enabled by their orthogonal intersection in my bodyhood dynamics as a languaging observer whose consensual orienting brings forth such an intersection. Thus is ball "fitted" to bat, and summer village greens are observed echoing to the gentle to and fro of cricket. Thus too, is rocket "fitted" to space.

2.1.1 Structuralism and a constitutive ontology

My original intention was to develop a Theory of Organisation from the cybernetic perspective. What I imagined when I started out on this project, was that I would develop a theory about social organisations - about the ways in which

individuals and groups interact as they constitute the variety of social organisational forms.

What in fact transpired, was that in the course of a lot of confused and tortured thinking, I arrived at where I had originally started and knew the place for the first time (Eliot 1944 - "Four Quartets, Little Gidding", Section V). What I gradually realised, was that I was really striving to make visible novel forms of interaction between human individuals, rather than comment on existing social practices.

This "making visible" or "bringing forth", is distinct from the intent of radical social theorists whose aim is rather to highlight by critique or analysis, the shortcomings or faults of existing social practices and forms. I commenced with a somewhat naive notion that I was "doing" critique, but am ending with a desire to "language" hitherto absent forms of social practices.

At this juncture, I will attempt to convey a flavour of my argument and to anticipate the conclusions of the thesis, in order to facilitate the journey for the reader. I will begin by describing some of the similarities and some of the differences between a constitutive ontology and structuralism.

2.1.1.1 Structuralism

Structuralism was a body of thought or a methodology, which sought to bring to light more abstract levels of pattern and invariance, rather than to directly subject visible social forms to analysis and critique. Structuralist thinkers, such as Claude Levi-Strauss, hypothesized that a deeper coherence of pattern than had hitherto been recognised in the human and social disciplines, was a function of the constraints imposed by one common cognitive class - "humankind" (eg. Levi-Strauss 1972).

From such a perspective, constraints perceived to be imposed by any one particular set of cultural codes or practices, were considered to be of an arbitrary nature. "Local" characteristics, were held to give evidence of surface variety alone, and not to provide the observer with a text from which could be "read off" deep meaning (eg. by inferring absolute categories such as Gender, Race or Intelligence from culture-specific behaviours). Immediately visible variations between social groupings (cultures), were then not seen to depict an inevitable absence of isomorphisms on a higher, more abstract level. "Surface" isomorphisms or their lack, were not held to be informative at the "structural" level.

In shifting the focus of attention to a different, to a higher level of abstraction, what was being suggested was that along some dimension or other, isomorphisms will always be visible in the human social domain, giving evidence of the structural commonality of human beings, whatever local variations, whatever the race or creed.

For example, just because an equivalent for the English word "family" or "god" was apparently absent in a particular language, wasn't at all held indicate an absence of signifiers which, once identified as such by the observer, could be seen to perform an equivalent function to that of the word "god" or "family" as understood in one's own culture. When distinguished by the observer, it was such a logical equivalence that indicated a structural commonality.

In order to observe commonality between what might at first sight appear totally alien cultures with nothing in common (or even, as was frequently the case until well into this century, be held to give evidence of sub-human or pre-human societies), it is necessary to bracket out the anomalies between "surface" codes and practices presently observed as constituting the idiosyncracies of a specific cultural or linguistic domain.

In bringing to light structural commonalities, this abstract strategy was held to demonstrate the way to braid

the diversity of social and cultural forms into one common domain of human experiences, independent of the political and ideological demands of any one particular society or culture. Naturally, such a "deep" level of commonality is suspect in any claims made for its neutrality, but this issue does not concern me at present. Indeed, when we shift our attention from structuralism to a constitutive ontology (eg. a hermeneutics of distinction), its problematic dissolves. I will anticipate the argument at this juncture, in order to forestall possible confusion and misunderstanding as to my own stance.

2.1.1.2 Constitutive ontology

In a very real sense, arguments about whether or not such identified abstract structures are indeed "out there" in distinct cultures, or are merely the product of a fertile imagination on the part of the researcher, are irrelevant provided that one can supply a logical framework in the context of which it is possible equally to explain the emergence of either point of view. In essence, this is the implication of "multiversa" (Maturana 1988b), and of the "multiplicity of domains of coexistence" (Maturana 1988c).

The generation of equally valid realities in a consensual domain, means that the actual choice of point of view becomes a matter of one's emotioning or "bodyhood

predisposition for action" (Maturana 1988b), rather than a logical decision based upon some pseudo rationality.

Now, structuralism itself arose very much in order to oppose the sort of arguments for cultural relativity which tended towards a neo-Darwinian classification of cultures according to some "norm", in terms of which superiority or inferiority might be apparently deduced, and applied in practice to a given instance. Such was a common procedure in certain schools of nineteenth and early twentieth century anthropology, perhaps finding its culmination in the doctrine of the Third Reich.

It was the explicit intention of structuralist thinkers, to indicate commonalities across different cultures. Once such an intention is recognised, it matters not in the least whether a given observer "finds" or whether s/he "imposes" commonality. What does matter, is to what extent such a viewpoint seduces a community of observers, thereby giving rise to a particular region of consensuality (in other words, whether such judgement is embraced - eg. Kuhn's insight into scientific revolutions as change of paradigm: Kuhn 1970).

Let me be clear about this. For the observer, the crucial consensual movement is not the recognition or insight of one particular culture-type as representing Truth, nor is

it the recognition of some category as Objectively valid, which is how the process of scientific exploration and knowledge was often held to accrete, prior to Kuhn's research.

What is consensually crucial, is the indication of structural isomorphisms across regions of truth, hitherto not indicated as intersecting, whether or not transcendental claims are made for such isomorphisms. Such indication and its witnessing, are not arbitrary fancies created at whim by the solipsist subject. They emerge and cohere, congruent with the experiences of the observers constituting a community of observers, in the course of their ongoing actions as autopoietic unities (ie. as biological organisms).

Biologically speaking, the orthogonal intersection of distinct dimensions of structural coupling in the course of the bodyhood dynamics of the organism, might be described as the prerequisite for any indication of commonality or distinction. In other words, as far as the nervous system is concerned, "system" or anything else is not plucked from "out there", but is just a particular a mark (ie. a consensual distinction), resulting from a play of orthogonal relations congruent with the recursive play of language and bodyhood structural dynamics, and laying down the cognitive space of the observer.

The implication for a hermeneutic of distinction, is that it is the observer's identity, rather than some actual object or system, which is made visible and entered as a consensual term in a community of observers where it is witnessed as such (3.8.2). This is firmly a move away from "systems" thought as hitherto understood, without at all turning a back on the issue of complexity, returning to some form of analytical reductionism, logical positivism, behaviourism or solipsism.

The interesting thing about systems thinking, is that it is tempting to feel that because one has uncovered or discovered a "more complex" domain (ie. a system), such a domain is nearer to the Truth than "less complex" phenomena (eg. the individual). Neither system nor individual are nearer or further any Truth. Systems discourse does not concern emergent properties in the "natural order of things". In the course of the making of distinctions, the observer in a particular consensual region brings forth some phenomena indicated as complex and others indicated as simple. Indication of complexity or singularity is a consensual mark by the observer, which by its affirmation situates the individual affirming it, in a consensual context.

Claims concerning the validity of some truth, whether atomic or systemic, inescapably reflect the region of consensuality in respect of which the claim surfaces, rather than mirroring or echoing some actual transcendental Reality.

When this relativity is lost sight of, we overlook the function of truths as orienting tools that "filter upwards" in the course of the consensual "flow" of a community of observers in structural drift (Maturana 1988a, 1988b; Maturana and Varela 1987). Instead, Truth becomes "driven downwards" so to speak, from consensual dynamics as their traces are frozen in institutional forms and practices alone. When this happens, as it does all the time, particular "wholes" are ascribed a spurious legitimacy as objectively valid, and used to banish or control the multiplicity of realities that actually constitute consensual flow of languaging beings.

I arrived at this insight, as a result of a convergence in my understanding of two distinct dimensions of discourse (ie. their orthogonal intersection). I spent much time contemplating Beer's model, and reflecting upon the issue of identity as explicated in relation to that model (Beer 1979, 1981, 1984, 1985). At the same time, I was deeply immersed in the work of Michel Foucault, especially as it concerns insights into the workings of power as "power/knowledge", and what he called the "tyranny of the norm" (Foucault 1979, 1980).

Foucault's work led me to the insight that we operate in a social medium which has as its own "motor" or justification, that certain truths are imposed as absolute.

This imposition is not generally visible in the modern world, but is realised as a fabric of norms that are unquestioned in their function of governing rationality or mores. Foucault's argument was that in previous times there has been no less tyranny, but it has worked differently. Truths and norms have generally been explicitly identified. For Foucault, the characteristic of the contemporary age is the sliding on to the consensual stage of the notion of "norm", claimed as not being truth, yet in point of consensual practice functioning as Truth.

As a result of this preoccupation with what in essence concerns the functioning of power in the social domain, my interest in Beer's VSM developed along a dimension where the actual mechanisms suggested by the logical relations of the model, were of less interest than the question of how interpretation of the model effects its take-up in practice. Not merely that, but what is entailed in interpretation of the model. Eventually I was to focus upon the question of the "identity" of a particular system-in-focus. Not what the identity might be, but the question of what it means to "identify" a particular system-in-focus, notably in the context of the VSM, but also in the context of any model. This would lead to my own perception that, contra Beer, a thing is not what it does, but what it is observed to do. This apparent trivial distinction has concrete consequences, as will be seen throughout this thesis.

2.1.2 The Viable System Model

A model can be thought of as an explanatory procedure. As such, it may be understood as opening along one of two dimensions. Either it is held to represent or convey a picture of some Objective state of affairs, or else notions of objectivity may be left to one side (ie. bracketted), and the model understood as orchestrating diverse viewpoints, as a procedure that brings forth consensually acceptable versions of reality.

Thus, the VSM may be understood as concerned with either the explanatory mode of objectivity-in-parenthesis, or else the explanatory mode of Objectivity. The distinction is not an easy one to communicate, in spite of gallant attempts (eg. Espejo's teaching at Aston University). Because of the prevailing consensual patterns of our own day and age, the student or practitioner tends to take as given that the model concerns Objectivity. This generates a great deal of confusion. Formal relations and "actual" objects become juxtaposed along one logical plane. The model is then conceptualised as a representation or description of some Reality, whether the nervous system or the firm.

In the explanatory mode of Objectivity, identity of the "system-in-focus" is likely to be interpreted as a fixed reference point serving as the source from which to derive

the functions and mechanisms constituting an actual structure of some social system. The VSM will then tend to promote inflexibility in the appreciation of social interaction. "Messy" actuality and logical relations become hopelessly entangled in a oscillatory procedure, wherein the named fundamentals of the cybernetic insights (such as invariance, real-time, observing system), lose consensual efficacy and become hung on to or attached to more traditional interpretations.

Instead of the system-of-concern emerging as constituted by the participation of the observers giving witness to it (ie. real-time: Chapter IV), and merely itself languaged with reference to the VSM, the observers then discover themselves being languaged with reference to some abstract set of relations, a set treated as having an objective status to which they must bow. Social identity then takes on the status of a norm or straitjacket, functioning to inhibit diversity and variety for the sake of social solidarity which it is held, would otherwise disintegrate.

Hence one comes across statements such as: "the lowest recursive level of the firm is the human individual". Now, whatever the human individual is (ie. the observer), it is not the "lowest recursive level of the firm", nor indeed of anything else! What is going on here, is that the individual is being considered invisible save via the role

(ie. the individual is held to be no more than a sort of composite representation constituted by the roles ascribed by an observer).

This is in sharp contrast with my own insight, which is that role be seen merely as a garment taken up or discarded by the individual giving witness to it. As such, role is still a crucial orienting tool, as indeed are clothes. But just as we make a mistake if we take clothing to be the measure of the individual (ie. as if there were a two-way, constitutive relationship), so it is the case for roles. For the observer in the context of a constitutive ontology, what matters above all else is the shifting intersection of the bodyhood dynamics which brings forth different cognitive realities (ie. role is transient and insubstantial).

I believe that lack of clarity concerning the above point, has led to the type of interpretation which underlies much of the more vociferous criticism of the model (eg. Checkland 1980; Ulrich 1981, 1983; Zeleny 1986).

This thesis stakes the claim for the model to be presented as explicitly concerning a constitutive ontology, and residing in the explanatory mode of objectivity-in-parenthesis. Now, instead of conceived as orchestrating a generalised consensus about some norm,

inviting the hegemony of organisational identity, and inadvertently encouraging institutional processes to proliferate, the model can be seen as indicating mechanisms which explicitly acknowledge that no truth escapes its grounding in the bodyhood dynamics of the observer, and that viability is a function of the structural flow of such truths (ie. operational coherences).

The notions of "real-time" (Beer), "multisystem" (Espejo 1987), or "distributed planning" (Espejo and Garcia 1984), are then seen to emerge out of the mutual acceptance by distinct observers of multiple realities (ie. "multiverse" - Maturana 1988b; also 5.5.2). Not of multiple explanations of reality, though that too. But the acceptance of costructural drift in yet nonintersecting phenomenal domains. This is how I choose to interpret the closure of the System-Five/System One loop, instanced in Beer's description of President Allende's comment "At last, el pueblo" (Beer 1981: 258). "The people" were not being indicated as a simple unity (eg. "King Mob"), but as a composite unity giving space to the multiverse. That is what "the people" are in a democracy.

In the multiversa, as distinct from the universum, there are no objective landmarks by which to assert the claims of one person's Reality over someone else's. Instead, reality is conceived of as part of the cognitive dynamic enabling the autopoiesis (ie. self-production) of the human

observer in a community of observers. This "upward flowing" dynamic is then seen as the "motor" for social, or indeed any other systems. Such systems are then properly situated as functions of their own structural realisation in the course of the flow of the observer in a community of observers.

In such a domain of consensual interactions and expectations, cooperative tasks are enabled not by Authority or appeals to the expert for Truth, whether religious or scientific, not by surrendering individual identity to some abstract Norm (eg. State, Gender, Family), but by the flow of consensual coordinations of actions entailing mutual acceptance of the legitimacy of the reality of the other (eg. "virtuality" - Nelson 1987). The recurrence or not of such coordinations of actions, determines the configurations that specify any consensual domain.

A linguistic term such as the VSM (Chapter III), is then understood as an orienting mark, the expression of which encourages congruent consensual distinctions by different individuals. As such it is firmly located as a model, instead of distorted or misused as descriptive of or prescriptive for some social "reality".

Reality and truth, as indeed is the case with any linguistic term-in-use (3.7.1), never transcend their own enunciation and witnessing. Objectivity is bracketted.

2.1.3 Second-order cybernetics

From its earliest days, cybernetics echoed or mirrored many of the insights that had inspired the structuralist agenda, firstly in linguistics and later in anthropology. The way I chose to describe the method of structuralism above, in bracketting out certain surface idiosyncracies of culture in order to bring to light more abstract patterns, makes visible its phenomenological roots (Husserl's "phenomenological epoche").

In Maturana's work, these strands are united with hermeneutic insight as to the crucial constitutive role of "interpretation" as the concrete laying down of effective history (Gadamer 1975). In addition there is the existentialist concept of concrete bodyhood or physiological being, grounded in a physical and not just metaphysical domain of utterances and experiences, as these shape our descriptions and explanations of what we experience. Thus, in sharp distinction from Husserl, Maturana's intent is not to bracket "objects", but merely "objectivity".

Closely associated with work emerged out of Heinz von Foerster's Biological Laboratory at the University of Illinois, this body of discourse is sometimes referred to as "second-order cybernetics" (von Foerster 1979; for example see Maturana 1978, 1988b, 1988c; Maturana and Varela 1980,

1987; von Foerster 1981; von Glasersfeld 1987). This emerging tradition has deeply influenced my own work.

It is necessary to dwell on the word "interpretation". In the present context, interpretation is not at all intended to suggest the function of the expert, as she or he establishes by Authority, the Truth that is beyond the grasp of the layperson. There is no "expert" to interpret and translate otherwise "undecipherable" signs. Whether a sign is interpreted by an expert or not, it either is or is not erupted into effective history. The expert interpreter has only incidentally anything to do with this eruption, which is continuous and endless.

In the hermeneutics of distinction, "interpretation" suggests something quite different from the expert who can render the indecipherable, decipherable. What it is intended to convey is a sense of the inevitable interpretative function of every observer in making distinctions. Each one of us cannot help but interpret that which we indicate.

2.2 Cognition, consensuality and language

Having introduced several of the themes which will reverberate throughout this thesis, I will now focus upon my methodology - the linguistic tools which I will utilize in order to open up these themes. This concerns my own epistemology.

The configurations or patterns that are observed to characterise a consensual domain are important (Benedict 1935). However, this is not because they point to natural, in the sense of objective horizons for the particular region of consensual interaction that they are held to indicate.

Such configurations might be described as embracing and nourishing, as well as channeling and constraining, the epistemological patterns available for packing out the cognitive space of this or that location of human consensual interaction. However, it is important to realise that "this or that" location of human consensual interaction (above), is the observer's own, and not that of the observers who are observed.

In terms of human social experience, it is not too much to say that the play of such consensual configurations is ALL. However, in any instance this grounds our own ontology as observer of it and not someone else's. The

consensual configurations which we realise through our activation of them in their indication and distinction, determine the epistemological patterns available within the horizons of our consensual space, rather than opening a door into some consensual region that is "foreign" to ourselves as an "objective" observer of it. This is because in the final analysis it is our own experienced operational coherences which arbitrate and determine our judgements

To clarify this point, I will anticipate Chapter III, and briefly consider the relationship between language, consensuality and cognition, as understood by myself. This understanding governs my own practice.

2.2.1 Linguistic term - a definition

A linguistic term, whether indicated as a sound (word or utterance) or a movement (gesture or display), can be described as the symbol for an action which effects a consensual distinction in the cognitive space of the observer (3.7.1). Such a distinction might be conceptualised as connoting the orthogonal interaction of nonintersecting phenomenal domains, as part of the structural dynamics of the bodyhood of the observer.

2.2.2 The observer and the act of distinction

So far as the nervous system is concerned, there is no difference between structural disturbances as a result of hearing a sound, and structural disturbances as a result of, for example, changes in temperature. It is the observer who "attends" a word, or "notes" changes in temperature. This difference might be said to concern the "density" of the dimensions of interactions observed to trigger structural changes (Powers 1973). The difference - ie. the distinction - is itself indicated by an observer. The density of interactions taking place as bodyhood structural dynamics, enables the recursive functioning of languaging, which is what allows us to describe the intersection of what might well be otherwise nonintersecting phenomenal domains (such as my present description of it).

For the observer, a distinction functions as the severance of a cognitive plane, separating two complementary halves along a seam which, if once more sealed, would regenerate the original plane.

Spencer Brown wrote of a primary act of distinction, or "mark", as sundering a void (Spencer Brown 1972). The word "void" is poetic licence, as no such thing can be observed to exist (for an observation already entails a distinction or mark). In Spencer Brown's discourse, what is indicated is the

space which, prior to this particular mark, did not resonate in respect of this set of interactions. Whatsoever the interactions it previously enabled (hence the use of "void"), it has been consensually sundered anew, enabling different sets of interactions to be activated. In other words, metaphorically we could speak of two differently arranged halves of an indicated space.

The fundamental consensual mark concerns the cognitive realisation "self/other". Such a primary distinction is sometimes interpreted as giving evidence of a fundamental polarity and opposition (eg. "me" and "them"). From such an interpretation is then derived the whole weight of discourse promoting the "inevitability" of conflict or competition, as "facts of life". The logic of distinctions in the context of a constitutive ontology, firmly denies both the Objective validity and operational efficacy of such a stance. An oppositional indication can never be primary, but will always be observed as a higher order recursive play of distinctions (ie. secondary to some initial mark).

An initial act of distinction has not yet any content or context, although it is these which "secure" the positivity of the mark as it arrives in consensuality. Consequent on a mark being effected, a space is laid down that indicates concomitantly both content and context for further acts of distinction to sunder. The primary mark can

be held to indicate two complementary though operationally nonintersecting, consensual spaces. If these complementary and nonintersecting spaces are distinguished and witnessed in recurrent consensual interactions, there arises the phenomenon of the observer and the possibility of higher order recursions of distinctions (such as dichotomies). Else there is silence.

Higher order recursions of distinction, depend for their witnessing upon the structural dynamics of the source of such attended distinctions, as such dynamics are indicated by the witnessing observer. The structural "embedding" of the source of such distinctions (ie. its medium from the perspective of the observer), determines the cognitive domain or reality ascribed it (ie. the dimensions of sensory/motor correlations understood as available to perturb the observed system). This will be understood by the observer, as the domain of structural couplings available to a structure-determined system, in order for it to be said to persist according to the identity attributed it (Maturana 1978, 1983).

Consensually, what is significant is how the indicated marks are integrated (ie. are witnessed and taken up), rather than whether they actually demonstrate Reality, Truth or Objectivity. Maturana's discourse demonstrates that this is equally the case for the natural, human or social

sciences (Maturana 1978). What becomes coherent or acceptable, and thence in our own culture enables both the doing of science and the production of artefacts such as washing machines and contraceptives, is not the foundation of a once-and-for-all fixed, immutable Truth. No domain of objectivity is required, in order to be able to explain the constitution of a field of rationality or operational coherences in a consensual domain.

From the perspective of hermeneutics, and specifically in the light of Humberto Maturana's brand of ontology, what emerges as constitutive of a consensual domain is one particular dimension or strand in the flux of effective History (Gadamer 1975). Historical status is determined by how discourse is interpreted or "witnessed" by the observer in a community of observers at a particular moment. It is the mechanism enabling this witnessing in the course of recurrent consensual coordinations of actions, that erupts the observer into the order of things.

Particular regions of consensuality become activated as a function of their being witnessed (ie. distinguished as distinctions), in the course of recurrent coordinations of actions. To the extent that a discourse permeates or is shared by diverse viewpoints in their actions and behaviours, effecting similar interactions in the bodyhood dynamics of a set of community observers, an expression of commonality

other than had hitherto been understood is either brought forth or not, in the consensual coordinations of actions which constitute this as opposed to that consensual domain. Such expression of commonality is the space for further distinctions.

2.3 Disengagement and enabling

In the last two chapters of the thesis, I will be using the two terms "enabling" and "disengagement" as a complementary pair. What I wish to communicate is an asymmetry, rather than a polarity (as for instance, might have been suggested had I used the pair of terms, "engagement" and "disengagement").

Rather than pointing towards the notion of membership and non-membership of some social group, I wanted to indicate two distinct processes from a particular vantage. I am describing social solidarity (ie. membership of a group or enterprise), from the perspective of the one who realises such solidarity in the moment of distinction from it. I did not want to dwell on the mechanisms or dynamics entailed in something called "membership" (eg. "Behaviour in Organisations"). I am taking membership as the grounding which enables the observer to emerge as observer. From this premise, membership is no longer problematical, but changing membership is.

Thus, disengagement is from organisational processes, while enabling is of the making of distinctions. The effect of any act of distinction is a novel organisational domain or experienced reality. Distinctions do not secure singularities. They impose consensual classes.

From this perspective, the enabling of novel distinctions - or indeed, any distinctions - is the motor behind social processes. What is distinguished, falls about or "permeates" the observer, as the circus tent closes in upon the ring-master. We always find ourselves situated within the distinctions we make, though we sometimes naively imagine that such distinctions are pointers or representations of objects external to our cognitive field. It might be supposed that the ring-master orders about lions and tigers, as these animals inhabit the African savannah and the Indian subcontinent. He doesn't. He conducts members of a multi-coloured orchestra according to the sheet music of the ring, with more or less degrees of success. The ring-master brings forth the domain of the circus, not that of the jungle.

Might the ring-master bring forth the jungle? Yes. Not by increasing the numbers and variety of acts, but by leaving the circus and seeking out the jungle.

Thus in Chapter VI, I will explicate the terms "enabling" and "disengagement", as concerning two distinct but complementary, consensual movements. They may be indicated as orthogonally intersecting when languaged as complementarities in the explanatory mode of objectivity-in-parenthesis.

In some form or another, a bifurcation has to be admitted between organisationally closed systems and anything outside such closure (eg. between observers, according to the biology of cognition). This bifurcation is braided into coherence for the observer, in the course of intersections of bodyhood dynamics accompanying recurrent consensual coordinations of actions, during the persistence of structural drift. The power to affect such intersections, as they are being brought forth in consensual flow, is perhaps similar to what Castaneda called "personal power" (Castaneda 1972).

The dominant preoccupation of contemporary societies with social identity, appears to concern the desirability and need to encourage and maintain membership and minimise non-membership, in the explanatory mode of Objectivity. Lack of "State" is a loss; lack of "Marriage" an absence; lack of "Employment" a stigma. I don't recognise such problems vis a vis the observer, but only in relation to Foucault's "tyranny of the norm" or what I call "organisational hegemony". Thus I do not see a pressing duty to enable or sustain "engagement".

What I will be describing in the course of this thesis, will be the specification of realities, and mechanisms to enable the maximising of such specifications. My goal is to enable the person "in a marriage" to specify the situation from outside, regardless of whether this leads

to a disintegration of the social system, "marriage". Likewise with any of what I call "formal social structures" (6.3). Their usefulness for the observer as distinct from some organisational process, is their visibility as constructs. They may then be handled as consensual marks. Their pathology for the observer, is their invisibility as constructs, when they are understood to denote a domain of Objectivity or Truth, and when they are felt to determine consensual flow, rather than serve as orienting marks in its unfolding.

The consensual configurations that I am attempting to make visible in order to de-power, are closely associated with Foucault's description of a "disciplinary" matrix - the sort of consensual region in which expression of individual freedom is reduced to a function of its visibility in terms of the categories of some discipline or other (eg. psychiatry, law, medicine - Foucault 1974, 1979, 1980). Membership and categorisation are then applauded as constitutive of being, and the persistence of individual autopoiesis as the biological grounding for an ontological substratum, is lost sight of.

In the complementary play of the consensual pair enabling and disengagement, the observer gains visibility as the motor for social or physical artefacts (the cricket bat as well as the cricket club). Such consensual abstractions

are now understood as cognitive entities, and are somewhat shifted from their power as reifications. These cognitive entities can be described as generated through bodyhood intersection of nonintersecting phenomenal domains in the social space, in the course of consensual coordinations of actions. Such a play of intersections may either be encouraged or discouraged in languaging.

III LANGUAGE, LANGUAGING AND THE VSM

3.1 Summary

The embrace of a constitutive ontology - as distinct from a transcendental one - has certain consequences for our usage and understanding of language, and for our insight into both social and natural domains. Language comes to be seen as braiding distinct domains of human existence and awareness, which can never be observed as such outside the recurrent play which "packs out" any particular consensual domain. Models are understood as orienting tools which facilitate linguistic interactions, and the Viable System Model is considered in this light.

3.2 Introduction

A key operational implication of a hermeneutics of distinction, is that it makes no claims to be able to escape the linguistic domain and describe phenomena not appertaining to such a domain. The immediate question is then of what practical use it is. The answer to this question, entails recognition that the positivity of a hermeneutics of distinction does not consist in being able to reach outside language and point at Objectivity, but lies in its power to make visible the recursive play of consensual coordinations of behaviours.

This does not mean that such discourse speaks "only" of linguistic matters (ie. as linguistic philosophy). Rather, the implication is that all phenomena appertaining to consensuality in the human social domain, whether a material artefact such as the atom bomb or a psychological category such as schizophrenia, "find" their ontology as consensual terms, bedded within such recursive dynamics. As such they are "cognitive entities" (Maturana 1988b).

The "natural drift" of the human biological phenomenon (ie. its autopoiesis, including the physiological dynamics of bodyhood intersections), is a function of such a domain of consensual "flow".

In the context of managerial cybernetics, a model such as the VSM can be said to gain positivity through being indicated and affirmed as a linguistic term in a field of consensuality, rather than by being "visibly" descriptive or prescriptive of phenomena which somehow reside "out there", in a neutral domain of Objectivity or Reality.

Phenomena such as self-awareness, consciousness, observing, and languaging are all explained as recursive orders of recurrent interactions between organisms, rather than by invoking dualism, whereby some inside is held to mirror or represent some outside, in order to reflect upon it. Language is thus described as a higher order recursion of physical orienting between organisms. This radically alters interpretation of linguistic interactions, including the functioning of models.

Bearing this in mind, it is clear that phenomena which apparently find their horizons firmly delimited within the linguistic domain (ie. as terms of language-in-use), do not merely reside "within" such a domain, but are constitutive of the actions that they coordinate, whether those be indicated with reference to management models or building highways, to the emotioning of love or to the act of death.

For example, the whole complex of activities associated with an operating theatre in a hospital (ie. the entailed praxis of performing operations), including the wielding of the scalpel which penetrates flesh, is irretrievably braided to consensual coordinations of actions within a linguistic domain, without which there is not nor can there be, some activity referred to as "surgery".

In other words, language is not a luxury which presents us with an additional vantage over the activities we are involved in, enabling us to point at them and accurately describe them (in the sense of arriving at some sense of Objectivity). Language is the means by which otherwise acategorical and contingent happenings are braided into nets of relations and constituted as significant events through the increase of the levels and dimensions of recursive intersections available the effecting of distinctions.

The implications of this will be considered in respect of models, notably by using the VSM as the focus of attention.

3.3 Objectivity-in-parenthesis

This thesis is intended as an outline for practical action rather than explicating some philosophical doctrine for its own sake. Primarily, I am concerned with the communication of models. Such communication or exchange is not as simple as passing a glass of sherry or the pepper, because the whole question of models is itself problematical. One of the fundamental grounds of my own approach, is the understanding that the adoption of the explanatory mode of objectivity-in-parenthesis dissolves at one stroke many of the major difficulties in talking about models, and in conversing in terms of them ("conversing" as in Pask 1975).

The notion of objectivity-in-parenthesis arose historically in the course of Husserl's phenomenological endeavour (ie. as the "phenomenological epoche"). Maturana is at pains to distinguish himself from this philosophical tradition with its accompanying idealist dangers (ie. of bracketting all phenomena, including the objects we routinely deal with). Critics of Maturana frequently overlook the significance of this distinction.

To bring to light Maturana's stance, I will contrast Ernst von Glasersfeld's "Radical Constructivism" with Maturana's biologically based ontology (Maturana 1988b, 1988c; Mendez, Coddou and Maturana 1988; von Glasersfeld

1987). In Maturana's view, von Glasersfeld surreptitiously slides Objectivity back on to the stage, by talking about different constructions of Reality instead of about different realities (ie. a multiverse). From the vantage of his own insight into the organisational closure of the nervous system, Maturana refuses to grant credence to any notion of Objectivity or Reality, either as an operational or epistemological need - which would appear to reduce his explanatory procedures to the status of any others.

But this reduction to the status of "just" one more means of explanation, should not lead us to overlook that explanatory modes have distinct concrete effects - indeed, to the extent that they enter the consensual arena, they resonate concretely, generate these effects as opposed to those. Let us consider this with reference to a recent paper by Francisco Varela and Samy Frenk (Varela and Frenk 1987).

3.3.1 The organ of form: an example

As the authors of this paper put it, "A distinction is the act of defining what constitutes the components of a given unity" (Varela and Frenk 1987: 73-74). In the case which they consider, they describe how western anatomical practices and accompanying discourse, have historically developed consequent on the distinction of those parts of an organism resulting from the actions of a knife. The

indication of such parts was a function of the distinctions available by the braiding of both material effects (the cut) and accompanying observation and discourse (eg. the fundamental division or taxonomy, related to the separation of bone from flesh, and organ from organ).

The point is that, once such an initial "mark" had been made and was witnessed in a consensual region, a whole "population" of distinctions became couched within this grounding of rationality (the western anatomical tradition, with its diagnostic techniques, surgical practices and medicinal procedures). This proliferating population together with its "rationality", denoted no domain of Objectivity, nor signalled some inevitable progress towards Truth. Indeed, the argument of the paper in question is to propose an "organ" of shape (ie. the extracellular matrix), whose existence (together with an alternative set of surgical, pharmaceutical and other practices) was obscured by the distinctions logically consequent on the significance granted to the initial cut of the knife.

I am not proposing to examine the scientific claims for an "organ of form" made by Varela and Frenk. I am merely using their example to demonstrate how the orthogonal intersection in the bodyhood of the observer of material instrument, conceptual model and language, actually brings forth a particular effective reality, regardless of any

question as to whether this reality is Truth or not, or even the "best" or not. This reality is dependent on bodyhood dynamics of languaging organisms as their autopoiesis persists in the course of recurrent interactions, and says nothing about Objectivity.

Consensual coordinations of actions, are not at all discreet from material happenings and their effects. A whole set of surgical techniques and pharmaceutical researches resulted from the orienting of observers in the above case, and these have had enormous influence on the whole domain of western knowledge by the legitimacy they conferred on to one particular model of organic reality, through the dominance of the explanatory mode of Objectivity.

It is precisely because of the biological grounding of objectivity, indeed of any linguistic term (eg. Maturana 1978), that consensual coordinations of actions are so pregnant with positivity, and indeed give rise to material artefacts and social practices. By biological grounding, is simply meant that such terms of language are language to the extent to which they have effects on the dynamics of the bodyhood of the observer in the course of his or her consensual flow. They enable the intersection of otherwise nonintersecting phenomenal domains (such as "knife" and "doctor"). In such a manner do we get to the moon, compose symphonies and design social organisations.

To see why this is so I'll pass on to look at the recursive function, and attempt to demonstrate just why this recursive play which is language, can never escape consensual parameters or point at Objectivity, except as an explanatory mode that is bound to but obscured from any action that it is held to coordinate (ie. it falls within objectivity-in-parenthesis); while at the same time it can never long remain adrift from the the resonance of the actions of languaging observers in the domains which their actions constitute. The accompaniments of social interaction, including material phenomena such as high rise buildings, will be explained as constituted in the course of such recursive consensual processes.

3.4 The recursive function

The explanatory mode of objectivity-in-parenthesis, presents the observer as both the opening voice and closing term. Maturana resolves the logical difficulty of breaking into such a closed loop, by describing a recursive continuum in the biological domain, in which the observer is understood as emerging in the course of the play of recursive orders of distinctions effected in the course of the recurrent interactions of two or more structure determined systems, including the case of the distinctions he is himself presently effecting. He beds this description in the higher order distinctions which he unfolds as an observer, in the domain of his descriptions of them (ie. descriptions of descriptions of....).

Maturana (and indeed Francisco Varela), builds his logical framework from descriptions of interactions of the most simple organisms, and considers more complex organisms and laterally their social, consensual and linguistic domains of interactions, by consistent application of recursive procedures of distinctions. I will pick out those aspects of this recursive play which appear consonant with my own discourse and purposes. I start with the emergence of "objects".

3.4.1 Objects

Maturana writes: "As language arises, objects arise in the first recursion as consensual coordinations of consensual coordinations of actions that obscure the consensual coordinations of actions that they coordinate." (Maturana 1988b). At first sight this might appear somewhat complex. An example might help (also, see 5.3).

Let's focus upon the object "football". This is a little unfair from the perspective of the above quotation, as the object "football" emerges in a very dense and sophisticated historical context, rather than instancing a primitive for the development of such a context. However, such an example perhaps more readily conveys the meaning intended by Maturana, to the reader not familiar with his discourse.

We all would presumably agree that a football is indeed an object. In the explanatory mode of Objectivity, the word "football" is held to point at a material phenomenon, generally a spherical artefact made of leather, and inflated with air. Such an object is frequently kicked about a field. In this mode of explanation, the word "football" is held to enable us to communicate with one another about this "independent" entity, and indeed, it would appear to be this

independence that allows us to play team games with it. Otherwise, it is held, we would be hallucinating and making a fool of ourself in the eyes of others observing our actions.

In the explanatory mode of objectivity-in-parenthesis, the object "football" is no longer something having an independent and neutral existence necessary in order for it to be pointed at or kicked. Instead, it is a consensual procedure which coheres or gains its positivity (including that positivity enabling it to be "passed", or "kicked into the goal"), in a particular field of understanding and expectations (ie. it is a linguistic term in the process of consensual coordinations of actions).

As it surfaces as the particular object which enables coordination of a field of actions in respect of it, "football" obscures the understandings and expectations out of which it initially emerged (hence, bracketting the possibility of, and indeed the need for Objectivity). In the process, such understandings may come to be seen as emanating from an objective material entity "football". We tend to lose sight of the fact that it is our own understanding in the course of coordinations of actions, that lays down or brings forth the operational coherences which enable recurrent interactions in respect of it, as well as determining the conventions required for giving witness to it (Maturana 1988b).

Not only does the actual process taking place get obscured (ie. the praxis of football as confirming a particular region of consensuality), but the ontological grounding of "football" as an object depends upon the reduction in variety entailed in obscuring "the consensual coordinations of actions that they coordinate". Were there not such a reduction there would be no languaging and no football. This is because objects emerge as tokens serving as the foci for our pointing, without which there would be no possibility of recurrent consensual coordination of behaviours (which is the shuffling or dealing of such tokens, treated as such).

The very nature of the object (a linguistic token), serves to "glide over" the unique entity or event towards which it is held to point. Such unique events or entities ("this" football as distinct from "that"), surface for indication and are attended to, within the horizons of an already formed field of understanding and collaborative interaction (consensual coordinations of actions), and do not appear in the space of their own uniqueness. To the observer who knows nothing of ball games or balls, whatever this unique object is, it is not attended as this "football" or any other one. What makes it a "football" is its indication in an already shared consensual region.

The object "football" entails the praxis of football, though in the explanatory mode of Objectivity we tend to treat the praxis of football as itself being a process that "uses" or "points at" an "actual" object "football". From the perspective of the explanatory mode of objectivity-in-parenthesis, object and praxis are the play of nonintersecting consensual regions, mutually specifying phenomenally distinct but complementary linguistic series. In the explanatory mode of Objectivity we overlook this, and consider them as phenomologically nonintersecting.

To put it another way, we often speak as if the object "football" could exist irrespective of the praxis of football. This proves very useful as a descriptive short-hand (as a reduction of variety). Indeed it is this usefulness that deceives us, leading us into the fallacy of misplaced concreteness, whereby "usefulness" becomes interpreted as "objective fact". In order to play football, to talk about it, or to design new "footballs", what is necessary and sufficient is the usefulness of a consensual series indicated by recurrence of use in a community of observers, rather than any symbol of Objectivity. The object "football", arising as a token in a consensual domain realises such a usefulness, without at all signalling Objectivity.

3.5 Distinction

The observer observes through the distinctions s/he effects, and what are distinguished are other distinctions. We do not and cannot step outside of this fabric of the making of distinctions in a region of consensuality. What we may do, is to recognise and utilise the recursive structure of the process as the grounding for human consensual interactions and our own responsible actions.

Whether "atom bomb", "bag of flour", "jelly beans", "god" or "nation", each is a recursive order of consensual distinctions in a particular linguistic domain. The "fact" that the bag of flour if dropped on my head will cover me in white, while the atom bomb if detonated will obliterate me, is neither here nor there. Such facts emerge as "objects" through the braiding of nonintersecting phenomenal domains by their orthogonal intersection in bodyhood dynamics in the course of recurrent interactions, not for example through an objective property entailing the disintegration of my organisation.

Language grants me the recursive facility of being able to refer to "fact" as if it were not an "object". Thus I might say that, to the degree that fact is not object, then such a fact is analogous to the case of the sole of my shoe

descending on the unsuspecting column of ants, from the perspective of such unsuspecting ants. This absurd rendering should not detract from the postulation that such contingent happenings do take place. However, they are no part of the dynamics of consensuality except as contingency gives way to recurrence, and an event is able to be recognised and witnessed as such in a consensual domain.

Vis a vis the operation of the observer, what matters is the distinction effected in the course of consensual orienting and not an event in itself (ie. Ding in sich). In so far as the bomb doesn't disintegrate me, and the bus doesn't run me down, I persist in a consensual flow with other observers, in the course of my recurrent interactions in respect of them. Leaving fate or luck to one side, the persistence of flow is a function of the consensual coordination of actions that can arise in the course of recurrent interactions between individuals in a community of observers. This is not trivial, though it might appear a truism. To the extent that such events are consensually witnessed and hence constituted, but do not happen to me in their completion, or else happen through me in a manner that does not fracture my autopoietic organisation, they become recurrent phenomena that I may indicate and distinguish in the consensual domains in which they happen.

To put it another way, my distinctions are what confirm and in their confirmation lay down, my consensual horizons. This is not the end of the story in a human consensual domain, for with the appearance of observing and the observer ("distinctions in language of consensual distinctions" - Maturana 1988d), there arises the possibility of distinguishing the distinctions of distinctions that one makes, and becoming a "solo observer", or the observer of the consensual region one presently orients in respect of (see 6.2.2 for further analysis of the solo observer). One can further distinguish one's own distinction as a solo observer, and move towards awareness and self-awareness (Maturana 1988d).

It is not my purpose to explore these recursive dimensions further at this point, but to open their play in the context of an understanding of models in general and the VSM in particular.

3.6 Denotative and connotative - generative mechanisms

Given that languaging is constituted in the course of consensual coordination of consensual coordinations of actions, rather than providing the means for the individual subject to denote and manipulate some Objective order of things, what are the implications?

Conventional wisdom, at least in the west, has it that language evolved as a tool to enable creatures (notably human beings) to point at or denote objects in nature, in order to be able to handle them in more complex ways. Thus was it, the argument tends to go, that first there evolved the use of material tools (eg. sticks, rocks), and then there evolved the words to represent such tools and the domain in which the tools were used (eg. "stick", "rock").

In this view, human beings exist in a neutral, Objective universe, which they act on, and latterly, investigate (eg. with science). Tools are conceived of as attacking and shaping such a neutral universe, enabling actors to distance themselves from it (homo faber). Words and language were seen to further widen such a gap between humankind and the natural world, in the sense of increasing the potential to mirror or represent such a passive medium, in order to be able to dissect and analyse it (as distinct from a distancing process which acts to actually obscure rather than pinpoint or highlight).

Maturana's studies led him to question such a view as to the essentially denotative function of language (Maturana 1978). This is not to say that he denies the denotative efficacy of language-in-use, but that he denies that this was the evolutionary pressure or selective trigger for its emergence. Further, he denies that this is the motor of the underlying usefulness of language for humankind in the present. In other words, the denotative utility of language is a by-product or symptom of its essential functionality for enabling cooperation in a domain of recurrent interactions.

The neurophysiological investigations of Maturana and others, notably concerning vision and the handling of the phenomenon of colour by an organisationally closed system (ie. the nervous system), led him to propose that the only way we are able to explain certain biological phenomena such as the indication of colour, is by understanding language as connotative rather than denotative (eg. Maturana 1983).

The apparent denotative "success" of language (eg. the general match of our descriptions of the internally generated colour experience with measurable variation across the colour spectrum according to the metric of physics), is a secondary phenomenon, a function of the characteristics of the domain of consensuality in terms of which a given individual is structurally coupled to other observers, in his/her constitution of a community of observers (ie. in this

instance, by the conventions of scientific measurement), in the course of natural drift.

In this evolving tradition of discourse concerning the biology of cognition, language came to be envisaged as generating the phenomena to be explained in respect of a community of observers in the course of their interactions, rather than as capturing or pointing "out there" at such phenomena in order to "then" discuss them. The relationship of words to the phenomena they purport to describe, is connotative in that words themselves as elements of languaging, only exist within a particular domain of descriptions and "understanding". In such a domain, they gain positivity (ie. validity), by their being witnessed in the course of recurrent operational coherences, as denoting other words and systems of significations (ie. constituting a consensual domain), rather than by pointing at or else implying phenomena outside a particular consensual region. Thus, even connotation is not connotative of some veiled Objective reality, but a connotation of some denotative term residing in a connotative space

In other words - and this is where Maturana's insights have rewarding implications for Thomas Kuhn's thesis (Kuhn 1970) - language exists, and indeed emerged biologically in the first place - by being selected for increasing the dimensions of intersections available in the

bodyhood of the concerned organisms, of otherwise nonintersecting phenomenal domains, which enabled languaging beings to orient in terms of one another more flexibly in a consensual space. Such a consensual space (ie. any domain of consensual interactions), finds itself coupled to "its own" environment, in respect of the specification of the component autopoietic elements which constitute it (ie. languaging, biological observers).

Now this is a significant turnaround in the normal way language is described and used. In this hermeneutic perspective, what is entailed is the orienting of the observer about a consensual domain in respect of other observers, rather than some successful manoeuvring around Objective Reality. This orienting is action, rather than abstract reflection as a result of which we act, which has tended to be the a priori underlying most western philosophy.

Human beings "bump into" one another in terms of language, to the degree that it is attended or "heard". This "bumping into" concerns our bodyhood (Maturana 1988b, 1988c). Language need not be heard. Just as I might brush against an old lady and knock her off the pavement without being aware of it and without suffering any untoward consequences myself, my words may be uttered and resonate in the physical space yet remain unheard.

3.6.1 The map is the territory

The shift in emphasis is similar to that suggested by Heinz von Foerster, when he turns around the dictum first enunciated by Korzybski, that the "map is not the territory", saying that indeed, the map is the territory (conversation). Korzybski was originally cautioning against a naive assumption of the representational powers of language, as a result of which we tend to treat language as at one with the objects it denotes. Von Foerster's point is to caution against the naive belief that we can ever step outside of the models in terms of which we handle our interactions. Thus, the map is the territory, in the sense that human beings cannot jettison their maps, except as they get traded in for other maps. Once more this is consonant with Kuhn's thesis.

In other words, the observer never secures a privileged vantage over Reality, for example by a "rational" handling of language. Nor do "effective" connotation or denotation indicate such a privileged perspective. Rather, the observer ceaselessly emerges in some particular reality, in respect of the particular manner in which s/he is languaging. In effect, there are a multitude of realities, which are the shifting contours of our "maps" (a "multiverse" - Maturana 1988b). This is no less the case for the intervention by the consultant in a company or some other social enterprise, as for the individual viewpoints whose

interaction constitutes such an enterprise (eg. "multisystem" Espejo 1987). In particular, the consultant or analyst never secures an objective perspective from which s/he can hand out the "right" prescriptions and remedies.

3.6.2 Diagnosis and design

These issues are important in discussions concerning diagnosis and design, because of the conventionally-understood grounding of this pair of terms as applied to a social context in management science:

- diagnosis tends to take as given some existing state of affairs or set of relations which can be described, explained and acted in respect of;

- design tends to take as given the future emergence, as a result of rational discussion and action, of a state of affairs or set of relations which can be described and explained.

In other words, both diagnosis and design tend to be bedded in a particular understanding of language - specifically, a notion that is grounded in the idea that language "points at" or "represents" Reality, or might do so if properly wielded.

Some attempts have been made to break out of this rather naive conception of the relationship between language, the observer and reality, notably in the idea of "punctuation" as used in a psychoanalytical context, where it is accepted that the analyst cannot but mould the situation s/he is hoping to effect, in the very act of participating and observing it. This has obvious overtones with imagery indebted to Heisenberg's "uncertainty principle".

In the context of management science, there is a recognition in Beer's management cybernetics, Peter Checkland's "Soft Systems Methodology" and Raul Espejo's cybernetic method, as to the interdependence of observer and observed (Beer 1979, 1981, 1984, 1985; Checkland 1981; Espejo 1978, 1989). However, there still appears to be a leaning towards a transcendental ontology - a yearning for an Objectivity that we might "epistemologically" comment on or refer to.

Conventionally, the philosophical problem that tends to be raised, concerns the possibility of functioning effectively without such an Objective reference point. Espejo attempts to resolve this problem by distinguishing his own cybernetic "method" from Checkland's explicitly phenomenological "methodology", with its debt to Geoffrey Vicker's "appreciative systems". Whether in the process, Espejo coherently avoids the positivistic stance which he consistently attacks, is a questionable point.

I hope to cast light on this issue, by focussing upon the function of models. I feel that the yearning for a grounding in some domain of Objectivity, underlies many of the problems in presenting and communicating cybernetic insights as they are expressed in the discourse of managerial cybernetics, and that many such problems simply dissolve if we explicitly embrace the explanatory mode of objectivity-in-parenthesis .

3.7 Models

Given the widespread use of models in a range of disciplines, both in the pure and human/social sciences, it is somewhat surprising how varied are interpretations of just what a model entails. A model might be understood to act as a general heuristic, or else as a rigorous series of formal terms. Sometimes a model is seen as depicting a homomorphic reduction of a natural phenomenon, while at other times a model is held to provide guidelines for understanding of complex and ill-understood phenomena. More often than not, such strands of expectation are jumbled together in a somewhat haphazard manner.

It's not my purpose to unfold a history of models, nor to detail their range of usage. I merely want to unfold one particular domain of discourse, in order that the function of the linguistic term "model" be properly understood in the context of my own usage.

3.7.1 Linguistic term-in-use

A Linguistic term is witnessed as a linguistic term to the degree that it is recognisably a model. I don't mean that it is consciously understood as being a model, but that such a "term" is observed to gain significance in a particular consensual domain to the extent that it is seen as

"plugged into" some indeterminate set of models that themselves already pack out some region of consensuality. A linguistic term does not adhere to such a series as an elemental component, but finds itself embraced in equal partnership as a constitutive element, as much constituted by as constituting this consensual region.

It is not very rewarding to visualise a "model" as something constructed by language - in other words, to think of a model as an ordered series of linguistic (or mathematical) terms. Such an insight might be correct, but not in the way it is normally understood. A model is better described as a field of linguistic associations that becomes operationally completed by its mode of affirmation in respect of some consensual domain (ie. as described by the procedure of "pruning" an "entailment mesh" - Pask and Gregory 1987).

It is this region (ie. context) that determines the quality of the closure of the model, in other words, its positivity in indicating some phenomenon to the observer. The model "itself" (whether by this we mean linguistic pattern or physical artefact) - in other words its actual terms and their order - is not descriptive (which would be a representation), but is a generative mechanisms in a consensual domain. Another way of putting this, is to describe it as resonating in a conceptual space (eg. Pask 1987).

3.7.2 Recursion

In order that a linguistic element be distinguished as being a constitutive element of a series (ie. become a meaningful term in a conversation, available for analysis or unfoldment as a "frozen" entailment tree), the element will be brought forth as an indication that is recursively transfixed by a series of sets of associations orthogonal to itself. The functioning of a consensual domain, the character of the organisational closure provided by its constitutive elements, arrives out of this recursive relationship, which once more reminds us of the Principle of Uncertainty of quantum mechanics - even as a term is indicated as such a term by the observer, on closer examination its initially indicated form will be found to dissolve. In consensuality, a linguistic term coalesces from a maelstrom of fragments of signification, as the consequence of some act of distinction by the observer, and dissolves when the focus of attention is altered.

For a consensual domain to be observed or experienced as such, any element experienced as fixed by a set of relations of this domain, will itself along another dimension, be experienced as opening into or constituted by further series of relations. Such an element has the quality that it may be indicated and distinguished as part of other structures realising different consensual regions from this.

As far as I know, this process has been most clearly described in the work of Gordon Pask (Pask 1975, 1984; Pask and Gregory 1987).

3.7.3 Languaging

Languaging "gives witness to itself" through the continuous indication, juxtapositioning and dissolving of models in the constitution of a consensual domain. This flux is never-ending. There is not one, single finite consensual domain. As soon as we observe an observer (ie. there is more than one observer), or more accurately, as soon as we have self-awareness or reflection (ie. as soon as we experience as observers), there is brought forth a dynamic play of distinct but braided consensual regions.

Consensuality isn't after all a thing or a state, but is rather a process of conversation. This is languaging, and it may be described in terms of recursions of distinctions. For example, Maturana writes - "organisms in recurrent interactions constitute languaging as they operate in a domain of recursive consensual coordinations of actions..." (Maturana 1988d). In his recent discourse, Maturana uses "consensual coordination" and "consensual distinction" interchangeably, coordination implying distinction.

3.7.4 Linguistic term in a consensual domain

What are models? Well, they are not the process of lived-interaction of human individuals, consequent on consensuality and a linguistic domain. A model is a linguistic term, conventionally handled in a consensual domain as the node of a web of conceptual associations, and witnessed as such by an observer, whether consciously or unconsciously. In the instant it is realised as a model, this node is no longer an empty carrier of meaning, but brings forth a background of reference points according to the "pruning" available it (eg. Pask and Gregory 1987), which is determined by its primary distinction (ie. in languaging). Models are the tools or "organs" of linguistic interactions.

When I say "This rabbit..", "this" as much as "rabbit", has an understood function in my enunciation and your attending it, although the actual significance of the whole phrase may be understood quite differently by each of us. It surfaces or erupts a model in respect of the domain of models which it lays down - possibly, in this instance, a model that entertains the notion of "this" as opposed to "that".

When von Foerster turns Korzybski's phrase on its head (3.6.1), he wants to remind us that we cannot "peer" out from our maps (our models), and regard Objective Reality.

However "modern", "privileged", "scientific" our own culture, our distinctions are still being constituted in terms of the models reverberating as consensual terms within its horizons.

Symbol, word, phrase, text, manual, novel, are all more or less explicit models or terms of a consensual domain. As I have expressed them, they are distinct to my own culture, my own consensual region of existence. As their significance is realised in the cognitive changes effected by their intersection in my bodyhood, the distinguished phenomenon is my model of it. It is a trivial truism (though pointing at an extremely interesting evolutionary fact) that my models are in a coherent dance or drift with my environment (ie. my domain of operational coherences). up to the time of my own disintegration. My cognitive domain IS my reality (Maturana 1988c).

Likewise it is a truism that the consensual domains I am structurally coupled in respect of, are themselves in a drift with an "environment" constituted by the many dimensions of structural coupling effected through all the components who constitute it as observers, by the relations brought forth in the course of their consensual interactions (ie. consensual coordinations of consensual coordinations of behaviours).

This helps account for the extremely interesting phenomenon of paradigm and paradigm change as explicated by Kuhn, in explaining why the paradigm ("episteme" Foucault; "consensual domain" Maturana) can never be "in phase" with Reality, and why the flux of paradigms will never converge on, or one day finally match Reality (Kuhn 1970). In a less extreme manner, Kuhn was anticipating Maturana's discourse concerning the "multiverse".

The important notion, is the realisation that a "model" is not just some quantitative construct in one particular consensual domain. The phenomenon of consensuality is itself the play of models across distinct, non-intersecting domains (ie. between the organisationally closed bodyhoods of individual observers). That's where models emerge or gain their positivity - as transducers. That's how they are "witnessed", and that's how there arises a community of observers.

3.8 The Viable System Model

In Chapters Four and Five I will be looking at the cybernetic intervention in a problem-situation along two dimensions - from the perspective of real-time, and in the context of invariances. What I want to do at this point, is establish my own interest in the VSM as a particular model, in the light of my comments vis a vis language.

In my own understanding, the engagement of the analyst in a problem-situation has little to do with "putting things right". One might say, that to the degree that a problem-situation is transparent in its details, it is possible to engage precise and "hard" methods and techniques, such as linear programming. However, this is to miss the point. Whatever the problem situation, whether well-defined or not, managerial cybernetics (and Soft Systems Methodology) is primarily concerned with bringing forth or generating, a particular consensual reality as the problem situation.

As the problem situation is explicitly brought forth in a consensual domain, the concerned actors (including the analyst) structurally realise a novel system, one which through their constitution of it, can now be altered along a dimension that is no longer confirmatory of the original system of concern. Thus is the original system rearranged, through opening the possibility of orthogonal intersections of a new kind in the bodyhoods of its structural elements.

3.8.1 Viability

My discussion of the biology of cognition and language, has been in order to provide the background in terms of which it makes sense to describe the task of managerial cybernetics, as the creation of the problems it is concerned to dissolve. This crucially concerns the notion of viability.

Both Beer and Maturana describe autonomy as the maintenance of certain organisational invariants in the course of structural changes, which enables the observer to indicate that the system-in-focus remains engaged in a dance with its environment in the course of which its autonomy persists. This is viability - the maintenance of organisational closure in the course of structural change, as witnessed by the observer.

Problems arise in understanding the VSM, when the model is presented as if it concerns the explanatory mode of Objectivity. When this is the case, the student or practitioner looks for the identity of the system-in-focus "out there", so that s/he can do something about the maintenance of its identity. This is the case whether we think of a national economy, a family or a multi-national. An enormous amount of intellectual effort then goes towards "identifying the identity" of the system-of-concern. Not by

making visible the recursive process suggested in the last statement (ie. identity of identity....), but aimed at once and for all pinpointing essential invariances, in terms of which assessments about viability can be made with reference to some available metric (productivity, profitability, or what have you).

For instance, the VSM doesn't tell us how to "maintain" or "make more effective" an economy. What it does do, is provide a description of the process by which an economy might continue be observed or brought forth, whatever environment it is distinguished as structurally coupled to (ie. whatever domains are perceived as determining structural changes in it). Let me be precise about this. The VSM says nothing about the productive success of a social enterprise, in the sense of some Objective throughput. It is not concerned with inputs and outputs as criteria to measure success. What it is concerned with is "viability", as described above. The VSM is about the "fit" of expectations in a community of observers. Not the fit of expectations with actual happenings (ie. Objectivity), but the fit of expectations with their perceived satisfaction. Such a "fit" concerns consensual flow.

This does not imply that managerial cybernetics dismisses the importance of input/output transformations, but that the focus of its attention is different. Transformations

- whether from pig iron into steel, or ill patient into healthy person - are understood to be effectively secured as a function of the self-realisation of the actors engaged in the cooperative tasks which constitute the organisation necessary to achieve such transformations (ie. their "eudemony" - Beer 1983).

This self-realisation is not an organisational metric, a function of membership of this social system as opposed to that, as is frequently suggested by organisational analysts. It is the experience of the observer as the site of the intersection of all the dimensions of his or her cognitive space, including those outside the organisational framework (ie. concerning the fuzzy environment to the left of representations of the VSM).

To put it another way. Social role or function, in their structural realisation through the living observer, are not reducible to the status of a logical derivation from some social identity (ie. of the sub-set "organisation"). They are not "formal social structures" (6.3). The labels "managing director", "foreman", "wife", "member", are all formal, logical relations, indicated in terms of a primary social distinction. This "organisational" set - such one-dimensional labels - does not at all point towards actual human beings.

The living, breathing, cognizing, emotioning observer, is the play of distinctions, even in the case where such a play is frozen by the social indication of it. At any instant, I am husband, lover, boss, servant, biological composite, and an indefinite number of other consensual and experiential strands. Viability concerns the flow of these consensual configurations or strands, rather than a quantifiable indication of one discrete formal dimension.

Analytical procedures which measure in terms of a metric that reduces organisational tasks to a scale of assessment in terms of some input/output function, are left to other disciplines. Such quantitative methods are not opposed or ignored by managerial cybernetics, but are seen as complementary areas of concern, already attended by a variety of approaches - O.R., accounting, economics, statistics and so on. The paradigm of managerial cybernetics, and indeed of Softs Systems Methodology, suggests that there has been a historical gloss over the qualitative dimension of human social interaction, one which needs redressing.

What then, about the "organisational invariances" that viability is held to be concerned with? Don't these somehow reflect on matters of success and failure, as assessed with reference to some objective metric?

This, crucially, is a matter of "identity". Conventionally speaking, if we affirm that the stated identity of a social enterprise is to "produce computers", or "to make money" or whatever, then the intervention of the analyst will presumably be in order to maintain such an organisational identity, or to reinstate it if it has been lost. For instance, at this historical point in time one might imagine that the task of viability concerning IBM, would be to reverse the fall in profits and decrease in market share; or in respect of NATO, the task might be seen as making sure that the North Atlantic Treaty Organisation doesn't disintegrate.

But this is not the primary issue for managerial cybernetics. Viability of IBM or NATO, is not seen as to do with their "success" or their survival per se. Though, indeed, it does have to do with the success of something, and the survival of something.

Identity and viability are descriptions made by the observer of certain behaviours in the light of particular expectations, during the observer's consensual flow in the course of his/her natural drift. They say nothing about an "actual" social system. If the indicated behaviour of a distinguished system matches the observer's expectations, then the observer will assess the system to be viable regardless of anything actually going on "inside" it. In

point of consensual practice, as opposed to philosophical niceties, in respect of the social domain such witnessing will emerge along one of two dimensions of recurrent interactions:

- the system will be witnessed as viable by being observed as behaving the same way in similar circumstances to previously (ie. it is "the same" - its organisation is assumed to persist);
- the system will be witnessed as viable by the very fact of having altered its behaviour in conjunction with the observer's present expectations of its viability (ie. the system "has adapted" - its organisation has been observed to change).

In other words, even Maturana's scrupulous distinction between "organisation" and "structure", are not Objective reference points, but orienting terms held up for negotiation.

In the social domain at least, "viability" is not "out there". It is a description concerning the satisfaction of expectations, as these are experienced in the course of shifting consensual flow.

The rise and fall of USA, the British Empire or IBM, don't hold any intrinsic lessons for viability, in the sense of the word intended by Beer in a paradigm of real-time (Chapter IV). They just tell us about how historical trends are specified in particular communities of observers. The profits of IBM don't say anything about viability, any more than does the longevity of the Curia. They express something meaningful to the observer interested in profits or longevity, as these concepts resonate in a particular consensual region.

These comments arose from a consideration of "viability" as conceived of in the explanatory mode of Objectivity. The significance of viability within the explanatory mode of objectivity-in-parenthesis is quite different. Survival, longevity or financial success are now seen to be arbitrary in indicating viability. As far as I personally am concerned, the satisfied hunger of the shark that has severed and devoured my leg is pathological - pathological of ME! The ecologist who comes to my bedside and congratulates me for saving a shark of an endangered type from dying of starvation, would get short shrift. Neither ecologist nor myself are wrong. We are just making our indications in respect of different systems and with different expectations.

3.8.2 The identity of the observer

"Viability", as being presently used, specifies closure of a loop of expectations in the explanatory mode of objectivity-in-parenthesis. To put this more precisely - that which I indicate as viable or not, holds up for visibility in a community of observers, my own "flow" of identity as an observer, witnessed by the distinctions I am observed to make from the vantage of the various viewpoints with which my own consensual flow intersects.

Such a definition is not at all intended to qualify or to deny the temporal drift or spatial extension of phenomena. Merely, at least in the context of the social domain, it anchors the word "viable" to the expectations of an observer in a community of observers. That which is indicated as viable, in other words, is a consensual mark in a community of observers, having nothing to do with some identity grasped or uncovered "out there".

In consensual interactions in the social domain, what matters is reverberating identity as the recursive play of distinctions in the course of consensual flow, which enables orthogonal intersections of otherwise nonintersecting phenomenal domains, in the bodyhood of the observer. This concerns recurrent specification in the course of languaging, of what is distinguished as viable or not, together with

accompanying behaviours that the observer consequently brings forth as grounds for the emergence of further distinctions. What matters is the indication of identity in the course of the braiding of language and actions, whether our own or others'. And this is where the VSM comes in - as a mechanism for generating statements of personal identity in a public domain.

3.8.3 Bracketted identity

The "identity" brought forth in applying the VSM (eg. of a firm), is significant, as Espejo puts it, in being expressive of a "multisystem" (Espejo 1987). In my own account, this is understood as the ongoing enunciation of personal identities on the part of those making indication of it, rather than hinting or pointing at the identity of the firm as some objective social phenomenon, which we experts might somehow "grasp" (5.5.2).

Such a "multisystem" is a different system to the one initially approached by the analyst, in that now it has ceased to be a system, and instead is a problem-situation brought forth by the entailed actors including the analyst, according to certain formal statements of viability, that prove to be compatible with the operational coherences experienced as such actors interact. These statements are distinctions made by the human components of this new system,

an expression of their own identities in indicating it in the course of their structural realisation of it.

It is in the course of consensual flow that problems, or anything else for that matter, are generated in a community of observers. Such problems, or such atom bombs, are not inert, neutral, passive objects - or if they are, then they are neither "problems" nor "atom bombs" (Maturana 1988b). Such consensual phenomena are expressions of identity - not identity of the phenomena held to be denoted, but of the observers who bring them forth and coordinate their behaviours in terms of them.

3.8.4 The VSM bracketted

A hermeneutics of distinction speaks of objectivity-in-parenthesis, and the bringing forth of many realities. If I attempt to make the VSM compatible with such discourse, then it is important that I should describe the terms of the VSM as themselves "speaking" objectivity-in-parenthesis, and describing the bringing forth of a multiverse.

I feel that one of the difficulties commonly experienced in attempting to implement the VSM in the explanatory mode of Objectivity, arises because the mechanisms described in terms of the model itself, don't

make any sense when approached outside the mode of objectivity-in-parenthesis. This is not to say that the model cannot be used to specify Objectivity (anything can be used to specify Objectivity). What it means is that such specification will indicate misinterpretation of the cybernetic grounding of the model. Furthermore, this will give rise to inconsistencies and consensual confusion amongst the human actors who are supposed to be coordinating behaviours and activities about a common endeavour.

What this implies, is the need for the model itself to be bracketted, in the process of usage of it.

From the perspective of the biology of language, any linguistic term is in fact "bracketted", in the sense that objects arising in the course of linguistic use are considered as consensual coordinations of actions, rather than as intrinsic signifiers that "point at" some phenomenal Reality (3.6). At this juncture, all I am attempting to demonstrate, is that the terms of the VSM don't need to be claimed to point outside the model. I want to demonstrate that the terms of the model do not need to depict Reality in order to secure consensual positivity, and enable consensual coordinations of consensual coordinations of actions.

Beer strenuously explains that the model is neither a metaphor nor an analogy. It is "a model". It is a

convention - a consensual "marker" or reference in terms of which, or in relation to which, recurrent interactions might persist. The VSM depicts a "blind" system in a "blind" environment. It is a logical construct. Checkland was right in saying that Ashby's Law was a law of logic rather than a law of nature (Checkland 1980). But he overlooked or ignored the phenomenological domain that such logic was bringing to light.

The confusion perhaps lay in Checkland's assumption that the "closure" of a consistent logical system denies its operational efficacy, and that only in pointing to Reality is discourse useful or consensually valid. The whole of this thesis, Foucault's research on the "episteme", Kuhn's studies of scientific change, Maturana's biological ontology, and Beer's own model, all are incommensurate with Checkland's view. For effective functioning in a consensual domain, neither language nor models are required to point to a reality, social or otherwise.

The VSM depicts the relations of a system that doesn't peer out at Reality, and doesn't need to in order for the persistence of its natural drift (eg. see Harnden 1989). Indeed, the model depicted is explicitly one of organisational closure. It is precisely this closure that grants the VSM its "own" identity and brings forth its utility in a particular community of observers. As a

linguaging observer I don't need to "get inside" the VSM. I just "bump into" it, either usefully or not.

The model doesn't describe or reflect some "Real" state of affairs that the orienting observer is attempting to get to grips with. It is explicitly a linguistic term in a consensual field. None of the terms or relations depicted in the model, escape its boundaries or claim to do so. I throw it up in the air, and catch it! I toss it at yourself, and make my next move according to whether you toss it back or leave it fall.

Beer makes explicit and enables this consensual functionality, by the mechanism of recursion braided to the closure of System One/Five loop. Should we attempt to include the observer in the picture, we discover he or she as forever stranded outside its terms. Which is the strength of the VSM as a consensual tool - a tool which refuses the observer entry as any of its terms. As such, it goes some way to answering both the critique of the Frankfurt School (eg. Habermas and Marcuse), and also the analytic of Foucault, concerning the tendency to "flatten out" complexity and richness in the social domain by conflating distinct phenomenal dimensions.

The terms of the model don't set out to "represent" any observer, whether as System One, or System Five. Instead,

they lay down a formal strata of consensual relations. Nothing in the model talks about human observers, or conflates one particular System with such a human. No aspect of the model should be taught as concerning human individuals.

The model concerns linguistic "constructs", constructs which, as suggested by the model itself, cannot be constituted in praxis except by the "Five-One closure" indicated by its terms. This means that no organisational closure is held to be attainable, unless the patterns generated by the orthogonal intersection of non intersecting phenomenal domains (ie. the System Five loop from the System Four/Three homeostat), are understood as underlying or providing the grounds for consensual flow (ie. viability - 3.8.2). Once more, this intimately concerns "real-time" (Chapter IV).

Such organisational closure IS NOT A FUNCTION OF CONSENSUS. In the human social domain, this is a matter of mutual tolerance in the face of multiversa (5.5.2), and the continued responsible choice to embrace or reject particular actions and accept their consequent effects. These are ongoing choices made by the observer in the realisation of his or her integrity (consensual responsibility), and are not the result of folding the individual into some systemic social union (responsibility to consensus). They are

functions of the recursive play of distinctions by the observer in constitutive relation with a community of observers.

Topographically speaking (not yet worked out in detail by the present author), the VSM flows out from the observer whose discourse and actions are mediated by its linguistic terms. As such it enables visibility of the recursive play of distinctions which constitutes consensual flow in a community of observers. The observer is never discovered in the model, because the model concerns visibility of these recursive patterns or processes of distinctions, which give witness to the "voices" of distinct observers (ie. realities), in a consensual domain. It doesn't point to a domain outside such a consensual play, because viability (as above) doesn't concern such an externalised domain of Objectivity (ie. Reality).

3.9 Conclusion

I have established the context for my project and the scope of its ambitions (Chapters I + II), and in the present Chapter have polished my own tools. This has involved outlining the explanatory mode of objectivity-in-parenthesis in the context of a constitutive ontology, and describing how this manner of speaking is compatible with my own understanding of the Viable System Model of Stafford Beer.

The next two Chapters will take this foundation as given, in describing the intervention in a problem situation from the perspective of two crucial dimensions of cybernetic discourse - real-time and invariance. My description will be a painting of broad brush strokes, rather than a detailed analysis. I am concerned to communicate a mood and a tone, rather than attempt to represent a Reality.

Having conducted a case study of sorts in the theoretical application of managerial cybernetics according to a particular interpretation (Chapters IV and V), I will unfold my own consensual tools and indicate why other methodologies, such as Beer's, Checkland's and Espejo's, do not address the issues that I bring to light.

IV THE LOGIC OF CYBERNETIC INTERVENTION: REAL-TIME4.1 Summary

"Real-time" is not a luxury nor an afterthought, but is foundational for an understanding of managerial cybernetics, and to appreciate just what it is that the intervention is intended to achieve. I will make no attempt to analyse the insights of Stafford Beer and Raul Espejo, but will attempt to enrich discourse concerning the notion of "real-time". Thus, I will explicate my own interpretation of the phrase, considering its contextual implications in respect of a cybernetic intervention, in the light of my understanding of a constitutive ontology.

4.2 Introduction

From the perspective of managerial cybernetics, an intervention can never achieve a return to some previously existing state. In other words, it is not the job of the consultant to find where the client has gone wrong, and put matters right. It is the job of the consultant to intervene in the problem situation, by bringing forth a novel system which now includes his/her role as a constitutive element of it (3.8).

What are the implications of such a description of the consultant's role? Such an intervention involves what Maturana calls putting "objectivity in parenthesis", and what Beer calls "management in real-time" (Beer 1979, 1981; Maturana 1988b; 3.3). I'm equating these two phrases, because I feel that their surface dissimilarity masks a deep commonality, a commonality which can be better understood when they are juxtaposed with one another.

I am stressing the consultant's function in the process of intervention, rather than focussing upon the problem situation itself, for one simple reason. This is that the effect sought by managerial cybernetics upon the problem situation, is precisely comparable with the system brought forth in the process of intervention, as that intervention unfolds. If we can highlight the ethos of the intervention we

will gain insight into the effects sought in the named problem situation.

A remarkable amount of thinking in our culture indicates naive assumptions of reversibility. If anything, such notions have been reinforced by ill-informed interpretations of eastern philosophical imagery concerning cyclical movements and reincarnation. Essentially timeless patterns and processes have been wrenched from their historical and cultural contexts, and been invested with the linear temporal arrow of western christianity.

Thus it is generally taken as given that the client approaches the consultant "with" a problem. However, for managerial cybernetics, even though the client's problem emerged out of the past and leads him/her to give voice to it in the present, as far as the consultant is concerned no problem presently exists. To repeat, managerial cybernetics is about "bringing forth" discourse in the system of concern, which system will itself be one constituted in terms of this discourse, which now includes the consultant him/her self as an element in its relations.

In other words, the consultant doesn't stand outside the problem-situation, observing it, analysing it and providing answers. The consultant enters a structural relationship with the problem-situation, becomes structurally

coupled to some dimension of it, and it is his/her participation in the situation as a constitutive element of it that leads to changes in it.

This is significant in that it is conventionally supposed that the role of the consultant is to be able to "comment on" the problem from outside. Indeed, it is often held that "only an outsider" might have an "objective picture" of the situation. Cybernetics doesn't provide us with the illusion that we can "comment on" anything. Cybernetics isn't about commentary, but about involvement or engagement. Involvement of the consultant in the initial process, and involvement of the viewpoints constituting the system-in-focus in their historical unfoldment. It doesn't set out to provide pictures for an audience to contemplate, but seeks to fold the historically-situated actor into the praxis of living.

Cybernetics, as Maturana has recently put it, might better be considered "the science and art of understanding" (Maturana 1988a). An appreciation of such a braiding of science and art, of the apparently objective and subjective realms in a process of hermeneutic engagement, is crucial for an understanding of management in real-time. "Real-time" is as relevant to the consultant's own situatedness as it is for the involved actors in the system-in-focus.

4.3 The Problem

We may never return to some previous state, or pick up the pieces at some point in the past. Both processes if valid, would indicate reversibility. History itself is not a rational, linear process, an "arrow" that somehow exists "out there" which we can advance along or follow backwards. It is an anarchic battle in the present (Nietzsche). As such it is not a battle of brute facts but the play of distinct points of view (eg. "recurrence of difference", Foucault's interpretation of the philosophy of Deleuze: Foucault 1977).

History is always of and from the present. It is this tension of divergence in simultaneity which provides historical movement. History might be described as the murmur of consensual flux, as it erupts in distinctions which are forever affirmed in the lived-present, but which cannot but point backwards. However, the process of pointing does not signify an existing object. Instead it directs or controls perception which is always in the present (Powers 1973). The play of action and perception is history.

These comments on history apply with equal weight to any process of duration, however local or short-lived. We are fairly clear that we cannot in fact retrieve the eighteenth century (though it is sometimes held that we can retrieve certain "historical" invariances appertaining to it), but it

is an unthought assumption that the consultant might retrieve an organisational structure laid down in the past, or the therapist might recall the personality or marital relations of a previous time.

In managerial cybernetics, as indeed in management science in general, discourse is frequently interpreted as providing the means of returning to a state of affairs hitherto felt as being desirable, or as laying down a blueprint for a state of affairs which will extrapolate what is presently felt to be desirable into the future.

Thus, notions concerning diagnosis and design frequently find themselves situated in such a context of historicity. The pair of terms might be regarded as two stages in one process, or more commonly as two modes of operation. In either instance the description is similar. Firstly one identifies the problem situation, bringing to light the critical areas of concern by diagnosis. There follows implementation of the changes made visible as desirable in terms of the stated intentions and expectations of the involved actors. Design applies to the description of a hitherto absent social enterprise, and suggestions for its realisation.

Where Beer tends to treat diagnosis and design as two stages in one process, Espejo stresses two distinct

"modes" of intervention for the analyst at any juncture. The analyst chooses which mode s/he is pursuing, and methodological consequences unfold accordingly. Thus it would appear that Espejo is more rigorous than Beer in his separation of the two terms. However, it is not this distinction that will be my focus of attention. My intention is to demonstrate the complementary nature of these terms, in order to explicitly direct the reader away from the naive entrapment in historicity suggested above, and to bring forth the notion of real-time.

As suggested in the introduction to this section, my way forward will be to focus upon the relationship between the analyst and the actors involved in the problem situation, rather than attempt to demonstrate or prove an objective historical process held to signify "viability" in real-time. Objectivity is in parenthesis, and the notion of viability in real-time is self-contradictory in the present context, in that it implies a fundament of Objectivity (ie. either "real-time" or "viability").

Real-time IS viability. They are a pair of linguistic terms which self-referentially play off one another in a particular consensual domain, and don't "point to" some Reality. My intention is to "ground" or "situate" the notion of viability as used by Beer and Espejo, in a rational framework clearly avoiding the positivist or

historicist trap, while maintaining the rigor of the VSM as a methodological tool. This will entail the bringing forth of a consensual domain rather than demonstrating some objective truth. In order to achieve this task, I will demonstrate the consensual equation of viability and real-time, grounding this in the historical involvement ("engagement") of the consultant as observer in the process of intervention.

Hermeneutic insight into "engagement", forbids the observer a privileged place outside the historical flow of which s/he is a constitutive element. This is one of the reasons why I utilise the pair "enabling/disengagement" as complementarities, in my discussion of enabling technology (Chapter VI).

Maturana's insight into the biology of cognition, would appear to forbid the observer a privileged vantage over anything, although he appears to grant the indicated mechanism of autopoiesis some sort of transcendental status. In this thesis, I am not going to comment on this "problematical" status of autopoiesis, because I am presently unsure of its grounding for Maturana. However, with this proviso in mind, I do refer to it several times.

I, as an individual observer, cannot but be engaged in the process which I observe that I observe, in the sense that Gadamer intended in using the word "prejudice" (Gadamer

1975). I am never a "subject", neutrally perceiving and reflecting upon an "object". In the discourse of Ernst von Glasersfeld, I cannot but "construct" the reality I find myself within (von Glasersfeld 1987). Such a construction is not a definable task which takes some target as its goal (the construct). It is a self-referential process, forever unfolding in the course of natural drift (Maturana 1988a; Maturana and Varela 1987). What applies above to the observer, equally applies to any subset of this class, such as analyst, consultant or manager.

However, in point of fact it is the rule rather than exception for the client in a problem situation to expect to proceed along one of two routes both of which are lodged in implicit notions of reversibility. It is frequently taken as given, that the task of the consultant is to provide the means for such action. I am equating the first dimension with diagnosis, and the second with design:

1: There is sought a return to a previously named set of expectations which are no longer perceived as being met. The insight into the problem is expressed by something like: "We're a firm which produces x, but for the last three years our orders are plummeting and we don't know why".

2: There is a desire to lay down a new set of expectations which are envisaged as "holding" for the future. Here the brief might state: "We've always done quite well as an x firm. However we feel times and markets are changing, and therefore feel we should diversify. Thus we want to set up a division concentrating on y".

The linear thinking I am describing, is intimately related to a particular notion of "control". "Control" is assumed to be a commodity - it is something lost, or something to be gained. This commodity is very closely allied to a force which can be asserted over some thing or process external to oneself.

4.4 Control

Now control lies at the heart of cybernetic discourse. Historically, while cybernetics was focussed upon mechanical processes, such as how to shoot down fast-moving aircraft and missiles, or how to organise the mass-production of steel, mechanisms concerning control tended to be seen as situated external to the human actors in a particular situation. In other words, their own status as active observers was taken for granted. This in spite of the fact that Ross Ashby for one, was primarily a psychologist, and he himself as well as many other of the seminal figures in the emerging discipline were aware of the problematic of the observer itself as part of the processes of control (Ashby 1964; Beer 1960; Wiener 1948).

4.4.1 The evolution of cybernetic discourse and operational research

In the context of managerial cybernetics, it is interesting to note that the ambition and goal of Stafford Beer himself at the early Namur conferences and in other papers published in the 'fifties and 'sixties, was primarily to mathematize the processes of social organisation in the context of the emerging discipline of Operational Research (eg. Beer 1956a, 1956b, 1956c). Although there are frequent references to the human dimension in these early papers,

there is no attempt to explicitly include the observer (ie. the human individual) in the mechanisms of control themselves. This was not regarded on the whole as at all an outrageous suggestion from the perspective of cybernetics or OR.. The "invariances" sensed as underlying the order of things, while recognised as being intimately related to our languaging of them, were clearly felt to be analysable without recourse to the involved human actors.

The point that I am making is that many of the dimensions later brought forth in cybernetic discourse, though perhaps grounded in the discourse of the seminal figures, were not necessarily perceived as crucial at the time. Thus it was not to be until the late 'sixties that Humberto Maturana and Heinz von Foerster were to start to explicitly focus on the observer him/her self as constitutively part of the problem situation, and not until the seventies that such an approach was to be more rigorously enunciated and laid down (examples in Maturana 1970, in Maturana and Varela 1980; von Foerster 1981).

What was perceived as new and disturbing about the emerging discourse of cybernetics in its first decade, especially to outsiders, was the "rape" of traditional boundaries between disciplines, disciplines which had in many cases only recently gained their status as representing distinct bodies of thought (Foucault 1974). It was one thing

for claims for universality in linguistics (Saussure) or anthropology (Levi-Strauss 2.1.1.1), but the invariances discussed in the context of cybernetics appeared to refuse even a token acknowledgement of discipline boundaries.

In many eyes, cybernetics seemed to be equating machines, social organisation, neuro-physiology, bio-chemistry, botany, biology, and worst of all, reducing human beings themselves to automatic mechanical processes. This was very much the thrust of Habermas' early criticism (Habermas 1970).

Attempts to forestall or deflect such naive insights, didn't necessarily always work. The two papers "The World, the Flesh and the Metal" and "Cybernetics and the Knowledge of God" (Beer 1965a, 1965b) were more likely to set off alarm bells than to be read closely. Papers with vitally relevant themes in more prosaic titles, such as "The Irrelevance of Automation" (Beer 1958) were just as likely to be overlooked because of the times. The last-named paper would possibly have greater impact and be read in depth in the 1980's, when issues of automation and work patterns have become so much more widely discussed.

The thing that was never quite understood outside the circuit of those individuals toying with so-called "cybernetic" ideas, was that cyberneticians didn't actually

exist as cyberneticians! The discourse and insights of the 'forties and 'fifties didn't flourish into a discipline, with its own boundaries and rules, but very much remained an informal club. It was the club that transcended discipline boundaries, rather than any formally established discipline seeking a place for itself in competition with already established professions. "Members" of this club became members as a result of having pursued researches in their own specialist areas from a certain perspective, with a certain insight which logically led them to wish to interact with others from diverse bodies of thought, with diverse interests, who yet shared an underlying vision.

I opened this discussion by mentioning linearity and control, in order to re-introduce the issue of "real-time". I have briefly sketched these historical points in order to make clear the purpose that the following discussion is intended to serve. The main point is that "cybernetics" didn't arrive all in one piece on the world stage, nor did it arrive "out of tune" with the times of 1950 in the same way that it might be "out of tune" with 1989. Cybernetic discourse has itself evolved. In the 1988 Annual Meeting of the American Society of Cybernetics, there was serious discussion as to whether the discourse should even be called "cybernetics" (also see Maturana 1988a)!

Beer's initial papers on the topic of management cybernetics, and his thoughts on the management of complexity in the social domain, though frequently mentioning language, rarely mentioned the human individual (the observer), and took little account of the "position" of the individual in the processes by which social organisation might be controlled. This bias has since lessened as a result of Beer's own integration of more recent developments (eg. Maturana, Powers, Varela and von Foerster among others).

But in the first instance, this wasn't an oversight or shortcoming. Quite simply, this wasn't Beer's interest or focus at the time. His aim was to take the insights of cybernetics as he understood them, and "marry them" to the emerging discipline of Operational Research. Of course, the reason why he was driven to this task was because he felt certain that the marriage would be one that would prove beneficial rather than damaging for humankind. But the excitement of the early papers and addresses, arose because Beer conceived of being able to mathematize social processes, initially in the context of industrial production.

The important point is that there remains a historical legacy that permeates managerial cybernetics, and which undoubtably influences readers of literature in the field and effects their interpretation of just what managerial cybernetics is about or what it may claim to do.

It is in part this legacy that has problematized the notion of "real-time". Although the idea itself was visible in Beer's papers from the start, it did not include the human individual him/her self until perhaps the explication of models in "Decision and Control" (Beer 1966). For many present day interpreters this dimension appears completely missing, especially as "Decision and Control" tends to be the last text studied, rather than the first, in spite of its undoubted historical and intellectual significance. This is perhaps where Peter Checkland's "Soft System Methodology" broke new ground (written up in Checkland 1981).

4.4.2 Contemporary discourse

Espejo, whose work is visibly influenced by contemporary developments in management literature, including the work of Checkland, has more consciously attempted to integrate the notion of "real-time" into his own discourse on cybernetic methodology. This is especially visible in his discussion of "distributed planning" (Espejo and Garcia 1984), and through his introduction of the word "viewpoint" to describe the relationship of the human individual as a constitutive part of the social enterprise (Espejo 1987). However, from personal conversations with students of Espejo, it would appear that while the notion of "viewpoint" is fairly well understood, or at least is unproblematical, it generally is not felt to bear any relationship to

"real-time", which is as enigmatic as ever. As far as I am aware, critical literature also gives evidence by its absence, of no understanding of the issue.

What is significant here, is the interdependence of the words making up the discourse of managerial cybernetics - the closure of the discourse. This consensual closure was not always explicitly acknowledged, nor was it dealt with as sensitively as could have been the case. This is surely one of the main reasons why, in the context of managerial cybernetics the word "control" became interpreted as aimed outwards, while in other developments in cybernetics, control has become more firmly lodged within an observing system (eg. Maturana & Varela 1980; Powers 1973; von Foerster 1981). It is here that there appears to have developed the most destructive breach between the work of Beer and Espejo, and that of "second-order cybernetics" (von Foerster 1979).

In the context of 1989, the notion of control entailed in the VSM need not be taken as the notion of control as understood in Beer's writings in 1959. This is no weakness of the fundamental ideas, but a fact about the natural drift of consensuality. A consensual domain unfolds dynamically along its trajectory and in respect of the changing structures that realise it. It is never static. The problem is to make explicit this difference concerning discourse about control.

This is important for one simple reason. Many of the assumptions of the contemporary reader will have arisen out of the conventional wisdom of 1959, and very few will be those of 1989 vintage. We are not after all historically situated in the events of the present, but are transfixed by events of the recent and not so recent past. This doesn't mean that the average reader will be familiar with Beer's early work, but that their own mindscape is likely to be emerged out of the historical juncture in which the early work emerged, rather than being already "coupled to" the present. As we in point of fact live in 1989, this is sometimes overlooked. We often make the mistake of assuming consensual simultaneity. The explication of this issue itself concerns "real-time".

Today it is easier to describe "control" without implying an attribute asserted "over" anything. Partly due to the input of work such as that by Humberto Maturana and Bill Powers, Beer himself and certainly Espejo, now conceive of control as intimately related to the processes of languaging between human individuals in particular social situations, rather than as mechanical processes of closure which achieve some expressed goal (for example, see Maturana's comments on "control" and "understanding": Maturana 1988a)

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Control "over" other human beings is "force" rather than cybernetic control. This indicates that it gives

evidence of the refusal to accept the simultaneous existence of nonintersecting phenomenal domains (ie. a constitutive ontology embracing objectivity-in-parenthesis), and signifies the attempt to fold the manifold variety of things into one hegemonic vision (ie. Objectivity, or a transcendental ontology) (Maturana 1988b). This is as relevant to managerial cybernetics and the problems of social organisation, as to issues concerning neurophysiology or psychology.

4.5 The Intervention

The notion of management in real-time is revolutionary. It launches a new paradigm (Kuhn 1970).

One of the reasons for my own changing insight, was that Beer's discourse concerning "economy in real-time" arose anomalously for myself. The reason why this was so significant, and attended by myself as an anomaly, was that I couldn't communicate the significance with anyone else! People would either shrug if they knew nothing of the area of discourse, or else, if they knew a little or a lot, would mutter about statistics (eg. Harrison and Stevens). None of which made any sense to me, because in my own interpretation, Beer wasn't saying anything about some statistical process, even though he himself apparently thought he was (4.4.1).

This apparent flippancy disguises an important point. The point being that I had "bought" the notion of managing in real-time. In the midst of all my early confusion in understanding Beer's discourse, my least problem, so at least I felt, was with "real-time". This is why I am spending a whole section on this issue, and will attempt to unfold the argument as clearly as possible.

4.5.1 The observing system

The interesting thing in focussing upon "the intervention", rather than upon the "system-in-focus" which the consultant is held to be dealing with, is that one is forced to enter the observer into the discourse. The trouble with discussing the VSM by concentrating upon actual situations (eg. case studies), is that almost inevitably one loses one's sense of "prejudice" as a situated individual (use as in Gadamer 1975), and adopts the hat of the subject viewing an object of concern. Which is precisely the hat I'm trying to throw aside. This might not have been so were I now starting from scratch with my present insights, and was embarked on my own case study. However, that's not the case.

It is more difficult to overlook the issue of the observer when focussing upon the process of intervention itself, because, as Peter Checkland's explication of Soft Systems Methodology indicates, one cannot overlook one's own active role as hypothetical analyst, in opening up the problem situation which includes unfolding, recursive definitions of what the problem itself entails (Checkland 1981).

Let's be clear about this point. The consultant doesn't create an objective state of affairs "the viable system" which he then launches, as a new ship down the

slipway. The consultant is engaged in an ongoing process, which process is brought forth as a particular quality by the structural fit of his/her engagement with it. In other words, the consultant doesn't control any phenomenon extrinsic to him/her self. Rather, control may be said to exist to the extent that the consultant is witnessed as having been a constitutive part of a novel organisation congruent with his/her own insight into it.

The strength and difficulty of Maturana's discourse, is in good part because of his rigorous inclusion of the observer, including himself as the observer of the whole process he is involved in describing. Thus, if I am to talk of the constitutive processes involved in any system-in-focus, my own descriptive or explanatory discourse must account for my own expression of it. Else I am merely tricking the reader and possibly myself, into believing that I am describing a constitutive system in respect of which my own description is not constitutive, when indeed it must be so.

What I am in fact doing, is focussing upon one particular system-in-focus, in which the relationship of myself as observer is more visible but qualitatively no different from the actors involved in the problem situation "outside" myself (eg. as "viewpoints" in a "multisystem": Espejo 1987). As the hypothesized consultant, I myself am

explicitly constitutively involved in the system-in-focus (Mendez, Coddou, and Maturana 1988). I am a constitutive part of the system that I am describing.

So, the consultant him/her self "manages" in real-time, and is a constitutive element in a viable system which, along the dimension of the intervention, concerns the identity of consultant plus actors in the problem situation. As this is a professional intervention on the part of the class-type "consultant", the latter is intending to extricate him/her self from the structure of the system-in-focus as it realises the problem-situation, just as soon as s/he receives the requisite fee or is satisfied, whichever is relevant. But in the interim, the consultant is a constitutive element of a problem-situation, which is now different from the system which existed before his/her involvement in it (3.8; 4.2).

Due to the consultant's own acknowledged role in relation to the named problem-situation, s/he is not to "dive into" the system-in-focus, becoming a reinforcing constitutive element in it, but is to interact orthogonally to the confirming structure that actually realises the system (4.6.2). This orthogonal relationship must entail one or more of the existing structural components of the system, else there would be no structural coupling of the consultant with the system and it would remain an opaque black box. In the sense that its complexity is beyond the grasp of any

observer, every system is a black box, but to the degree that the observer interacts with the system, s/he must be coupled in some dimension to at least one structural element in terms of which the system is realised. Only thus are changes triggered in an organisationally closed system.

4.5.2 Viability and consensuality

Let me once more recap where I'm headed in order to avoid any misunderstanding. I am well aware that I appear to be wrenching the VSM out of its usual context, in describing the intervention itself as a "viable system". But this is deliberate. I'm adopting this strategy for one straightforward reason. In taking up the consensual tools offered by Humberto Maturana, it becomes contradictory to attempt to apply a model outside of the consensual domain within which one is orienting. This is because the consensual domain within which one is orienting IS the consensual domain within which one is orienting. One cannot "step outside" of it. Thus, quite simply - if it proves impossible for me as an observer to recursively situate the VSM at all levels of consensuality, then the model loses its claims for usefulness by its own terms (for it is claimed to be of universal applicability). I hasten to add that I don't see this as problematical.

So, to be explicit about this. I'm not attributing any temporal duration to "viability". As Beer himself says, a thing is what it does. As I say, a thing is what it is observed to do. It is observed to "do" this thing in the instant that it is distinguished as doing so in the eyes of the historically situated observer. In other words, the act of observation effects the distinction of what is affirmed to be distinguished. From such a "prejudiced" initial act of distinction, all else can be derived, including history and science (Spencer Brown 1972). In other words "recognition" (ie. "witnessing" an event as being part of a temporal sequence) does not entail an ontology of temporality. It only requires the ontology of the observer in consensuality.

The above statement is I suppose quite radical, but fully consonant with Maturana's neurophysiological investigations, and also his theoretical reflections. Heidegger, Merleau-Ponty and Foucault have pointed in this direction, but largely been ignored in the contexts in which management science deals with and claims its operational wisdoms.

In bringing forth the notion of real-time, the domain of concern is the linguistic coupling of human components in a consensual domain, as they presently orient in respect of it, rather than the laying down of plans or the analysis of a state of affairs that will be acted on in future.

This isn't to deny historical antecedents and consequences. It's merely to recognise that such a historical trajectory (the observed dance of events along a temporal axis), has nothing to do with cause and effect, except as such a relationship is indicated by the observer in his/her historical present. This lies at the core of "real-time". It is not that the observer is trapped in subjectivity from grasping the objective, unfolding course of history, and therefore peers out at such a Reality through biased spectacles (ie. the conventional, non-hermeneutic implication of the word "prejudice").

In other words, history is not an unfolding dimension of Reality, but is a dimension of consensuality which enables a particular quality of orienting between observers. In respect of the biology of cognition, this distinction between transcendental and constitutive ontology applies to all areas of "knowledge", including physics. The scientific method is a model of consensual orienting rather than the means of describing or approaching some Truth. The concrete effects of science and technology, such as particle accelerators, space rockets, computers, and indeed the written word, all demarcate regions of consensuality. They open up further research programmes which are laid down in novel linguistic series, hypotheses, conditions for witnessing the testing of such hypotheses, and validation (acknowledgement of witnessing). Without such dimensions of

consensuality there is no science, no proof, no witnessing, no history, no realities.

Such regions or dimensions of consensuality, never point at, nor do they need to point at in order to secure their positivity (ontological grounding in respect of a community of observers), some underlying physical or metaphysical Truth or Reality. Merely, yet crucially, such regions of discourse indicate the means by which human individuals experience their own dance with all that is, in the course of their own natural drift (ie. in their cognitive space). In the limit, every individual brings forth unique consensual configurations as s/he orients in respect of other individuals.

4.5.3 Implications

All the forgoing applies to any interaction of human beings in terms of a consensual region, including the case of the consultant and client. The interesting question is what to do with this insight. The point being that all historical happening is in the ongoing present moment, and it resonates historically to the degree that it is "heard" or "witnessed".

These points in respect of real-time lead us to several crucial conclusions in respect to interventions which are attempting to follow the guidelines laid down by

managerial cybernetics. These general conclusions should provide the corollary to the more specific issues brought forth in my discussion of language and the VSM (Chapter III).

1: The consultant doesn't stand apart from or outside of a situation of concern. This is a similar point to that made by Checkland's Soft System Methodology (SSM - Checkland 1981). The consultant is engaged in the situation, in terms of which s/he becomes a constitutive element (a structural part).

2: The structure which the consultant is engaged in, realises the system-of-concern along a dimension which is orthogonal to that of the original system. The consultant, in other words, is not engaged in the sort of circular sequence suggested by SSM.

3: The "appreciative system" entailed in the intervention, structurally intersects with the existing social enterprise by altering the bodyhood of one or more of the structural elements of that enterprise.

4: Bodyhood is engaged in the course of languaging which is attended and "heard" by the listener. This is not a matter of rationality or traditional logic (Chapter II). Once more this is a crucial difference between the cybernetic methodology and SSM.

5: The consensuality entailed in managerial cybernetics, demands putting objectivity in parenthesis, and the witnessing of this (ie. it must be attended). The involved actors appreciate that their own "problem situation" is not located in an objective domain, but is brought forth or constituted by an arbitrary set of indications.

6: Such an "arbitrary" set of indications is hermeneutically lodged. In other words it is not floating free, but is historically situated (ie. prejudiced - Gadamer). The "punctuation" of the problem situation, to use a technical term from psycho-analysis, is enabled upon the realisation (ie. seduction) by the involved actors, as to their own historical situation as effectors of history (eg. Gabor's "inventing the future").

7: This entails the embrace of a constitutive rather than a transcendental ontology.

8: In managerial cybernetics, the VSM as a consensual term is a trigger for the orthogonal interaction of the consultant in the process of languaging with the involved actors. Granted the real-time involvement of the consultant's own engagement, we can see that the consultant's consensuality includes the VSM as a particular set of linguistic terms in terms of which s/he orients (Chapter III).

9: In this description, the VSM has no grounding in any objective Reality, nor does it point at a domain of Objectivity (ie. objectivity outside parenthesis). The VSM secures punctuation of the problem situation, but punctuation according to the logic of a particular consensual domain. By definition, this consensual region is not yet shared by the involved actors, else they would have already been using it and have either discarded it as useless, or secured satisfaction in terms of it.

10: Just as this consensual term (ie. the VSM) is a handle for the consultant in effecting orthogonal engagement in the problem situation, so, if the intervention is effective, it becomes an effective handle for the actors in their ongoing consensual flow in respect of their indicated areas of concern.

4.6 Discussion

Real-time doesn't involve some magical way of overcoming the constraints of history, and existing in simultaneity. In the words of Bill Powers, real-time concerns the manner in which our behaviour controls our perceptions in a closed dance. Higher order reference signals are all the time compared with lower order signals entering the nervous system, and either reference signal or behaviour must be altered if existential coherence is to be maintained (Powers 1973, 1988). Natural drift (Maturana and Varela 1987) or viability (Beer, Espejo), is then seen as the homeostatic dance of the set of comparators at all levels in the system, as it maintains its status as a structural determined, organisationally closed composite unity in an environment.

4.6.1 Adaptation

This is not the same as saying that the key to natural drift is maximal adaptation to changing events, often claimed to be the best organisational strategy indicated by certain interpretations of Darwin's theory of natural selection. Adaptation is a reactive concept, and owes its consensual origins to notions of process wherein the temporal trajectory was understood to dominate the spatial dimension. It required the consensual bifurcation introduced by relativity theory, quantum mechanics and the contemporaneous

emergence of ecological insights, for systems discourse to break free from this hegemony of history, and return the asymmetric complementarity provided by the spatial axis. Adaptation does not entail real-time. Natural drift as viability, concerns the dance of structurally coupled, nonintersecting phenomenal domains (systems) in real-time.

The insights and discourse of managerial cybernetics concern involvement or engagement in the process of observation or distinction, which entails the complementarity of the notions of time and space. This complementarity is no abstract principle, no transcendental category which grounds the human experience and dictates the laws of physics. Engagement is no passive, reactive fatalistic stance, but in the domain of human consensuality is affirmation of the positive distinctions entailed in the persistence of natural drift. This is the hermeneutics of distinction.

To return to the role of the consultant, we discover that s/he does not relate to the problem situation as the expert standing apart analyses the system-in-focus. The consultant does not treat the existing system as some Objective entity, pursuing its own trajectory and hence available to expert regard for commentry and advice. The consultant does not adapt to the approach of the client.

4.6.2 Orthogonal intersection and autopoiesis

The consultant's role is to plunge him/her self into a constitutive relationship with a novel system, structurally coupled to the problem situation, but in a dimension orthogonal to it, and thence to trigger organisational changes by enabling the situated actors to bring forth a different reality.

When this orthogonal structural interaction is not recognised, the social enterprise is likely to be granted autopoietic status (6.3.3). In other words, it is granted an ethos and a character of its own, a momentum and inertia in respect of which its structure is observed as constituted by a set of actual observers and the relations between them, and attributed less importance than its own self-production. This is equivalent to Beer's "pathological autopoiesis", though Beer's original identification of "pathological autopoiesis" did not hold this implication (Beer 1979). His analysis implied that the pathology concerned the tendency of certain social organisations apart from System One of the System-in-Focus, to strive for their own self-production, rather than being perceived as servicing their System-in-Focus.

However, any social form held to exist in or for itself, is pathological in terms of its human structural

elements. For one simple reason - every formal social apparatus (eg. family, state, church) only exists to serve its human components, and to enable the relations between them. When social forms are not perceived in this guise, they are brought forth as pathological.

Pathological autopoietic social forms are social categories abstracted from real-time, and not viable. This is not to say that they may not persist. Recognition of such pathology, is made visible in a consensual region, by the indicated social system not being available for orthogonal structural interaction with non-organisational elements. This is a commonly perceived social phenomenon, not at all an academic abstraction. It is to be witnessed by the claim for Objectivity outside parenthesis, in respect of organisational identity. This claim may surface in a variety of linguistic forms. Examples are "sanctity of State", "mankind", "universe", "the purpose of this firm is to produce ball-bearings". Such claims appear legitimized by Beer's statement that "a thing is what it does", which is why "enabling technology" doesn't fully endorse Beer's insights (Chapter VI and VII).

In practice, what happens in terms of consensuality is quite straightforward. A phenomenon which in point of fact is distinguished by the observer as a composite unity, and thence may be unfolded in terms of organisation and

structure, is instead indicated as being a simple unity alone (6.3). As a simple unity, it is not structure determined, and thus is unavailable for orthogonal structural interaction by elements that are not confirmative of it in its own phenomenal dimension. In other words, it has come to be treated as a closed system. Among other things, such a system is not approachable by the scientific method.

In the context of an actual social intervention, it is easy to recognize the autopoietic system by the fact that the client "knows" what the problem is, and asks the consultant the sort of questions that Heinz von Foerster has called "illegitimate questions", meaning that the questioner already knows the "right" answer, and is only seeking confirmation of it. Such an approach to problem situations, closes the situation off from learning, denying the system its quality as a composite quality, and hence its availability to be observed as structurally coupled to an environment. In effect, this entails the refusal to grant a system natural drift.

In such situations, the consultant's duty is clearly to deny the closed nature of the problem situation, even if by doing so s/he could satisfy the illegitimate questioning of the client for the time being. Before anything else, the punctuation must entail "breaking open" the perception of the problem situation for the client, thus constituting a

composite unity whereas hitherto there has been a simple unity, and bringing forth objectivity in parenthesis where previously there has been Objectivity. Only then can the intervention proceed. If this initial punctuation is not successful, there is no orthogonal structural coupling and the intervention must be terminated.

To pick up the discourse of this section once more, in order to stand any chance of being effective, punctuation must itself launch a real-time structural relationship of client and consultant, a relationship which constitutes a problem system intersecting with but orthogonal to the client's initial system-in-focus. Without such structural coupling, the notion of organisational closure degenerates into that of a closed, self-confirming system.

4.7 Conclusion

This chapter has explored the logic of cybernetic intervention from the perspective of the concept of real-time. In order to bring forth the author's own insight into this concept, several different discourses and linguistic terms have been threaded together, and the focus has not at all been trained on the problem situation itself.

This has been at least in part because in my own interpretation, discourse of managerial cybernetics does not grant an Objective existence to a "problem situation". This point is sometimes misunderstood in interpretations of Beer's work, because Beer has not always situated the observer within the logic of the VSM, and sometimes it appears that the "Viable System" might stand alone, independent of the constitutive function of the observer. This sort of interpretation leads to grave difficulties in understanding and utilizing the VSM.

One of the ambitions of this thesis, is to demonstrate that discourse about managerial cybernetics is recursively self-referential, and that you cannot casually "cut out" a particular term or series of terms and expect the consensual logic to hang together. The notion of real-time permeates the fabric of the consensuality of managerial cybernetics, granting its configurations the shapes and eddies

that constitute its own peculiar qualities and characteristics.

The thrust of the chapter has been to shift the "identity" of the discourse of managerial cybernetics, away from the positivism that formed the grounding for Beer's own early work, towards a hermeneutic understanding. In other words, the VSM is portrayed not at all as descriptive of some reality, but as a term of consensuality which finds its own positivity only in terms of that consensuality, and not at all from the vantage of some pseudo-objective criteria of success and failure (3.8).

One final comment on the notion of the VSM as a term of consensuality. Strictly speaking, as already mentioned above, no consensual term exists outside its own consensual horizons. Given the consensual domain, the terms gain their own positivity, and without this consensual domain, the terms do not exist as terms of this region of consensuality. In other words, a consensual term emerges in its positivity as a snapshot of a particular configuration of consensuality, which may then be recognised and utilised as an handle by the observer who finds him/her self orienting in terms of this domain of consensuality.

While it is permissible to make the point that the relation between term and consensual domain is reciprocally

constitutive, in that neither exists in this particular positivity without the other, for the observer, the "empty" term can float across a variety of consensual domains, and does so in the normal course of events (3.7.1). Thus the word "red" may signify "letter box" or "communist". And so on. The VSM is no different, except in being a more complex term or set of terms.

In other words, the VSM might readily appear as a linguistic term in a variety of consensual domains, and indeed has done so (eg. the intervention in Chile compared with that in Uruguay; also the editor's comments and the separate contributions in Espejo & Harnden eds. 1989). Nothing intrinsic to the VSM itself determines its ontology as constitutive of a particular consensual domain. An "understanding" of the VSM does not stand alone. The VSM will always be understood in terms of the consensual horizons in which the observer grounds it, in the course of his/her coordinations of actions.

This whole thesis can be viewed as an attempt to bring forth and make visible a particular consensual grounding in terms of which the VSM will be understood as one particular explanatory mode. At this place in the thesis, the claim is being made that the VSM must be lodged within the horizons imposed by the notion of real-time in order to be recognisably a constitutive term in managerial cybernetics.

V THE LOGIC OF CYBERNETIC INTERVENTION: INVARIANCE5.1 Summary

Language might be described as the braiding of a common fabric for linguistic terms, which facilitates consensual coordinations of actions through enabling the intersection of otherwise nonintersecting phenomenal domains, in the bodyhood dynamics of the observer. Such a grounding for linguistic interactions (ie. for languaging), does not dictate the manner of structural realisation of any one social or cultural form, but does lay down the subset of relations (ie. the organisation), in terms of which a community of observers find themselves able to engage in languaging processes. Thus is made possible the immense structural variety of social and cultural practices. In other words, such an organisation provides cognitive horizons to the proliferation of such culture-types.

The explication of "organisation structure" in the VSM, indicates a similar level of abstraction. To talk about the particular structural realisation of a social system (ie. its actual components and their actual relations), is not the same as to talk of organisation structure. What the model

provides is a template for talking about one particular form of organisation. It does not point towards (ie. denote) one particular actual structural realisation of social system. It allows clean epistemological accounting concerning these two dimensions of discourse, enabling their orthogonal intersection in the bodyhood of the observer of them.

5.2 Introduction

One of the most controversial statements of managerial cybernetics, concerns its claim to enable the handling of complexity. In the most general terms, opponents treat such a claim as indicating an ambition to reduce the "natural" variety of things; advocates sometimes appear to confirm the thrust of this view, by "collapsing" managerial cybernetics into the control mode alone.

This chapter will situate the phenomenon of invariance in everyday consensual practices. This is intended to answer critics and aid understanding, by making visible the universality of invariances as the framework in respect of which human beings are able to coherently and flexibly interact in a linguistic and social context. Once more the shift will be away from positivism towards hermeneutics, while attempting to keep hold of the methodological strengths of the insights of Stafford Beer and Raul Espejo.

To reiterate a constant theme of this thesis, my intention is to redress a particular weighting in interpretations of Beer's work, and to myself provide an instance of the historical development of a body of knowledge, rather than to unfold an epistemological analysis of the consistency or truth of such a trajectory. Thus I will be seeking to bring forth a particular understanding of "invariance" in the context of a hermeneutics of distinction.

5.3 The Problem

We might speculate, though somewhat illegitimately, that a universe without the observer would in effect be formless (Jung 1967; Maturana 1970). This however, indicates nothing about such a universe, while suggesting volumes about the observer. The observer "arrives" in a consensual domain as a languaging being who makes indications and effects distinctions. A particular universe only "arrives" consequent on the distinction affirmed by an observer. The significance of language in a consensual domain, is that consensuality itself emerges concomitant with the indication of invariance entailed by the orienting of individuals in a community of observers, in respect of linguistic terms whose function is to stand as tokens for the events to which they are held to refer (See Chapter III).

For example, let us consider an interaction in either a conceptual or social space in respect of the linguistic term "stone". "Stone" is only effective as an orienting term, to the degree that it resonates across a whole range of instances or associations in a consensual space. As such a term, the word is a token which, as other linguistic operations are performed upon it (eg. "This is the stone"), increasingly obscures any instance of stone (3.4.1). In other words, the term's consensual usefulness is an inverse function of its proximity to an actual "Ding in sich".

Consensual efficacy or positivity, arises from the commonality or invariance phenomenologically lodged in the activity of languaging. Consensual commonality constitutes coordinations of actions enabling recognition of recurrent practices, as the natural drift of the human observer is mediated by languaging. This point was made by Ross Ashby in his discussion about regulating very large systems and the amplification of regulation, although the focus of his concern was somewhat different (Ashby 1964). Ashby's intention was to look at variety and regulation, having "bracketted" the observer. My own intention, as Maturana's, is to look at the observer, having bracketted reality. However there is no intrinsic contradiction in the twin dimensions of discourse. Merely, the focus is different.

This sort of consensual commonality obscures any "actual" stone, because the observer cannot point to it as a stone except by entering the indicated phenomenon into a consensual field as an orienting term where it may be recognised or witnessed as such, and "fit" the domain of consensual coordinations of consensual coordinations of actions. In other words, the stone itself arises as an object in language (Maturana 1988b). What is witnessed, is the indicated linguistic token in a consensual field, even if the orienting between observers concerns a concrete instance of stone. This means that as a linguistic term, its significance has been "wrenched" from its object source, and has arrived

as a linguistic token in a consensual field which "replaces" (in the sense of curtains) its source.

This token can be dealt or played with in a linguistic field of operations, and as such it is an object. As a linguistic term or token in a field of consensuality, yourself and I can mutually orient in respect of it in a recurrent (ie. meaningful or significant) manner. Else there is silence. This process of "consensual coordinations of consensual coordinations of actions that obscure the consensual coordinations of actions that they coordinate" (Maturana 1988c), is fundamental for consensual positivity. This includes the eruption of historical effects, such as the emergence of culture and knowledge, or the building of space rockets, computers, hospitals and all else.

In effect, this is the constraint indicated by Ashby's "repetitive disturbance" (Ashby 1964). Such a repetition (ie. indication of constraint), says nothing about the world "out there", but does speak about the relation between observers in respect of the system they indicate (Ashby 1964: 61). What Maturana has done is to situate such observers in the historical trajectory of a community of observers, and consider the implications of such a historical and social grounding in respect of their actions.

The characteristic of "consensual domain", lies in enabling the orienting of individual observers in respect of one another, as they "pack out" the consensual space which they are constituting, rather than learning about some external universe. This packing out does not mean pointing towards Reality or Truth, but is the recursive unfolding of terms of consensual interaction, whether these are thoughts or light-bulbs, which increase potential for orthogonal structural intersection in the bodyhood of the observer, of nonintersecting phenomenal domains (eg. "thoughts" and "lightbulbs"). The singular thought or light-bulb (strictly speaking a contradiction in terms, as any thought or light-bulb will be consensually situated in its field or context), gains singularity by its situatedness relative to a consensual field.

The "use of" either thought or light-bulb, whether in one person's head as reflection or in a community of observers as part of a conversation (including the case of mutual orienting in respect of a physical instance, such as you threatening me with a stone), consists not in seizing the singular instance and illuminating it in its uniqueness, but in threading the entailed operational disturbance to an already established associative series in respect of which it can effectively resonate. Such a series or field of commonality, is the braiding together of an invariant subset of linguistic relations, the practical consequence of

which is to enable the individual observer to affirm a reference signal for the acategorical happening of life (his/her changing bodyhood). This subset of expression or linguaging ("conversation" as in Pask; Pask 1975), is intrinsically and by definition of lower variety than the mode of experience itself.

This point is sometimes overlooked in our handling of language, notably in versions of the mirror-image picture of the relation of our words and cognitive processes with nature (see discussion in Rorty 1980; Krippendorff 1989). Such insights naively suggest that the complexity of nature can itself be brought forth in terms of our linguaging of it. Two assumptions tend to underlie this point of view:

- 1: language is itself a neutral "window" or "mirror" of all that occurs, and imposes no constraint of its own on such "natural" happenings in our description and perception of them; and:

- 2: the world or else our innate conception of it (depending on the entailed perspective), comes already packaged in "natural" classes, such as "oak trees", "nations" and so on, which it is our duty to grasp, uncover, discover.

This is an ancient and honourable philosophical problem, one which I am not going to dwell on. I have highlighted it in order to describe my own way forward.

From its earliest days, cybernetic discourse suggested that any invariances that are perceived to exist by the observer are a function of the relationship between the observer and that which is observed (eg. Ashby 1964; Beer 1960). Notably in cybernetics, the notion of "system" itself emerged out of the distinction of commonality across phenomena as a consequence of its indication by an observer in a community of observers, rather than being some "thing" discovered in the natural world.

Almost thirty years ago, Beer wrote:

"What after all is order, or something systematic? I suppose it is a pattern, and a pattern has no objective existence anyway. A pattern is a pattern because someone declares a concatenation of items to be meaningful or cohesive. The onus for detecting systems, and for deciding how to describe them, is very much on ourselves. I do not think we can adequately regard a system as a fact of nature, truths about which can be gradually revealed by patient analytical research. A viable system is something we detect and understand when it is mapped into our brains, and I suppose the inevitable result is that our brains themselves actually impose a structure on reality." (Beer 1960: 7-8).

Such a definition of system has been carried further and more explicitly unfolded, in the literature of second order cybernetics, but is not at all the norm of "systems" discourse. Some have said that there is no pattern, but merely an indefinable sense of agreement which is continuously brought forth in the present - an "appreciative system" (Checkland 1981; Vickers 1983). Others would say that the pattern is the expression of a more global consciousness or Mind (Bateson 1972, 1979; Teilhard de Chardin 1959; and most of the literature from an ecological viewpoint).

In second-order cybernetics, the emphasis has changed from its expression in the passage I quoted from Beer above. In this more recent, unfolding tradition of discourse, the focus is no longer on the invariances imposed or captured in the relation between observer and observed, but upon the invariances which serve as the framework to enable the human observer to orient in respect of language in the domain of experience (eg Maturana 1978; Pask 1975).

In the most general terms, the ironic thing about a "systems" standpoint, as distinct from a cybernetic one, is that in its striving to make systemic complexity visible, the systems' view often loses sight of the most important constitutive element of any named system - the observer who indicates it in respect of some set of consensual expectations. After all, it is the observer who is postulating the existence of "system" in the first place.

Not that such an observer "points at" such a system in the real-world, but that the observer effects his/her distinction according to a predisposition or passion, braided within consensual horizons. Discourse frequently unfolds as though a system might be talked about, described or indicated in the absence of the observer doing the describing, as if one could "stand outside" the indications in terms of which one's distinctions are effected.

The thing about Beer's description of the process (above), is that he takes the physiological basis of the nervous system as given in its relationship with the environment, and appears not to recognise that such a relationship in respect of the human observer, cannot but be mediated except through the use of linguistic terms in the process of languaging in a consensual space. He currently accepts that there is a lacuna in the VSM in respect of the observer (personal correspondence).

The result of this oversight concerning operational inclusion of the observer in systems' discourse (including Beer's own), is to gloss over the fact that invariances can only be witnessed as a function of linguistic indications made by observers in a community of observers in the course of recurrent interactions. When this understanding is absent, "system" is granted Objective legitimacy as the phenomenon which determines the horizons of any derived invariances. For

example, from the perspective of a hermeneutics of distinction it is the granting of autopoiesis to a system by the observer that has such concrete consequences, rather than the grasping of the fact of autopoiesis "out there" (Mendez, Coddou, Maturana 1988). It is insightful to compare Mendez et al with the discussion of autopoiesis between Fenton Robb and John Mingers, who both adopt the explanatory mode of Objectivity (Mingers and Robb forthcoming; 6.3.3).

Such a "pathological" autopoiesis is one way of understanding some of the less benevolent effects of the discourse of the "systematizers" of the late eighteenth and early nineteenth century, as they brought forth apparently autonomous systems of finance, population, history, philosophy, biology, sociology, thermodynamics and so on (in this respect see the discussion of issues such as race, intelligence, gender and nationality which bound the individual as "subject-object" into an all-pervading disciplinary matrix, in such works as Foucault 1979, 1980; Gould 1978, 1981; Illich 1982; Wallerstein 1983).

In such a mode of systems thinking, the system itself tends to "float" acategorically, becoming an invisible constraint or grounding for rationality, and leaving no space for the individual observer to be anything other than confirmatory of it (see my comments on "systems" - 1.2 and 1.3.2). Epistemological commentary and revision dominate. A

similar tendency in the discourse of Beer and Espejo, leads the student or other interpreter of their insights to search for "systemic" invariances in the "real world", in order to be able to manipulate and implement them. The analyst then inexorably tends to reinforce the organisation of some existing system which s/he continues to bring forth by giving witness to it, instead of enabling a novel organisation to emerge as s/he is structurally coupled to the existing system but in some dimension orthogonal to that which is confirmatory of it. Confusion prevails between a search for coherence, and the orchestration or bringing forth of some novel coherence.

The alternative operative mode being offered presently, has concrete consequences to such ways of interpreting systems thought. Instead of the system-of-concern being discovered by being abstracted or isolated from a tacit environment, to which one of the purposes of the intervention will be to return it, system or anything else "arrives" consequent on indication and distinction by an observer who finds him/her self folded into relations with both outside and inside of it (Spencer Brown 1972).

Any derived invariance in respect of the organisation of that which is being attended to (ie. its recognisability in the course of some recurrent interaction by

the observer), inherently "fits" a perspective wider than a closed or circular logical frame marked by the named area of concern. It resonates in a context for as well as marking out the content of, the indicated system.

What this signifies can be clarified with reference to hierarchy theory. Insights developed from the biology of cognition, refuse to attribute logical precedence to a particular hierarchical level. Any play of perspective, any hierarchy, is lodged in the indication entailed by an act of distinction, and itself expresses a consensuality which indicates particular cognitive horizons. This is so at any level of resolution, including the case of the observer who indicates planet Earth. An indicated eco-system has no more claims to Objectivity than any other named system.

Thus, hierarchy theory is not seen to entail claims of precedence for any one "level" or focus of attention, a point highly relevant for an understanding of the claims by Beer for the non-hierarchical status of the VSM. The "fact" that deprived of a certain atmospheric mix humankind will perish, says nothing about some transcendental ontology in the sense of some objective standard of primacy, though it evidences one particular constitutive ontology in its indication. Such a notion arrives or emerges historically as a "fact", in a particular consensual region (western, scientific, rational), and would not be indicated by an

observer as such a "fact" outside the terms legitimised by this region.

Just to dot the i's and cross the t's - the indication of any system, carries within it invariances distinguished by the observer, at a metalevel or orthogonal to the indicated system. Such is an operational constraint of the consensual and cognitive domains. No thing can be described as separated out from another (ie. distinguished), except that the two are indicated, whether consciously or unconsciously, as inhabiting some domain already transfixed by invariances constituting the consensual space of the observer, including the case of "system".

A hermeneutics of distinction makes visible that it is the focus of indication by an observer which demarcates the area of consensuality being granted priority in the moment. This focus never pinpoints or highlights a singularity in a void, nor its alter ego a transcendental Objectivity (both vitalist reductions - Maturana 1978), but opens up a cognitive play of recursive relations which will be interrupted or punctuated according to how it is attended by the observer in the course of consensual flow. Such an indication is never arbitrary, but is part of the trajectory of a whole series of "regulators" (as in Ashby, above) - ie. history. Notions of hierarchical relationships unfold as a result of this cognitive and consensual dynamic, and take

their "apex" as a consequence of the manner of their being attended by the observer.

Unless "system" is explicitly being used to indicate "that of which we cannot speak", then it has already been granted an identity which can be studied and commented on, however complex and indeterminate its details. Such an identity is distinguished from the background in respect of which it is attended to by the observer as this system and not that, and in terms of which it "makes sense" in the context of operational exigencies to distinguish it. This background resides at the same logical level as that which has been abstracted from it - just like the piece that has been taken from the jigsaw. Were it not for the perceived totality of the jigsaw, we should not hold up the piece as a piece.

To put it another way - the piece specifies the jigsaw for which it is the piece in the eye of the beholder. This is the cybernetic presentation of hierarchy theory as I interpret it. If we indicate "eco-system", we in the same move specify its own "jigsaw", in terms of which it is itself a "piece", just as much as if we had attended a single gazelle. Now the crucial point is that even as we specify such a medium for that which we have distinguished by our indication of it, we obscure the actual niche which that phenomenon itself specifies in the course of its own

structural drift. As with the example of "stone" earlier in this section, it is precisely this "curtaining" of any objective reality, which is vital for the emergence of consensuality (3.4.1; 5.3).

The actual "mark" we make and the objects we bring forth (ie. the distinction effected), never escape history or "float free" from consensuality. In respect of my own consensual horizons, "ecosystem" implicitly brings forth other planetary systems and cosmological phenomena, while "gazelle" brings forth the class of all gazelles, the herd, animals or whatever system my indication finds its consensual purpose bedded within. The fact that "eco-system" is accorded a "meta" label according to one particular convention (ie. as the horizon for living systems), signifies no fixed truth transcending consensual horizons, but merely once more constitutes a region of consensuality. How the usage is expected to be witnessed by the observer, indicates the pertinent consensual domain.

When a piece is separated out from a jigsaw, both have to inhabit an intersecting operational domain in the eyes of the observer who is doing the separating out. Else, quite simply, they remain nonintersecting phenomenal domains, and their separation is not an issue. As far as the observer is concerned, nothing is finally and absolutely nonintersecting with any other thing. Intersection and

nonintersection are cognitive relations, granted positivity by acts of distinction. This is the significance of objectivity-in-parenthesis. Inclusion and exclusion are a play of cognitive and consensual activity (Spencer Brown 1972). The totality of what exists in respect of any one observer, is the cognitive space of that observer, and the historically-situated cognitive space provides at any instant the background or substratum in respect of which indication and distinction gain their contextual grounding. In the case of the human observer, such a contextual grounding is largely though not totally consensually lodged.

What, then, do I mean by "situated at the same logical level", or "inhabiting the same domain"? Why is it that the "piece" is not "less than" or "other than" the totality of the jigsaw? Where does "invariance" come in? The piece has no objectively given place in the jigsaw. Take away the "programmed" observer, and the piece will not be found to "fit" the jigsaw (eg. observe the very young child). The jigsaw will only be found to have a piece missing, by the observer's indication of it in a consensual domain, within which both jigsaw and piece are witnessed to relate in a particular constitutive manner which is confirmed in the course of experience.

In other words, piece and jigsaw realise their potential for completion of one another, by the constitutive

closure provided by the observer in consensual interaction. Else, completion is absent, and in so far as the two phenomena are still observed to exist, they "slide past" each other. Such an observer doesn't peer out into some Objective world in which piece and jigsaw have an immutable partnership. S/he "attends" the phenomenon and secures completion in respect of his/her own cognitive or consensual expectations. This is the gestalt experience.

Gestalt demands that indication of the "empty" corner carries within it the indication of the square (ie. lines that meet at right angles). Were it not for this invariant or commonality, no gestalt experience would occur. Indeed, were it not for such experiential commonality in consensuality (a square is after all a linguistic term in a particular consensual domain - see Rorty's comments on pythagorean relationships: Rorty 1980), no distinction of phenomena at any level would arise. Cognition, however primitive or complex, depends on this constitutive fact for its ontological grounding.

I am arguing that such dense networks of invariance already embrace (ie. regulate, as in Ashby) the relation between the observer and any social system. The focus of any science of complexity is then seen to be upon

"representations" or "models" of particular slices of social reality, as these linguistic terms consensually coordinate our consensual coordinations of actions. This is in distinction to attempting to peer outside a consensual region and "seize" the objects, which after all themselves arise as consensual coordinations of consensual coordinations of actions that obscure the consensual coordinations of actions that they coordinate.

5.4 Control

There might be some who don't follow my way forward, or who feel the need to protest that invariances are surely in the world "out there" or else don't exist at all. This concerns control, for what we feel impelled to protest is that there must be invariances "out there" in order for us to achieve control through our detection of them.

Linked with this conventional "common sense", is the accompanying theme that language emerged partly as the means to capture or match such "natural" invariances. However, the emergence of consensuality can be seen as concomitant not with proliferation of variety "grasped" or "uncovered" in the natural world, but with proliferation of the invariances entailed in the use of linguistic terms congruent with the experience of recurrent interactions. To be more accurate, it is better understood as evidencing the proliferation of the variety of linguistic invariances. The invariances which proliferate, far from capturing natural variety or indicating some class of transcendental invariances (eg. Platonic Forms), actually obscure that to which they are consensually held to point at or represent, as the recursive play of descriptors unfolds (tokens standing for tokens standing for tokens.....: 3.4.1).

We tend to be seduced by the notion that "progress" or "civilisation" is indicated by the increased facility to indicate and name details of the order of things (assumed by Francis Bacon when he set about compiling his "encyclopedia"), and that this gives evidence of our control over such "uncovered" phenomena.

The explication of the "hypothetico-deductive" method amply displays the fallacy of such a view, readily available for assiduous students of the history and philosophy of science, and indeed, most natural scientists themselves. However, it is rarely made clear that the distinction of any phenomenon, whether gene, sub-atomic particle or psychosis, emerges as a result of the control effected not by the discovery of specifics (eg. a gene, a sub-atomic particle or a psychotic), but by the indication of a class as it relates to an already existent domain of consensual coordinations of actions (ie. "gene", "sub-atomic particle" or "psychosis").

The languaging of human observers, is not a matter accreting terms-in-use in correlation with the discovery of "bits of" Truth or Reality, but of increasing recursions of "consensual coordination", which increasingly obscure the actions which they coordinate (ie. consensual coordinations of consensual coordinations of behaviors).

"Progress", as instanced in the development of our languaging, is not a matter of increasingly detailed representations of and control over nature, so much as increased facility for dimensions of recursive relations which enable us to orient in respect of one another in more flexible and varied ways as the origin or source of the so-called "natural" relations we claim to be orienting in respect of is increasingly obscured, and as the potential for our bodyhood to be disturbed by orthogonal intersections of otherwise nonintersecting phenomenal domains, increases.

The selective "success" of such enhanced flexibility and dimensions of consensual orienting, will be witnessed historically by the continued "fit" of a community of observers, in respect of whatever phenomenal orders are considered significant by the observer doing the witnessing. For example, it is quite likely that at this point in history, the human observer will make his/her indications coloured by ecological factors such as pollution. It should be recalled that pollution itself is no absolute - "one man's pollution is another's joy". The greatest "catastrophe" or greatest "advance" in earth's history (depending on the perspective), came when the atmosphere turned from being dominantly carbon dioxide to an oxygen mix (Jantsch 1980). Obviously, from the point of view of the emergence of life as we know it, the event was an advance.

5.4.1 Consensus and consensual

The following distinction is my own, and Maturana strongly disagrees.

"Consensual" does not carry the same semantic implication as "consensus". Where "consensus" signifies "general or widespread agreement", referring to a collective opinion (Collins Dictionary of the English Language 1979); "consensual" has two primary usages, the one in law ("existing by consent"), the other in physiology ("(of certain reflex actions of a part of the body) responding to stimulation of another part" - *ibid*). Specifically, "consensus" is epistemologically lodged, pointing towards the goal or source of the agreement. "Consensual" is ontologically lodged, concerning the bringing forth of particular states or processes in themselves.

Thus, "consensual coordination of consensual coordination of behaviour" has nothing to do with "consensus" as commonly understood. It concerns consensuality - the orienting of the observer in a community of observers, within the horizons of a consensual domain that is marked by the dimensions of orthogonal intersections of nonintersecting phenomenal domains, taking place in the bodyhood of the individuals who structurally realise such a domain in the course of their linguistic interactions.

Consensuality, in the present context and indeed throughout this thesis, concerns not just language as literature, art, conversational interaction as is conventionally understood, but any interaction between observers which leads to bodyhood effects, whilst marking out some cognitive space - whether in the course of making love, war, doing science, mathematics, philosophy, building, plumbing, playing football or whatever. None of these "activities" intrinsically (ie. objectively) entail disturbing of bodyhood. Maturana seductively suggests that we consider "love" as a logical-type "bodyhood affector" (Maturana 1980a).

In other words, consensuality concerns any significant interaction between human individuals, in a field of understanding or conventions, as such a field is constituted by the individuals who orient in respect of it. Such conventions are not restricted to "drive on the left hand side of the road", but permeate the deepest and most intimate interstices of human social interaction - gesture, tone, emotion, interpretation and indeed, literally anything than you might bring forth in your own languaging.

It cannot be stressed too strongly that "gesture" etc. are not objective absolutes. They don't stand alone in a neutral light, but are always highlighted or brought forth in terms of the horizons in which they are situated (see eg.

Benedict 1935). Even emotions have no standards or norms transcending cultural horizons (eg. Heelas and Locke 1981). The oedipus complex, contra Freud, is no longer seen to be a universal, nor scientifically neutral (Deleuze and Guattari 1984).

Consensuality doesn't express, capture or concern specifics (ie. unique, acategorical happenings), but is the process of social orienting in which individual realities "bump into" each other in the moment attending the other in languaging, which enables the increase in scope for orthogonal intersections to take place in our bodyhoods.

This is not a matter of rational debate. The act of attending a reality other than one's own present one, concerns a weaving of linguistic commonality in a consensual "fabric" which enhances opportunity for increased dimensions of structural intersection. To return to the explication of the "problem" confronted by this chapter (5.3), no phenomenon - whether name, physical entity, system or whatever - arrives in isolation in consensuality. Any novel term erupts or surfaces in an already rich field of understanding, where it is ascribed novelty, or witnessed as novel, in relation to already existing conventions, and where it has an effect on all other linguistic and consensual relations as the observer orients in respect of them. Novelty isn't "reached out to" from a region of consensuality. It "erupts" as a linguistic

token within such a region, which is the significance of the physiological source of the usage "consensuality".

As previously indicated, this unfolding region of consensuality which is the human social domain, is not synonymous with Rationality, nor is it concerned with Reality or Truth. It is concerned with "communication and control", the at first sight incongruous pair utilized by Norbert Wiener for his subheading to describe what cybernetics was about (Wiener 1948). Because "communication" itself is so lodged in the rationalist tradition that is dominated by the mirror-image of nature (described by Rorty 1980: 1.2), the function of communication in the human social domain is frequently misinterpreted. It has conventionally been taken as signifying agreement or consensus about an objective field - either internally situated as logic (Truth) or externally situated as Reality (Truth).

In this Realist convention, "to agree" has come to be understood in its transitive mode - as denotively pointing at something. What is overlooked is that agreement might intransitively generate its own logic - a logic of coherence (Gregory 1987). To attempt to highlight the distinction between "consensus" and "consensual", let me mention two implications. We might speak of "consensual responsibility", implying impeccable consensual coordinations of actions. Conversely, we might speak of "responsibility to consensus", and we would be implying obedience to some convention.

The written and spoken "word" constitute but one dimension of languaging. Its selective advantage is to enhance the speed and flexibility of consensual interactions by packing out a more public consensual space than was hitherto possible. The enhancement of potential for dimensions of orthogonal structural interactions, is a consequence of the structural coupling of the human nervous system to a consensual domain. This says nothing about agreement.

5.4.2 Control as dance

How does this pertain to control? Control is not necessarily an aggressive, dominating activity, is not intrinsically control "over" something else. Ju-jitsu, the martial art, is a form of control which seeks to utilise the force of the aggressor in order to make sure that no aggression is initiated by its practitioner. Ju-jitsu is no less a form of control than the aggressive act which brings forth its response. Homoeopathy and acupuncture aim to bring forth the body's own mechanisms of defence, even though the details of these defence systems are invisible to the practitioner. The cure achieved by these practices, is no less an effect of "control" than the cure achieved by an attack on the visible site of the disease, which is the way of western medicine. But the quality of control effected in each case, subsequently confirmed by the ensuing operational practices of the patient, is radically different.

In short, control need not be a synonym for force, although it is often used as such. Control is to "ride with" the order of things, in whatever way one finds most effective in terms of one's own present expectations. It is to "fit" or "exist in a dance" with the phenomena which disturb one's bodyhood, by whatever "visible" (ie. behavioural) means happen to ensure the persistence of autopoiesis in the course of one's structural-determined natural drift (Maturana and Varela 1987; Powers 1973).

The aggressive action out of context, or the misplaced passive response, are both pathological in terms of autopoiesis. The dance is all. In other words, for the nervous system, behavioural rationality or coherence (ie. "fit") is not teleological. It is the observer who imparts goal or direction in terms of his/her own expectations, in view of perceived recurrences in the behavioural trajectory indicated as significant in respect of the field of interactions (ie. environment) attributed as relevant to the observed organism from the perspective of the observer.

The "dance" is not some mystical category, as it has traditionally been held. Or rather, it may be mystical but it's concrete as anything! The dance is a dance across, intertwined or braided with, the invariant mechanisms generated through consensuality. To reiterate - no "dance", no pattern, no meaningful linguistic term can erupt except in

the crossover of invariances in the bodyhood of the observer. As soon as you see "stone", you're tied into the system of torus' suggested by Gordon Pask in his "celebration" of the conceptual process (Pask 1987). You are threaded within some indeterminate but all-embracing system of association ("entailment mesh" - Pask). You are "hooked" into consensuality. If you don't see "stone", fine - you're just not hooked into consensuality in respect of it (even if you throw something and smash the greenhouse next door).

Invariance or commonality then, is the cognitive norm rather than the exception. We are not in point of neurophysiological fact bombarded with William James' "bloomin' buzzin' confusion", though indeed, the intimate braiding of our languaging with all other structural dimensions we are coupled with means that we are quite able to summon up cognitive "bloomin' buzzin' confusion", as any psychiatrist well knows. Further, due to the orthogonal structural intersection which defines our bodyhoods, bio-chemical imbalances are themselves able to "encourage" such a summoning up by our languaging processes (eg. hallucigants). However, such all-too well documented cases are not the norm of consensual existence, although their own foundations (eg. the double-bind) may grow out of such norms.

5.5 The Intervention

Discourse of managerial cybernetics, notably in its use of Beer's VSM, hinges on invariances. They are its "life-blood". I'm not going to follow the usual path of attempting to identify the particular structural invariances "out there" in "real" social enterprise, for the simple reason that I don't conceive of them as existing "out there". Instead, I will situate myself inside the head of the imaginative cybernetician (a little homunculus somewhat akin to Maxwell's demon), and attempt to make sense of the ebb and flow of the invariances which are the inevitable terms of consensuality.

I have already established that the emergence of the observer concerns bodyhood dynamics as a consequence of recurrent consensual interactions, rather than the proliferation of novelty per se. The logical thrust of this indicates that contrary to conventional wisdom, effective involvement of the consultant in a process of intervention, will entail the indication and distinction of invariances in the situation of concern (ie. recurrent patterns), rather than a discovery of its novelties. This is in line with the thinking of Beer and Espejo.

The crucial thing about such acts of indication and distinction, is that they occur in the explanatory mode of

objectivity-in-parenthesis (3.3). What is the implication of this for the intervention?

5.5.1 Variety of invariances

In the human social domain, "problems" emerge about the issue of the visibility of the variety of invariances, rather than as the result of the proliferation of variety. The crucial question when the matter is approached in this way, is whether such invariances are held to be invariant because they point to some final arbiter or Truth (Objectivity), or whether it makes sense to consider invariance with no such one point of reference (objectivity-in-parenthesis).

By definition, the observer in a consensual domain does not and cannot observe singularities. What frequently happens is that involved actors claim to experience or perceive singularities in their frame of reference. This is precisely the "proliferation of variety" which "variety engineering" sets out to redress.

The notion of "objectivity-in-parenthesis" has been fundamental to the hermeneutic endeavour, and is increasingly crucial for an understanding of Maturana's contemporary work. At first sight, objectivity-in-parenthesis might appear to be a runaway feedback mechanism to generate uncontrolled

variety. After all, clinging to Objectivity can be understood as a means of "making order" of things, knocking shape into a Baconian monstrosity of accumulating terms and objects which otherwise have with no rhyme nor reason for their organisation and classification.

What has not been explicitly recognised in the course of the triumphant march of western science, is that taxonomies, methodologies and theories, come to be seen as coherent and legitimate explanations, upon their being witnessed as such by other observers in the course of their own consensual flow, rather than through having "demonstrated" some matter of Objectivity. When this crucial role of "witnessing" is entered explicitly into the domain of scientific methodology where it already is implicitly lodged, then the problematic of knowledge appears very different.

Objectivity-in-parenthesis indicates a particular explanatory domain (3.3). It is a mode of determining linguistic interaction in a consensual domain, explicitly recognising the horizons of such a domain and refusing to make any claims outside these horizons. Specifically, the observer no longer puts on the hat of the investigator of one Truth, but instead adopts the role of consensual juggler, one who functions to bring forth new realities into a consensual space.

The embrace of the one explanatory mode rather than the other, has fundamental repercussions for the manner of orienting of the observer, who finds his/her distinctions situated in a context laid down by conditions entailed in such explanatory horizons. For instance, we discover Maturana making the statement that "The atom and the hydrogen bombs are cognitive entities" (Maturana 1988b), which only appears odd or confusing in the explanatory mode of Objectivity.

However, from the perspective of the explanatory mode of objectivity-in-parenthesis, things, objects, ideas, or anything else pointed to in our languaging, are all "explanations of the praxis of living of the observer bound to the ontology of observing" (Maturana 1988b: 51). This includes "god" as much as "pebble". The use of "god" doesn't highlight one Reality or Truth, but brings forth certain consensual coordinations of actions bound to a particular explanatory proposition about them. This is not thereby to diminish "god" as an explanatory proposition. But it is to deprive this explanatory proposition (ie. god) of any transcendental claims that set it above and beyond other explanatory propositions proposed by other observers whether about god or absence of god.

Objectivity-in-parenthesis beckons towards a constitutive ontology, the legitimacy of many realities instead of one (multiversa, instead of many perspectives of

one universum: 1.3.3; 5.5.2), and the distinction of operational coherences instead of coherences being affirmed according to reference to some final Truth. Lastly, it requires the context of a dense web of consensual invariances (ie. a fabric of recurrent interactions, explained as such), in order to stand outside a naive solipsist stance. Such invariances are what is entailed in an indication of consensuality (ie. language as operation in consensual coordinations of actions).

5.5.2 Multisystem and multiverse

In the context of this chapter, the important point is the notion of invariances as a fabric of recurrent interactions. I will attempt to explicate this by considering the different implications of Espejo's use of "multisystem" and Maturana's notion of "multiverse". This will help to indicate the significance of invariance vis a vis the intervention (Espejo 1987; Maturana 1988b).

Espejo appears to consider that a variety of perspectives, what he calls "viewpoints", constitutes a "multisystem" by focussing on a space or area which none of them can define or describe except as a "slice" determined by their own perspective of it. The consultant or analyst attempts to bring to light such a multisystem, in order to enable organisational diagnosis or to implement

organisational design. The domain or space of such a multisystem, is presumably a representation of sorts which would exist if we could but "extrapolate" from all relevant viewpoints until the lines converged.

One of the practical consequences of Espejo's view, is that he conceives of an expert system which, in bringing to light and capturing the different descriptions of various "viewpoints" (their individual perspectives), models the structure of a particular organisation according to the principals of the VSM (VIPLAN). Such a model does have practical use as a tool to orchestrate consensus. However, it is its status as a model that I want to consider at this juncture. Espejo appears to be suggesting the need to postulate the existence of "something", in order to "model it" (ie. he is in the explanatory mode of Objectivity, implying the utility of commentary).

From the perspective of a "multiverse" (Maturana), we never model that which exists, homomorphically or otherwise. What we do is constitute particular realities. According to how realities are "listened to", and thus how they activate bodyhood changes in the observer (including ourself) in the course of consensual coordinations of actions, particular changes in consensual configurations are brought about. This is consensual coordinations of consensual coordinations of actions.

Such configurations, are inherently coherent in terms of the community of observers which is constituted in the course of the orienting of individuals who are structurally coupled in respect of it. Else they would not have been brought forth and witnessed in recurrent coordinations of actions.

In this understanding, we don't require Objectivity even as a hypothesis, in order to build models or to otherwise organise and make sense of things. A reality, any reality, is never in danger of escaping or evading consensual reality. It has no need of some transcendental status (ie. Objectivity) in order to be effective. Just as there are as many individual expressions of reality as there are individuals, so there are as many domains of consensual reality as there are consensual domains. But the biological basis of language and cognition, means that none of these are adrift in a sea of existential contingency.

The crucial point about multiverse, is that it does not set humankind adrift in chaos by denying any underlying coherence or pattern. Instead, it makes explicit that understanding and cooperation are a function of the voluntary play of transactions between different realities, as these are brought into play in various domains of consensuality in the course of the orienting of individual observers in relation to one another in recurrent interactions. This play

is one of give and take, where the exploration is all and the answer is nothing, except as it presents further avenues of exploration.

The difference between multiverse and multisystem, is that the first embraces the constitutive function of the observer in a consensual domain, each observer bringing forth a particular reality braided to those of other members of the community of observers; while the second focusses upon some "social organisation" being constituted by different viewpoints. In other words, a "multisystem" presupposes a "thing" that is "systemed" into existence, even though Espejo stresses that such a thing remains invisible in its actual workings (for further comments on "multisystem", see 3.8.3).

5.5.3 Social domain as consensual field

It might well be argued that, after all, "social organisations" do have an existence of one sort or another, and that the individuals giving witness to them, "peer" towards where they exist, only from slightly different perspectives or vantages. However, such a view plays no part in my own insight into managerial cybernetics. There aren't any social organisations to peer towards, at least there aren't such distinctions apart from our own indications of them, as we bring forth our own ongoing realities.

The human social domain is a consensual field - networks of the consensual flow of observers in recurrent interactions. This is where I identify Foucault's insight into "power/knowledge" and the "micro-physics of power" (Foucault 1979, 1980). Such networks are only realised or activated through the lived-experience of the human individuals who attend them. They exist as structurally realised or effected, in the bodyhoods of individual humans who thus grant them their positivity. They are not "out there".

It may well be convenient to ascribe an objective existence to some social phenomenon, in order to claim legitimacy for a set of procedures by which to assert control over it (eg. "multisystem"). However such a convention is at best a distraction and at worst an illusion. The orchestration of coherent social and consensual interaction ("dance"), has radically different consensual effects according to whether it is understood as "pointing at" Objective Truth, or whether it places objectivity in parenthesis, demanding a priority for mutual acceptance and voluntary cooperation as the motor for control.

5.5.4 Spectacles as handles for orienting

The above point once more underlies many of the difficulties entailed in the application and understanding of

the ideas of Beer and Espejo. It is not the case that we might merely "play with" or "toy with" the notion of Objectivity. It does not achieve neutrality to substitute "as if" for "is" (ie. to replace teleology with teleonomy). One is still lodged in goal-orientation suggesting a transcendental ontology, even in those cases where it is granted that ultimate reality is unobtainable for us mere human actors (as is the case in Espejo's discourse).

From the vantage of the biology of cognition and the biology of language, there is no need for "as if". We don't need the "motor" of "as if" in order to function coherently and unfold our historical trajectory. We don't require "as if" in order to get to the moon, make love, write poetry, build robots, market computers and so on.

All that is required, is a recognition of the invariances thrown up during the persistence of the organisational closure of the observer in the course of consensual coordinations of actions. This is the "variety of invariances" mentioned earlier. Human social systems, transfixed by languaging and consensuality, consist of the dynamic braiding of patterns of commonality (ie. consensual terms or tokens), in respect of which the observer is an acategorical node or better, a relay. Here we discover that the constitutive relationship between social system and its element (human individual) is not reciprocal. It is simply

not the case that the human individual is constituted by social or consensual forms, although it might well be logically the case, that the "social" or "consensual" individual is involved in such a mutual constitutive relationship.

A recognition of the "variety of invariances", the embrace of objectivity-in-parenthesis and acceptance of a constitutive ontology, all enable a gestalt switch in our approach to the question of our intervention in a problem situation.

For the analyst, or indeed for any person wishing to apply the VSM, whether in their own or some other social enterprise, the described invariant relations by which the model reduces the complexity of the "messy" world ("mess" as in Ackoff 1974), are not to be considered as uncovered in or imposed on to some domain of Objectivity - eg. the firm.

Any intervention - in other words, any attempt to alter the order of things - consists in trying on different spectacles, offering these to other involved actors, and exchanging views about what is seen through the various "lenses" until agreement is found in respect of the quality of what is described as discerned. When the colours, tones, shades, edges are all they "should be" (ie. according to the expectations of the observer, and consonant with recurrent

interactions in this consensual region), then the spectacles are fine and we pay the optician. It is not crucial what the colours, tones edges are "out there". All that matters is that a community of observers can orient in respect of the entailed distinctions effected. This is why we talk to other people and exchange views.

The invariances of the VSM, the particular relationship described between the Five Systems and the recursive relation of unfolding levels and dimensions with just these Five Systems, provide a way of talking about and thence a way of structuring social reality (ie. provide one particular pair of spectacles). The intervention aims to bring forth such a controlled pattern of relations, into the pertinent consensual domain - ie. the problem situation. The model is a handle, not to reduce the complexity of the order of things "out there", but to converse about things in a manner that engages the bodyhoods of the involved actors. To the degree that such a consensual region is opened up, an application of the model will be effective or not.

5.6 Discussion

The purpose of this unusual manner of considering "invariance" in the context of managerial cybernetics, is straightforward. Depending on whether invariances are conceived of as normal or unusual, as Objective phenomena or as consensual processes, our handling of discourse in respect of them will unfold very differently. In one case we might talk of "riding with" them, as the surfer rides with the breaking wave; while in the other we might talk of enforcing or imposing them, as the lion tamer attempts to instill a set of required behaviours on to his wards.

Likewise for the VSM (3.8). Irrespective of whether the VSM indicates an actual (in the sense of Objective) set of relations or state of affairs, it can be used to facilitate consensual orienting. However, the quality or manner of orienting, will differ enormously according to whether the model is considered as descriptive of a set of relations while lodged in the explanatory mode of objectivity-in-parenthesis, or whether it is held to denote or connote Objectivity. In the context of a teaching establishment (eg. the Management Centre, Aston University), an understanding and take-up of the model will be radically altered according to which explanatory mode is visibly affirmed.

In either case, the question of the logic of the represented invariances - the method of unfolding Systems One to Five, and mapping on to an actual firm or other social enterprise - is the same. However, this sameness should not lead us to overlook the profound difference in the consensual grounding of the model according to how it is understood or "attended" by the observer. This will crucially alter its power and manner of seduction - in other words, the quality of consensuality in respect of which its logic becomes unfolded and applied. The significant difference, is whether the student or practitioner is encouraged to an understanding that s/he has to mould Reality to fit this one set of procedures; or conversely, whether s/he is encouraged to conceive of invariances as already the bedrock of consensuality, and to think of the VSM as just describing one particular way of "riding with" them.

In general, interpretation of the VSM is bedded in the explanatory mode of Objectivity. This is in part due to the way the model has been explicated in writing, and in part due to absence of a particular set of consensual tools in its manner of presentation and teaching. I believe that it is not merely a luxury, but is crucial for a deep appreciation and consequent effective implementation of the model, that it should be unfolded in the context of objectivity-in-parenthesis.

The apparent problematic of the phrase "objectivity-in-parenthesis", should not distract from the fact that the shift in emphasis is not complex so much as a matter of colouring or tone. In the course of this thesis, I have attempted to unfold these issues in depth and consistency, in order to suggest a rigorous grounding for implementation. However, in terms of conveying an understanding of the model and its means of implementation, this degree of complexity is unnecessary. In other words, the shift is one of mood or attitude (ie. emotioning), rather than consisting of substantive changes in methods of explication, although I am indeed arguing that substantive shifts unfold from intent or mood.

5.6.1 Soft Systems Methodology (SSM)

It is insightful to set the VSM against Checkland's Soft Systems Methodology (Checkland 1981). Checkland, claiming his consensual background to be that of hermeneutics and phenomenology, explicitly describes his Methodology in terms of the orchestration of consensus, much as is the way of a quality circle. The rigour is supplied by the precise division of the consensual practice into real-world and "systems thinking", and describing the means to hermeneutically circle between the two. In the conceptual part of the Model, there is place for tools such as linear programming and quantitative analysis, and this is where he would situate the VSM.

Without a doubt, many of the methods brought to light by the practice of Soft Systems Methodology are valued as much by individuals utilising a cybernetic framework, as by those who specifically focuss upon Checkland's own approach (eg. the use of root definitions and the acronym CATWOE for the comprehensive naming of the entailed complexity (client, actors, transformation, Weltanschauung, owner, environment)). It might seem from my own approach that I am veering towards Soft Systems Methodology (eg. by stressing objectivity-in-parenthesis). However this is not the case.

Checkland describes two systems paradigms (Checkland 1983):

Paradigm I

- 1: Reality is systemic; the world contains systems;
- 2: Methodologies can be systematic.

Paradigm II

- 1: Reality is problematical; we cannot know it ontologically;
- 2: Methodologies can be systemic.

Paradigm II is where Checkland locates Soft Systems Methodology, while he places Beer's work in Paradigm I. From what has gone before, it should be clear that my discourse is

certainly not in Paradigm II. However, neither does it fall within Checkland's Paradigm I. What then is the difference between a hermeneutics of distinction together with my own interpretation of managerial cybernetics, and Checkland's insights?

5.6.2 Methodology as systemic

The fundamental difference is that a hermeneutics of distinction, within which I include second-order cybernetics, affirms methodology to be intrinsically systemic, which is what this chapter has attempted to demonstrate. This is different to Soft Systems Methodology, in that Checkland appears to imply that methodology might not be systemic. In so far as methodology IS methodology, it is consensually bedded and cannot but be systemic. This is the import of Maturana's ontology, and indeed the distinction is between such an ontological primacy, and Checkland's own affirmation of the primacy of epistemology over ontology (Checkland 1983).

From its opening, my thesis has concerned this problematic. The point is that methodology is technology - not technological or scientific primacy, but consensual engagement in activity which brings forth realities as it is lived. We DO know our own reality ontologically, because that is the reality we bring forth in the course of our own

natural drift. Not that we know one Reality (Objectivity), but that we cannot but be engaged in reality in respect of a consensual domain which entails many realities (objectivity-in-parenthesis).

We do not comment on the order of things, we don't know Checkland's "R". Instead, the structural interactions enabled in our languaging lay down the cognitive space which is our own reality at any instant. What is crucial is whether we label such a constituted reality "Objectivity" and judge others according to its light, or not.

5.6.3 Ontological grounding

When we grasp the ontological "nettle" offered by Maturana, we discover that the observer is the only one who can know reality, and at the same time we realise that his/her reality is unique, and that everyone else has a reality which is just as legitimate if not equally desirable for oneself. The significance of this, when braided with a conceptual tool or consensual term such as Beer's model, is that just as any linguistic token provides a reference point of commonality as an orienting aid for recurrent consensual interactions, so too does the VSM. It is such a visible (ie. understood) region of commonality or invariance, which is absent from Checkland's methodology, and indeed, it is this that Checkland himself affirms is the strength of SSM.

As I have constantly stressed, the above comments do not imply that the VSM represents or points to Objectivity, or that it structures one Reality according to its own imperative. At least it doesn't unless the model is considered as inhabiting the explanatory domain of Objectivity. In the explanatory mode of objectivity-in-parenthesis, what such a model does is to provide a focus or anchor point, in respect of which the observer can orient explicitly according to a particular set of conventions - just like the ones which stipulate that in Britain one drives on the left and stops at traffic lights when they are red. Such conventions exist while they are consensually useful - while the reality they bring forth is shared by a set of actors. Such actors do not at all need to confuse the convention with Reality.

But the absence of confusion, is dependent on the clarity of the exposition and the intention of the explication. It is not intrinsic to some discourse. It is intrinsic to the orienting in the present in respect of a particular consensual space of understanding, within which certain linguistic terms will be held up and used in this way rather than that. It is context-dependent, and the whole of my argument has been an attempt to indicate just how such a context is presently absent.

5.7 Conclusion

Much confusion concerning the Viable System Model, whether at the level of intellectual debate (Checkland 1981; Ulrich 1981, 1983), or at the level of the student coming across the model for the first time at a management centre, arises because there is no clear statement of what the model is for, in the sense of what the model is about. This is not to say that Beer and Espejo have not spent a lot of intellectual effort in explicating the model, but to suggest lacunae in their unfoldment of the model and its consensual context.

Just like Soft Systems Methodology, the VSM is about orchestrating discussion, debate and cooperative orienting in a consensual domain. Unlike Checkland's Methodology, the VSM is not about achieving consensus, but about making visible one particular linguistic token, or series of linguistic terms, which can be handled in the course of linguistic and consensual interactions in a community of observers. It is a way to language complex social interaction, by suggesting one particular visible form or structure of social enterprise (ie. "organisation structure").

Such a structure has no claims on actual Reality, in the sense of setting out to prescribe or shape the structure of an actual social system. Or rather, if it does so, then it

is no longer managerial cybernetics. The set of relations laid down by the model, the organisation structure it unfolds, is orthogonal to actual happenings (ie. to consensual flow). Such a set of relations are logical terms.

Any model is open to abuse, as is any linguistic token. The VSM is no exception. Checkland attempts to sidestep this problem, by denying that his Methodology is a linguistic token, and instead claiming it as epistemology. Beer too has sometimes leaned towards the notion that he is "doing epistemology" (personal conversation).

It should be apparent that I feel that this strategy is mistaken. Whether we call what we do "epistemology" or "ontology", Maturana's discourse enables us to perceive that we cannot help but instantiate the reality which we realise as our bodyhood is structurally coupled to those domains that demarcate our cognitive space, in the course of our languaging. We can indeed gloss over this ontological primacy, and name the process "epistemological". But we cannot escape the biological grounding of our consensual orienting in language, and "rise above it" in our commentaries about it.

The logic of cybernetic intervention, in its striving to avoid reductionist analysis and to effectively engage in history, dictates that the analyst orchestrates

debate in which the pivotal terms or reference points, are provided by some set of explicit formal relations. This is the function of Beer's VSM.

The model is to be understood as an explicit set of invariant logical relations - Policy, Intelligence, Control, Coordination and Operation - inviting a particular insight into organisational closure and how such a concept might prove functionally effective in the social domain. These invariances can be brought forth and discussed or oriented in respect of, at whatever level of resolution one cares to focus. In so far as they resonate in a consensual domain, or are witnessed as demarcating one, then the observers who orient in respect of this consensual domain, bring forth a consensual reality commensurate with them. The entailed relations "make sense", and the individuals orient according to the invariances entailed, as opposed to some other defined or ill-defined set of invariances.

Such a set does not at all banish, preclude or obviate the need for other consensual regions. Claims for the model's universality are simply irrelevant, as are claims for the Objectivity of its recursive logic. This is one consensual region or set of linguistic terms among many, more or less useful as such.

VI ENABLING TECHNOLOGY

6.1 Summary

This thesis has considered managerial cybernetics in discourse that is slanted towards "a hermeneutics of distinction". It opens up its own field of discourse consequent on such a perspective. However, such linguistic arrangements or fields are not the primary area of interest for the author. What concerns me are the consensual configurations which either confirm or deny particular interpretations of discourse. Such consensual regions enable us to bring forth different concrete realities in the course of our orienting in respect of them.

The insights of a hermeneutics of distinction, give rise to the indication of a particular class of social mechanisms that I call "enabling technology". The previous chapters have described the conceptual grounding for such technology.

I will now focus more directly on the phenomenon of "enabling", with a view to arriving at the description of a computer system serving as an infrastructure for enabling (Chapter VII). Rather than setting out to point at some novel set of social relations, my purpose in this chapter is to

unfold a second order recursive relation of enabling. I will discuss the enabling of enabling.

In approaching the rationale for an Enabling Network System (ENS), I will use descriptions of particular social practices and forms as examples of enabling technology. However, such social practices or organisational processes are not my focus of attention. My goal is not to focus on what is sometimes referred to as human relations, nor to describe a "viable social system", but to ground or situate a technological artefact. In Chapter VII, I will locate such an artefact as System Two for a human activity system.

The critique of "one-dimensional man" by Herbert Marcuse and others, was levelled at the conflation of social with technological processes, in the course of which the multi-dimensional human experiential domain was "flattened out" (Marcuse 1972). I am attempting to avoid this problematic, not by sliding the technological dimension surreptitiously on to the table, but by explicitly describing "one-dimensional" transducers for social organisational processes, and bracketting the social and human relations themselves.

6.2 Introduction

Social organisational forms such as firms, nations or institutions, emerge about a kind of "observing in community" which constitutes them as networks of conversations of particular kinds (firms, nations etc.). Observing in community simply implies a context in which consensual distinctions of consensual distinctions may be effected (ie. to make distinctions in language of consensual distinctions - Maturana 1988d).

6.2.1 Whole and part

Membership of this consensual region rather than that, is witnessed by an observer upon indication that the distinctions of the entailed actors are couched within a consensual commonality, or one particular set of conversational conventions. This is organisational cohesiveness (Beer), sometimes called corporate ethos or identity.

For managerial cybernetics, the crucial handling of complexity from the perspective of organisational purposes or goals, consists in balancing two needs:

- the need to distinguish cohesiveness or identity of the whole, in order to be able to indicate a social enterprise as a simple unity;

- the need to distinguish autonomy, or identity of the parts, in order to be able to indicate a social enterprise as a composite unity. Both fall within community observing.

If we were to conceptually follow the entailed dimension of cohesiveness/autonomy to its extremes, at one the system would be distinguished as a simple unity alone, incapable of any unfolding into component parts and hence not witnessed as a social system from the perspective of the observer; while at the other, the space of the system would be distinguished as some collection of fragments or unities no longer observed to be in a constitutive relation with the system as a composite unity - once more no social system would be indicated.

Strictly speaking, in the human social domain neither of these extremes exists, as such a distinction by the observer would indicate that the domain focussed upon was no longer a human consensual domain. After all, humankind could itself be described as constituted out of the orthogonal intersection (ie. apparent paradox) expressed by John Donne as "no man an island, every man one" ("Devotions" No. 17).

6.2.2 Organisational boundaries

The interesting point, given that neither extreme indicates nor serves as a reference point for human social systems, is how distinctions are made that bring forth coherent consensual interaction in a social domain, as is the norm rather than exception when we look around us. This concerns the identity of social enterprises - in other words, the consensual "space" marked out by the observer's distinction of them. Enabling technology concerns the bringing forth of social boundaries as the distinction of the distinctions of community observing, by the observer as a solo observer.

A solo observer is one who "distinguishes the distinctions of distinctions that it makes" (Maturana 1988d). My own rendering of this, is that a solo observer distinguishes the distinctions of distinctions that the observer finds him or her self making at any instant in the course of constituting a particular consensual region. In other words, the solo observer "steps outside" present consensual boundaries within which she or he effects the community consensual distinctions which constitute and confirm this particular social system, and distinguishes the entailed distinctions (Figure 1).

Cybernetic Holdings Plc

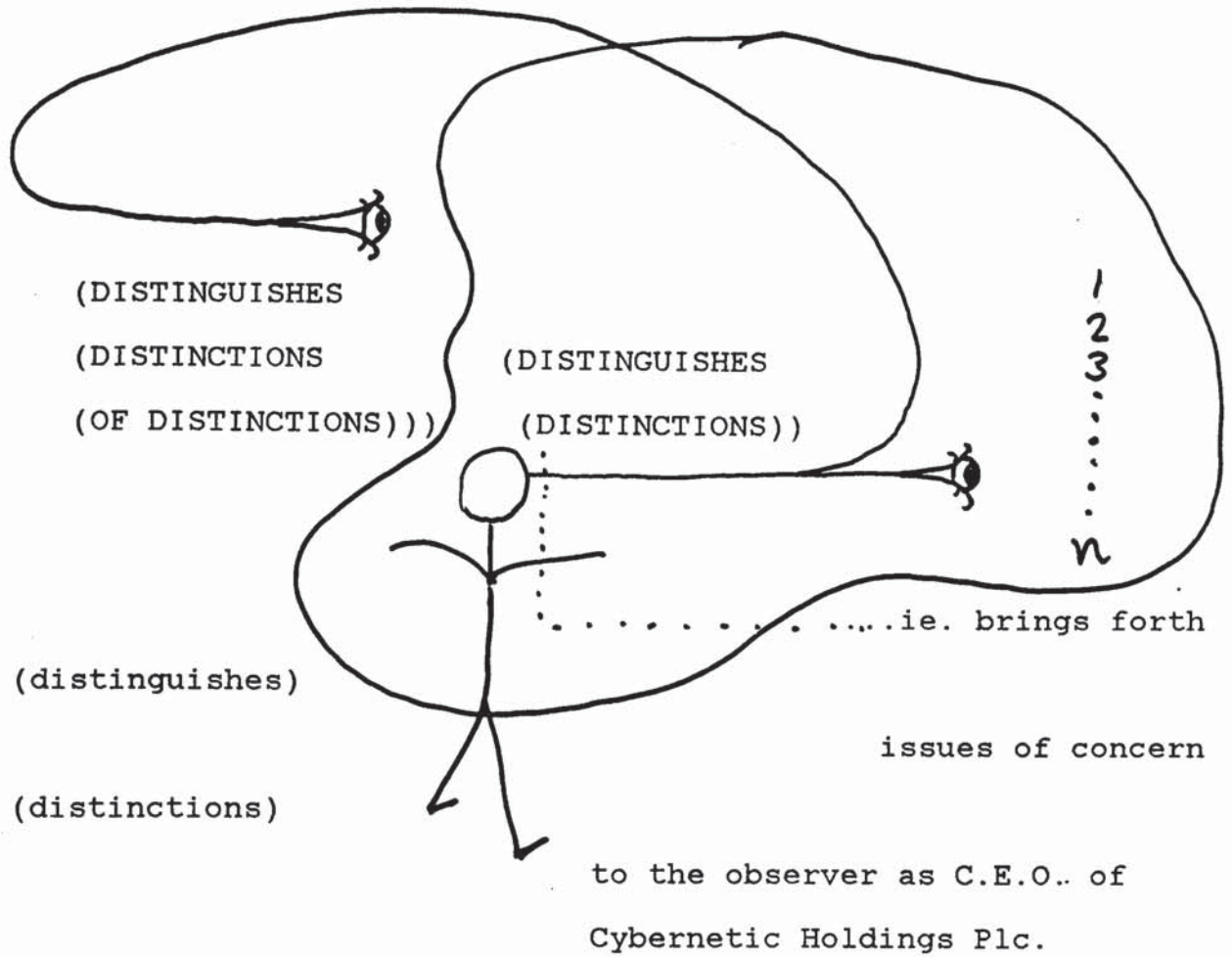


FIGURE 1

Such a "stepping outside" does not intrinsically involve any physical disengagement or decoupling, though it may well be that a material decoupling is the consequence of such a process. In other words, the observer may or may not decide to leave a particular social enterprise or field of consensual expectations as a result of such a distinction.

6.2.3 The play of disengagement and enabling

Disengagement is in respect of bodyhood changes in the observer, and concerns the enabling of orthogonal intersection of otherwise nonintersecting phenomenal domains, and the possibility of consequent neighbourhood effects that alter rather than confirm any particular social or other system as the observer structurally realises it in languaging.

With this in mind we can describe enabling technology as concerning the mechanism (hence "technology") that helps to effect (hence "enabling") distinction of the distinctions of distinctions. that observers find themselves making at any instant in the course of their consensual flow.

As such, it promotes a third order recursion in the making of distinctions, in the context of a particular consensual region:

(distinction (distinction (distinction))),

and effectively concerns the ability of the observer to distinguish the operational distinctions which s/he performs in bringing forth and confirming some social system by realising it as a constitutive structural element. Such technology thus concerns the distancing of the individual

from the group, in a move which at the same time brings forth possibilities for membership of new groups.

6.2.4 Social evolution

A comment at this juncture vis a vis the "direction" of the recursive unfolding of distinctions, in the context of the historical emergence of the human "individual". Such a third order recursion as that described above, in the domain of the distinction of consensual coordinations of actions that indicates the emergence of the solo observer, is at odds with our normal fashion of talking about the "emergence" of social groups, from a background of previously scattered individuals. Common understanding has it that "coordinated activities" follow the uncoordinated activities of individuals, in the sense that firstly the individual evolved, and then the social group.

No individual can be observed prior to the distinction of the apposite group. Indeed, there is neither individual nor group without the observing of them, and the distinction of the one brings forth the other in the instant of the distinction. From the perspective of the observer, self-awareness is a higher order recursion of consensual distinction than community observing, in that it starts from distinction of one's community distinctions. In other words, one's community distinctions are themselves now distinguished

from the vantage of a wider context, whereas previously they provided the horizons for all distinctions effected.

Prior to the distinction of consensual coordinations of behaviour, there is no higher-order recursive linguistic distinction which is then "surrendered" to community observing. Prior to consensual coordinations of consensual coordinations of actions, there is simply no witnessing of consensuality together with its higher order recursive accompaniments such as language. The description of recursion together with explanations utilising such a mechanism, are necessarily linguistic relations, languaged into being in respect of some already existing consensual domain. At a certain point, the recursion of distinctions enables distinction of the entailed distinctions, and post-consensual phenomena may arise - a linguistic domain, languaging, observing, the observer and awareness.

As the observer logically arises along this recursive trajectory of distinctions, there is a temptation for the observer who observes the process to overlook the fact that each level of recursion obscures rather than highlights, the actions that it coordinates (3.4.1). Such "higher" orders are to do with orienting in a more flexible manner in consensuality, granting further dimensions for bodyhood structural intersections of otherwise nonintersecting phenomenal domains, rather than for any

increased accuracy in describing or pinpointing some objective world. The solo observer, in other words, is never finally "free", situated at a privileged vantage from where s/he can objectively peruse the order of things. The solo observer is the process of a play of nonintersecting phenomena as they orthogonally intersect in the bodyhood of the observer in the course of consensual coordinations of actions.

The observer consensually orienting in such a recursive field (ie. languaging), approaches the vantage of solo observer by being able to comment upon his/her own consensual situatedness from some other consensual region. We may speculate that such a solo observer is a recent evolutionary phenomenon, and approaches what we intend by our use of the word "individual" in the sense of self-aware.

Such an individual was not the original source for the evolution of human social organisation, which would thence be understood as an accretion of singularities, but only emerges upon a particular number of recursive consensual computations in an already existing linguistic field. The precise number is arbitrary. The point is that individual is a late-comer and not the original motor of evolution. The individual as individual, never absolutely existed as a pristine state of isolation in a vacuum, but emerges as the observer makes consensual distinctions of its identity as a

constitutive component of the various systems which orthogonally intersect in its bodyhood.

6.2.5 Enabling as transducer

Bearing this in mind, I find it useful to portray the mechanism of enabling as a transducer between distinct consensual processes within the social domain. Irrespective of some search for actual boundaries of open social systems (eg. using non-equilibrium thermodynamics as does the work in demography of Peter Allen, associated with Ilya Prigogine's team at Brussels - Allen 1982; Allen and Sanglier 1981), it is the consensual action of the observer which determines or brings forth such boundaries by the specification or activation of some transducer (ie. orthogonal intersection) in the dynamics of his or her bodyhood (ie. laying down a cognitive space, or determining a domain of structural couplings).

Any processes on either "side" of such a transducer, are what the observer indicates and distinguishes as "social systems", and this is the significance with which I will be investing the term. In this imagery, social systems are seen not at all to constitute the observer, in whose bodyhoods they (the distinguished systems) are variously constituted as orthogonal intersections in the course of the individual's flow of languaging which brings forth such

systems into the consensual domain where they are witnessed. The bodyhood intersections which enable the structural perturbation of various social systems in particular consensual regions, correspond to the relationship of input transducer, anastomotic reticulum and output transducer in Beer's discourse (Beer 1981: 29ff.).

Using the discourse of Beer and Espejo, I will therefore be describing ingenabling technology as it is consensually secured closure by an ENS, as a domain of transducers "whose time is ripe". In effect, what Maturana calls "orthogonal intersection in the bodyhood of the observer", is the transformation effected between input and output transducers in the flow of languaging. The emergence of "solo observer" entails the specification, and hence the possibility of transcending some "organisational boundary", as the observer itself becomes an effective transducer in respect of social organisational processes which are now identified or distinguished as they are brought forth by bodyhood changes in their languaging structural components, human individuals.

The chapter will provide closure for the discussion of the conceptual background, and instance concrete examples of what I intend by the term "enabling technology". The final chapter will describe the sort of computer system that might provide the infrastructure for such technology to proliferate

(ie. enabling the enabling of enabling). The most immediate comparable systems that spring to mind are the French national Teletel system, or the more abstract outline of the Technosphere as described by Stafford Beer (Beer 1986).

In so far as any emancipatory claims are made for the consensual region I am bringing forth, these do not concern enabling technology per se. From one point of view, an arm chair as much as a bicycle might be cited as an instance of enabling technology. Emancipatory potential for the observer, emerges from the provision of an infrastructure for non-organisational connectivity, in the form of an Enabling Network System (ENS) which grants the space for the dance in one observer, of community and solo observing. I feel that this more accurately and effectively describes the distinction that Richard Rorty attempts to make between "public" and "private" questions (Rorty 1989).

6.3 Formal social structure

I'm going to define "formal social structure" in a simple though unfamiliar manner. Any consensual category which can be held to connote a composite unity in the human social domain, I will call a "formal social structure". Such a category indicates a social grouping or enterprise as having an implicit or explicit identity in the eyes of its constitutive observers (ie. it is indicated as a simple unity). "Constitutive observer" might be the observer who is generative of the actual operational coherences of its organisation or class type (ie. the observer as member of it); or the observer who is generative of the organisation's behavioural context (ie. the observer who specifies the class type in respect of some environment). More generally, a constitutive observer is in a dance or flow between each dimension or perspective of constitution.

6.3.1 Power/knowledge

This definition is indebted to the work of Michel Foucault, so I will briefly dwell on his thesis concerning "power/knowledge" (Foucault 1979, 1980). Foucault described modern societies as "disciplinary matrices", in which individuals orient by locating themselves and each other in relation to a set of abstract norms. He called this "the tyranny of the norm", for although all individuals orient in

respect to grids of norms, the norm itself is always orthogonal to actual social processes. Thus, even the most "normal" individual never matches the "norm", which is as distant or unconnected to this individual as to the most extreme "exception" to the norm (eg. the mass-murderer or terrorist).

Foucault's thesis was not at all a denial that humans have always oriented in respect to some set of norms or conventions. What interested him was the precise quality of contemporary "normalising" processes and their effects - in other words, their implications for political action in the present. His discourse concerning power/knowledge, attempts to describe the norm as a reference point that is unknowingly constituted by the subject, a subject who no longer functions except as "subject-object", ever more deeply embedding him/her self in relations which confirm the norm. Historically, he distinguishes this from the "classical" paradigm, in which hierarchy was deeply conceived of as functioning literally, whether the focus was upon angels, humans or baboons (Lovejoy 1936).

In the light of Foucault's thesis as to the all-encompassing mechanisms of the "microphysics of power" which embraces "modern man", it no longer makes sense to assume some neat boundary or parameter to an actual social unit (such as firm), because we discover that it is the

dynamic play of terms, as categories-in-use that carries the power relations which actually direct and constrain the actions, expectations and indeed bodyhood changes of the social subject.

Foucault described how the human individual as "subject-object", constitutes the relations of power which are held to dominate or oppress him or her, by becoming available as a "relay" for the proliferation of such relations, which gain their positivity as a field of signifiers for the consensual practices of such an individual.

If we focus upon conventional "social" arrangements, such as the firm, the family, or the State as providing the motor for power relations and supplying the framework for rationality (the same thing in terms of Foucault's thesis), then we completely overlook the all-pervasive "reach" of linguistic relations as biological constraints, and instead become seduced and distracted by a reification of the concrete issues involved. Hence the importance in a variety of linguistic guises for Foucault, Kuhn, Maturana and Varela, of the notion of a "community of observers", who concretely bring forth social phenomena in the course of their orienting.

My usage of "formal social structure" is particular to my own interpretation of it, in the context of discourse which brings forth a hermeneutics of distinction. Such a formal structure is not something to be sought and identified in some Objective "social domain" (ie. a transcendental ontology), but is understood as a particular linguistic relation to be seized hold of and brought forth in respect of consensual coordinations of behaviours (constitutive ontology).

Thus, formal social structure is that class or category, finding its epistemological horizons specified by an ontology which has it that the entailed composite unity has as the constitutive components which realise it, observers. Such specification might or might not be explicitly social or organisational. This allows me to include such class types as "gender", or "race", as well as conventional social organisational forms such as the firm, hospital or institution.

6.3.2 Interstices of social organisation

My motive for the above definition (6.3), is simply that I am aiming to describe the interstices of social organisation, and if I followed the normal management course of using more visible organisational forms as my reference point (such as the firm), I would be in danger of falling

into the trap of bringing forth yet other "organisational forms" permeated with "power/knowledge", while describing these as interstices. I want to be able to get hold of the "transducers" in terms of which the observer specifies "gender" as much as "IBM".

What I am seeking to do, is to maintain my distance from sociological or psychological analyses of human problems. I am establishing one particular linguistic term ("formal social structure"), as consensually resonating in a particular manner. I am doing this, not in order to dissect or explore such a term, but in order to bring forth or make visible a technological mechanism which relates orthogonally to it, in respect of the structural engagement of observers.

In practice, such a set of linguistic terms will provide the explicit and visible atoms for the "language" of the domain of enabling technology, and in particular for the ENS. Such terms will cease to be treated as autopoietic social relations constitutive of their human members (ie. Objectivity), and will be reduced to the status of consensual terms-in-use (ie. objectivity-in-parenthesis: 4.6.2, 6.3.3). To put this more explicitly - from the perspective of enabling technology, formal social structures are being reduced to an allopoietic function for the autopoiesis of the observer, in the course of his or her consensual flow.

Couched in all this highly theoretical and difficult discourse, is a simple, indeed stark proposal for design. The discourse might be seen as justifying this simplicity or else as complexifying the design, in order that it becomes visible in a particular light. But what I am trying to do, is to distance myself from the intense analytical procedures of people such as Michel Foucault, Jurgen Habermas or Werner Ulrich. I am aiming to do this by myself "stepping outside" consensual analytical processes in some manner, while accepting my own limits as a consensually lodged, languaging observer.

For the purposes of this thesis, I am pointing towards a conceptual bifurcation in the "formal" social domain (ie. enabling orthogonal bodyhood intersections in respect of the languaging of it), by lodging a "hard" technological artefact in it. This is in order to deny the hegemony of such a formal social apparatus in laying down the characteristics of the observer, in which process the observer becomes conceived as allopoietic (ie. a "subject-object"), and the social forms themselves are ascribed autopoiesis.

6.3.3 Naming of formal social structures

As the last sentence implies, the point about formal social structures is that it is their acknowledgement by the

observer as a community observer (ie. the fact that an observer gives witness to them), that engenders autopoietic claims on their behalf in the consensual domain wherein the acknowledgement takes place. We see an example of this in the discussion between Fenton Robb and John Mingers on the status and implications of "autopoiesis" in a social context (4.6.2). The "pessimistic" claims for autopoiesis in the social domain by Robb and the refutation of their relevance by Mingers, arise because both writers are working in the explanatory mode of Objectivity. As a consequence, the constitutive significance of such a notion as it resonates in the biology of language, is completely lost.

So the actual mechanism that I found myself groping for, was one which while avoiding all claims to be emancipatory in any sociological, psychological or any other "-logical" context, at the same time might be seen to enable the user to highlight the claims of formal social structures, even where the notion itself was absent. Thus, "disengagement" (6.4) can be seen without any grandiose claims (though I personally feel such claims are justified), as merely making visible for the observer the "gateway" out of one formal social structure, at the same time as bringing forth "gateways" into some other .

What I was edging towards, was a mechanism to enable the naming of "formal social structures", a naming which

entailed no commentary upon nor classification of such structures. In other words, I required something that was almost the obverse of the computer package "THE COORDINATOR" (Action Technologies). Where the latter encourages the naming of cooperative tasks, and the completion of linguistic transactions with a view to encouraging organisational effectiveness, what I was looking for was the means to fracture organisational tasks, and the ability to "float" linguistic statements in a public domain.

6.4 Disengagement and enabling

I have already pointed out that disengagement concerns dynamics of bodyhood of the observer rather than social practices (whatsoever those might be in the absence of bodyhood changes!). However, on the more visible level (ie. in terms of observed social practices or behaviour), disengagement describes a mechanism which enables the passage of the observer from being a constitutive structural element of one consensual region to being a constitutive element of another.

Now the observer is all the time a constitutive component of many distinct consensual regions. What matters from the perspective of a hermeneutics of distinction, is not "actual" membership (eg "employment", "nationality" etc.), but how the perceived boundaries of particular formal social structures get thrown up, established and maintained. I cannot stress too strongly that such boundaries are not to be taken as given, are not objective. They are continually constituted and affirmed through the actions of observers consensually coordinating behaviours in respect of them.

At first sight the above is a problematical claim. We feel impelled to respond - "Yes, but if you get the boot from IBM and get head-hunted by ICL, then you have actually left one particular formal organisation and are now a member

of another!"; or else - "Look, you gave up your job in the City and are now an apprentice to a corporate cybernetic enterprise in Pont Creuddyn, of course you've changed environments!". Indeed, this is the case. But the domain I am interested in and am focussing upon, is not that of visible membership, but the dynamic specification of the boundaries of formal social structures, as these are constituted in respect of the changing bodyhoods of the observer. This closely concerns Beer's notion of economy in real-time (see Chapter IV).

The analysis of social organisations and human interaction in the context of such organisations (managerial cybernetics, behaviour and organisation, sociology, management sciences in general, human relation theory etc.), all in the final analysis depend on the specification of organisational boundaries - it is these which determine how any detailed analysis may unfold. In other words, to do some sort of "organisational analysis", one has to define or point to some boundary for the system-in-focus. Now what I am doing, is to indicate a field of social interaction which does not entail identification of organisational boundaries, and is thus not available for organisational analysis. Hence my claim to be focussing upon the "interstices" of formal social structures.

Michel Foucault was critical of the endless nature of Interpretation (ie. hermeneutics). His critique was that however rich a consensual process might be engendered, problems arise when one attempts to "seize hold of" or to punctuate such a process. Where precisely does interpretation stop and action start (or, to paraphrase "Hamlet", how do we avoid thinking "too precisely on th'event")?)

The above is not a problem as long as you hold on to the explanatory mode of Objectivity, because the linguistic terms categorised as "objective" themselves provide the parameters for the punctuation of any problem situation (or for the demarcation of organisational boundaries). However, problems would appear to arise when you throw away that prop and embrace objectivity-in-parenthesis. After all, one of the seductive appeals of Objectivity, is that it does away with the need to interrogate any boundaries of the dominant consensual domain. The important task for functional effectiveness to be witnessed, becomes one of learning "objective" reference points, and thence how to navigate in respect of them.

From the perspective of a hermeneutics of distinction, such unquestioned consensual boundaries become implicit and arbitrary markers indicated as such by being granted "objective" status, rather than actually giving evidence of some objective frame of reference.

In respect of a logic of distinctions, I am closely associating the pair of terms "disengagement and enabling", with the two complementary dimensions available to unfold a composite unity as explicated by Maturana - organisation and structure (Maturana 1978). Where organisation refers to a recognisable class type in respect of which this system has been indicated as the phenomenon of concern (eg. school, as one of the class "schools"), structure refers to an actual realisation of such a social system from the perspective of the experience of the observer (eg. "this" particular school, with its teaching staff, timetables, pupil-staff ratio and so on).

Any initial or primary indication of a composite unity, logically allows an explication in terms of organisation and structure (as above). However, such a point of reference (this distinguished composite unity in this context), is never once-for-all, but depends on the focus of the indication, or its specification. The logical or functional coherence doesn't point outwards towards Objectivity, but merely entails an understanding that upon such indication, whatever has been thus distinguished can be unfolded according to organisation and structure as described.

The practical problem would appear to remain as stated by Foucault, of how any initial act of distinction

comes to focuss upon any one composite unity as a space of interest distinct from the order of things (ie. punctuates the "messy" world). How does anything come to be focussed upon, and conceptually seized hold of as concrete and manageable? Resolution of this apparent difficulty concerns explanatory horizons embraced by the idea of "bringing forth" reality, for such an explanatory mode (objectivity-in-parenthesis) dissolves the problem as a problem. I will turn to my own pair "disengagement and enabling" in order to cast light on the issue.

"Disengagement" describes a process that is bedded by the explanatory mode of objectivity-in-parenthesis in the domain of a constitutive ontology. In such a process, no "state" is hypothesized nor sought. In other words, there is no postulation of a vitalist reduction in which the case is rested with a statement of the properties intrinsic to some constitutive component of a composite unity (see Maturana's criticism of Monod - Maturana 1978).

What is proposed is a mechanistic explanation which specifies that the properties of the system to be explained are generated by relations of the components of the observed system, and are not to be found in the properties of such components. In the present case, this refers both to a particular mode of social interaction by human individuals, and the dynamics of an Enabling Network System. The domain to

be explained is that which is brought forth by the observer in a manner which can be witnessed in the course of consensual coordinations of actions. In the present context, this concerns the making distinctions in respect of formal social structures, whatever their ilk (eg. race, intelligence or employment).

The reason for the complex way of expressing such a statement, is that such orienting in respect of the social domain by the observer, is not some purely abstract affair but is material, and concretely brings forth social artefacts such as philosophical notions, laws, bus-stops, hydrogen bombs or lawn-mowers. Not one of such a mixed list arrives "unannounced" or "out of the blue", but each surfaces subsequent on the recurrent confirmation of formal social structures of particular sorts, by the overlap of consensual boundaries laid down as transducers by the dynamics of states of the bodyhood of observers in a consensual region.

The interesting thing about the phenomenon "power" that Foucault pinpointed as "power/knowledge" (Foucault 1980), was its "invisibility". This is what distinguishes such processes of power from those of force. As such, power relations are tacit or implicit - therein lies their problematical nature and tenacity. With force the matter is very different - it is visible and naked, and any tenacity is due to its actual application. To the degree that such

mechanisms become more sophisticated and "modern", we discover power.

In the light of Foucault's thesis, I am arguing that the act of making a distinction of formal social structures (ie. disengagement), is equivalent to de-powering them (by enabling the emergence of the solo observer in respect of them). This has nothing to do with denying or protesting against the objective "reality" of such structures. Nor has it anything to do with the need to identify the boundaries or parameters of such social phenomena in order to evade or escape them (eg. Objectivity). In respect of disengagement, "actual" visibility or not of organisational boundaries and identity are irrelevant. What matters is that some transducer is realised, made visible or activated in the bodyhood of an entailed observer who is orienting in relation to the domain where such formal social structures are affirmed.

Beer himself, is increasingly voluble about the dependency of any organisational form on the human individuals who constitute them and their tenuous, ephemeral existence distinct from such constitutive observers (eg. his comments on marriage - Beer 1989). But a further step is required. Just as Beer situates a range of systems-in-focus in their recursive embedments in order to attempt to make visible the requirements needed for their effective self-regulation, so too the VSM itself must be situated in a recursive embedment which is not itself.

The whole of this thesis has been an attempt to indicate what such a context might consist of, or more accurately, how it might be described. It concerns the languaging observer and the consensual region within which the VSM gains positivity in respect of its own terms of reference. In other words, it concerns its own observer realising organisational boundaries in his/her own bodyhood rather than grasping such boundaries by pointing to them or trying to discover them "out there".

In a way, a social organisation is analogous to a scientific theory, in that the height of individual social "knowledge", just like the height of scientific insight, comes not with vindication or confirmation of an existing theory or social form, but with its falsification (McCulloch 1965) - that is, at the instant of the disengagement of the observer from it, or the emergence of third order recursive distinctions which signify the solo observer in respect of it (6.2.2). Indeed, this is all that is signified by "falsification", in the explanatory mode of objectivity-in-parenthesis. It no longer refers to some absolute standard, reference or march towards Truth, when something is once-and-for-all "disproved", but points towards a shift in the play of consensual intersections in the bodyhood of the observer as one particular consensual domain is no longer realised in a manner that is confirmatory of it by this observer (see also Rorty's discussion of contingency,

change as the play of metaphor and redescription - Rorty 1989).

The observer as a solo observer, never "arrives" nor is required to arrive at some Objective vantage. More pertinently, there is no such vantage to arrive at. But there are realities - those brought forth by observers, as they orient in a consensual domain in terms of the particular objects brought forth in the course of their constitution of it as community observers (ie. "multiversa" - Maturana 1988b). These objects are not chimera - they are "real" objects, regardless of not being situated in Objectivity, and hence they are constituted by the community observer in a domain in respect of which they can be witnessed by other observers in the course of their consensual flow. Such objects provide the grounding for the constitutive ontology of any such an observer.

Such "realities", such consensual coordination of consensual coordinations of actions, might be described as the process by which the community observer becomes a solo observer and in turn a community observer, as the play of bodyhood intersections is disturbed and the underlying pattern or gestalt changes. Strictly speaking, the observer does not "arrive", but merely distinguishes itself in respect of some region which it previously constituted as a community observer of a particular sort. The play of community observer

and solo observer is the process of distancing and approaching a variety of distinct phenomenal domains, which in their indication by the observer, orthogonally effect neighbourhood bodyhood intersections. This is consensual "flow".

This "dance" does not achieve any final goal, or secure a privileged vantage of one Reality. Instead it signifies, that as the observer distinguishes him or her self as realising a given consensual context, it becomes possible to recursively distinguish the distinctions now made within the terms of such a context (ie. distinguish its distinctions of distinctions), and disengage from the newly visible consensual horizons (which were invisible to the observer as a community observer) in becoming a solo observer, constituting new linguistic "objects" in the process of change. In terms of Conversation Theory (Pask 1975, 1984), I would describe this as the shift of conversational domains.

Such a pattern or process, is disengagement from community observing, enabling solo observing from a new perspective or context, situated within new community horizons (or vice versa - disengagement from solo observing and enabling community observing). This is historicity, and it has nothing to do with Objectivity or Truth. It is simply, almost trivially, the braided patterning of second and third order recursive distinctions by the observer in the act of

linguaging in the course of consensual coordinations of actions. Any punctuation of this apparently unanchored flux, enabled by the solo observer consequent on disengagement from it, brings forth a further domain available for witnessing or community observing. Once more the idea is captured by Pask's description of the pruning of an entailment mesh (Pask 1984; Pask and Gregory 1987).

Disengagement and enabling are terms of our cognitive space in a consensual domain, as we flow in and out of awareness of self and other, in a process that throws up the artefacts and residue that are the history that we "read" (eg. the space-rocket as much as the historical text). The process may be "endless" as Foucault complained, but if so it is an endless battle of alertness to the consensual visibility of otherwise nonintersecting phenomenal domains which may orthogonally intersect in the dynamic of our bodyhood, as a result of our flow in language and in the course of our natural drift as autopoietic unities.

The third order recursive distinctions entailed by the solo observer in respect of some consensual region, arise not out of laziness or loss (ie. alienation or anomie), are not some oscillatory pathology, but situate or ground the observer in consensual coordinations of actions according to the explanatory mode of objectivity-in-parenthesis, where intolerances entailed in notions of Certainty, Truth and

Reality, give way before mutual acceptance and the embrace of the multi-faceted realities we bring forth as the human lived-experience in a community of observers. Indeed, "No man an island, every man one".

6.5 Enabling Technology

Before passing on to consider an Enabling Network System (ENS), I will give several concrete examples which highlight what I mean by disengagement and enabling. The list is not comprehensive or complete, but conveys a flavour of the social quality of what I envisage. When I turn to outline the ENS it will be as a mechanism which enables similar processes of disengagement and enabling.

Let me recap. I am attempting to encourage the visibility and acceptability (ie. a consensual domain) of a space which concerns the interstices of "formal social systems" (as above). Such a space is not intended as an overturn or a denial of the value of such formal apparatus'. In other words I am not tilting against such forms, advocating their removal or even change. I have made clear from the start of this thesis, that such an epistemological remit is not for me. I leave such critical tasks to others. What is of interest to myself is the bringing forth of novel arrangements in the social space at this historical juncture.

Several points need to be made in order to clarify the rationale for the status of my examples:

a: As social mechanisms, they find themselves historically situated as post industrial phenomena, and are not at all returns to some romantic past. Further, they could not have predated such an industrial organisation and its technological and social effects.

b: If we use the discourse of the VSM, we might say that in general they concern coordinating functions at the lowest recursive level of the social domain (ie. the interactions of observers), which only emerged as problematic consequent on developments at the highest recursive level (ie. complex, technological societies). Enabling and disengagement concern the distinctions effected by the human individual as solo observer, and are not emergent properties of some objective phenomenon called "society".

c: This point (b) does not deny nor inhibit such mechanisms from being of use to "macro" social phenomena at their own level of recursion (such a social services, firms etc.).

d: One of the effects of a consensual coordination of behaviour (ie. a distinction), is to obscure the actions that are coordinated. Thus, there is no once-for-all final distinction which grants an objective vantage to the observer. Disengagement and enabling are mechanisms for a continual, ongoing social process.

e: As the solo observer, makes consensual distinctions that obscure the actions that they consensually coordinate (3.4.1), such obscured actions might include those by which the observer might have distinguished itself as the observer in the act of making solo observations (ie. self-awareness). What this means is that the distinguished phenomenon (country, gender, firm, intelligence and so on) comes to stand between the observer and him or her self as a solo observer, who thence grants these distinctions a transcendental ontological status and a spurious objectivity, while downgrading his/her own existential grounding in the order of things. Disengagement and enabling directly confront such a problem, which relates to Foucault's insight into "power/knowledge" (6.3.1), but might be described as concerning the semantics of ontology.

f: The pair "disengagement and enabling" address the problem of the distancing of the observer from him/her self (e), by disengaging the observer from its situatedness as a community observer, and enabling distinctions as a solo observer. Though not a once and for all process, this should promote a learning curve towards effectively situating self and other. As will become clear from the examples below, such a process is concrete and common-sense, usually involving realistic and modest claims as regards its criteria for effectiveness.

g: Specific mechanisms (ie. technologies) carve out specific niches. Thus, each of the instances below only claims a limited space. It is my own thesis which is situating these various social tasks at a more fundamental level, and that in the ENS will seek to thread such endeavours into a global context.

6.5.1 Examples

This section gives concrete examples of what I mean by first order enabling social mechanisms, in respect of which the ENS will be described as a second order recursion, enabling enabling. I will separate my list into two halves - the first, of more specific (or "hard") applications, the second of more abstract (or "soft") processes. Each example will have appended a pointer as to its area of disengagement and enabling.

6.5.1.1 "Hard" Systems

1: The Escape Committee

John Wilson left teaching after 19 years, determined to try and provide the means for teachers who are disillusioned and bitter, but who feel trapped within "their" profession, to discover their own potentialities for engaging in other

professions and activities. In his own words, he set up the Escape Committee to help teachers "dig a tunnel out of" schools and colleges, by "stimulating them, giving them ideas about how to change their lives", and convincing them that they have markettable skills.

Disengagement from hegemony of profession; Enabling the exploration for and realisation of other dimensions of personal potential

(Deirdrie Fernand in the "Sunday Times" 26-3-89 - "How 200 fled education's Stalag 19")

2: Merseyside Training and Development

Ron Price found himself situated at the crossover of training programmes and the voluntary sector. He was disturbed at the location of quality training programmes in London or other urban centres. Frequently they weren't attuned to the context of locality in which the problems of training had first arisen. Valuable resource capital and personnel were being removed from the regions in order to get personnel trained. He decided to attempt to reverse this trend by setting up a framework for regionally-based training courses aimed specifically at satisfying local needs.

Disengagement from hegemony of centralisation; Enabling development of variety

(Ian Williams in the "Guardian" 28-3-89 - "It's courses for horses on Merseyside")

3: Electronic Village Halls - Teleports for Rural Village Communities

Lars Quortrup is running a research project based at Odense University, which is attempting to specify and establish pilot projects for "electronic village halls" spread across the Scandinavian countries. The remit for this EEC funded project, is that such centres in thinly populated rural communities, with transport and communication problems, are to fill the space formally occupied by local community centres.

While the entailed hardware allows interaction with the most modern and global communication systems, the software is biased towards local culture and needs. The coordinator in situ is a person from the region whose task is to enable the individuals of the local community to utilise technological resources for their own needs and purposes, in the process of themselves becoming technologically "literate" according to their own interests (ie. specified by themselves). They refer to the software needs as the development of "org-ware" (organisation software).

Disengagement from penalties as a result of mobility and transport difficulties; Enabling the specification of how information technology will work in favour of local interests

(Lars Quortrup, Telematics Project, Odense University, Denmark)

4: Electronic networking - a new tool for development action

Gabriel Rodriguez describes the way in which a tool such as Action Technology's "Coordinator" can be harnessed to enable the collaboration of research projects separated by large distances, especially in developing countries. This cuts out the need for expensive, macro, research institutions that characterise traditional Western research facilities.

Disengagement from stranglehold of massively expensive research institutions driven by the need to crack generalised problems (eg. cure for cancer) and requiring a highly developed economic and social infrastructure; Enabling of collaborative interaction and research by geographically separated persons over specific interests

(Media Devlpt 4, 1987: 2-3)

5: Local Investment Networking Company (LINC)

This is a network of agencies, established with the intention of introducing investors to small firms, with the long-term policy of encouraging a more even spread of capital.

Disengagement from hegemony of centralised institutional control of funds; Enabling more sensitive and speedy means of matching investment goals and needs

("Guardian - New Business" 4-1-88)

6: Africar

Tony Howarth had a lot of personal experience of the problems in "third world" environments concerning transport. In most third world nations, he discovered that such problems were couched in discourse concerning the need to generate the enormous financial resources needed in order to build-up the necessary infrastructure for a modern transport to be able to act as transport - ie. tarmac roads, railway systems, the manufacturing base dictated by the needs for "economic" mass production and so on.

He gradually arrived at the insight that this was to put the cart before the horse.

The cost-effective way forward for undeveloped or developing nations was not to mimic the scale of western production runs and the design technology as applied in respect of such an economic rationality, but to design and utilise a novel form of transport appropriate to existing third world conditions. He is presently entering his first production run of uniquely designed, two, four, six and eight wheel driven vehicles, constructed with a body of epoxy resin treated plywood, and with a wheel span which enables these vehicles to run in the tracks of larger transport forms such as wagon and bus convoys. The key design criteria in respect of their functioning, is to ensure that they don't require the infrastructure of western-type road systems.

The vehicles are of a modular construction throughout, which allows for servicing and maintenance by the removal and replacement of damaged parts in short-time under any conditions (absence of mains electricity, sophisticated tooling machinery etc.). Their construction is to be in plants in the third world countries themselves, licensed by Africar, who only control quality checks. Howarth's intention is to attempt to break the stranglehold of the multinationals on global vehicular development, and to expose the fallacy that third world nations need to devote such horrendous capital sums to transport development. He is designing and developing similar products for water transport in the far east, and for products such as refrigerators. The whole rationale is to enable their local production and maintenance under the most primitive conditions.

Disengagement from hegemony of multinationals and the demands that development programmes should follow "well-tried" western practices; Enabling the emergence of alternative development patterns, self-reliance and the lessening of dependence on the financial institutions of the developed world, such as the IMF

(The Africar Centre, Caton Road, Lancaster, LA1 3NG)

7: Exchange Resources

This was set up as a recruitment agency for professionals concerned with the ethical implications of their defence-oriented work, and who were seeking suitable, alternative employment in civilian life.

Disengagement from professional hegemony; Enabling closer "fit" of needs for earning a living and ethics

(Ian Harper in the "Guardian - Frontiers" 31-7-86)

8: Green Money

Michael Linton set up LETS (Local Exchange Trading Systems) in Courtenay, British Columbia. I quote from an introductory leaflet:

"LETS is a non-profit trust initiated locally to provide a community information exchange and recording service. Its purpose is to support trading and exchange for

individuals, businesses, service organizations, and other groups active in the local community ."

A further dimension to what is essentially a locally-focussed bulletin board service, was the establishment of a "green dollars" system as the facilitator for such transactions. This serves to maximise the flow and exchange of resources in respect to community transactions and interactions based on trust and commitment, rather than mediating all such transactions via fiscal systems whose rationale is focussed upon the macro system (nation etc). In effect the green dollar system records the credit and debit of transaction values (agreed between individual participants according to their own personal reckoning). A crude example, based on a closed system of three transactions and three members:

| | |
|----------------------------------|------------|
| R agrees to render P's gable end | R+10, P-10 |
| S sells a mixer to R | S+10, R-10 |
| P repairs S's greenhouse | P+10, S-10 |

This loop of exchange is crudely and unusually complete (P0, R0, S0). Any one of the listed transactions might have been other than 10 units, and the ongoing balance would be carried in the system for future accounting processes.

*Disengagement from unnecessary seepage of resources from the local community and the hegemony of central standards;

Enabling closer match of local resources and needs,
especially ones that have no readily defined common financial
metric (eg.baby-minder matched to sawing wood)*

(LETSsystem, Comox Valley, 576 England Avenue,
Courtenay. B.C.)

*

6.5.1.2 "Soft" Systems

1: Family Therapy

Traditionally, Family Therapy has been concerned above all else with "The Family". Its advance over more traditional psychiatric interventions was that it refused to treat any individual client in isolation as "the patient", and instead insisted that in order to understand any individual with problems, it was first necessary to review the total context of the concerned family. In other words, it was system-oriented.

Recently there has been a shift back to focussing upon the individual, but in a manner radically different from the traditional approaches. Under the influence of Maturana, it is now becoming acceptable to envisage that one practical option to family problems is the disintegration of this particular organisation in respect of the involved actors - in other words, there comes a point when there is no use hanging on to the family for its own sake (which would be pathological autopoiesis).

In this novel way of talking, all the entailed individuals are perceived as affected by and affecting the individual with problems as they all constitute and confirm a particular consensual domain. Each one is to be considered individually

as they constitute different consensual systems. The priority is no longer the maintenance of any one social form (ie. Family), but the attempt to structurally involve all the protagonists in whatever system would entail their own well-being.

Disengagement from dominant institutional form (one particular model of family); Enabling clearer exploration and specification of individual desires and needs in terms of social relations

("The Bringing Forth of Pathology" , by Carmen Luz Mendez, Fernando Coddou and Humberto Maturana, in The Irish Journal of Psychology 9 (1) : 144-172 1988)

2: Share-a-care

Share-a-care is a register for sufferers of rare diseases and the friends and relatives of such sufferers. At present it has no "official" or formal advertising medium. Its aim is to engender support between individuals and groups who might benefit from each others' insights and experiences, including the bringing forth of novel areas of medical knowledge. We sometimes forget that medical knowledge is a taxonomy, and that exceptions to the existing taxonomy are not automatically registered as medical disorders, but may be viewed as simply anomalies or psychosomatic pathology. Such an embryo register is the first step in widening the safety

net as regards such "exceptions", to the rule of dominant medical expertise and know-how.

Disengagement from isolation; Enabling contact, support and emergence of new research programmes

3: Article 19

The intention of Kenneth Boyle was to set up a computer database detailing the state of freedom of information round the world. The establishment of the description of such a topic in this relative framework, obviously enhances the potential to critically observe the merits or drawbacks of any one political system.

Disengagement from standards being tacitly dictated by vested interests; Enabling visibility of the legitimacy of such claims

4: Brian Martin has commenced the compilation of a register of persons whose careers have been destroyed because of their opposition to nuclear programmes. In addition to providing an embryo support group, such a data base also is a focus for a common area of interest, and a catalyst for future directed action or indeed, means of earning a living. To answer the critic who points out that such a data base could also be used by the "powers that be", to censure and

persecute such individuals, it only requires to point out that the individuals are already registered on someone's data base as deviants. The important political act from the point of view of enabling, is to set up another data base in which they are registered as normal rather than the exception.

Disengagement from "Big Brother", notably in that such repercussions are often veiled in secrecy; Enabling of awareness of causes of dismissal etc., clearing associations of guilt and focussed upon possibilities of future action

(Science and Public Policy 13 (6))

5: Deaths in the City

This publication by Melissa Benn and Ken Worpole (Canary Press 1985), researched the details of deaths of civilians while in police custody and as a result of police action, in London over a period of several years. The enabling is obviously in respect of the families of any "victims", but also as regards police internal investigations, whether now or in the future. Further, such an observing "eye" itself acts as a control against any tendency for excess of particular police officers.

Disengagement from hegemony of police authority; Enabling justice and more positive monitoring in respect to certain aspects of policing

6.6 Conclusion

The two above listings suggest several dimensions relevant to my understanding of disengagement and enabling. The themes are de-centralization, utilization of Information Technology for particular purposes, reinterpretation of historical processes in order to forgo their repetition, the enabling of individuals to change their consensual horizons, and the enabling of connectivity between otherwise disparate individuals and sectors, in order to generate synergy, or to highlight issues for the purpose of generation of political action.

None of the above are particularly radical or surprising. From my point of view, what is interesting is the potential to empower such programmes from the bottom up with the aid of the tools of I.T., and to encourage shifts of style within conventional organisations commensurate with a paradigm of disengagement and enabling as I have described it.

VII ENABLING NETWORK SYSTEM (ENS)

7.1 Summary

One of the questions frequently addressed about discourse such as Maturana's, is how to operationalise it. What does one do with it?

This final chapter attempts to demonstrate the process of operationalisation. It commences with a mapping exercise across from discourse concerning a hermeneutics of distinction, to the imagery of enabling. A system that enables the enabling of enabling is then explicated in more detail, and discussed with reference to its social implications.

Appreciation of such a network for enabling, will be described as concerning its location as System Two in Beer's VSM, with the System-in-Focus being a human activity system or consensual domain.

Thus the goal of the overall project - to merge the biology of language and cognition (Maturana) and structural management (Beer) - will have been achieved.

7.2 Introduction

This chapter is not the climax or core of my thesis, so much as a "symptom" of its implications. I am not claiming to demonstrate technical expertise in outlining the model of a computer system. Merely, I seek to show logical consistency in terms of the previous chapters, and to describe a viable (in the sense of realisable) system. Rather than laying down a specific blueprint for design, I am instancing a consequence of my thinking as it implies a particular design.

The ENS will enable many other more conventional dimensions of social interaction than those indicated by the examples I have previously listed as Enabling Technology (6.5.1). However, it will intrinsically favour a particular sort of social process, one based upon maximising the making of distinctions in a coherent frame of reference.

This might be described as establishing an infrastructure for System Two of Beer's VSM, where the System-in-Focus is a "human activity system" (Checkland 1981, 1983). In Beer's model, System Two concerns anti-oscillation in the domain of activities of the System Ones of any Viable System. In a human activity system, such System Ones will be human beings - observers.

No social organisation, whether church, firm or nation, has as System Ones, the human individual or observer. Instead, the "bottom line" of such formal structures will be elemental functions or roles realising such structures. These will at most be particular dimensions of actual observers. In effect, they will always be part of the environment for that observer in his or her consensual flow. In the social domain, membership is not organic but is a consensual indication. Organic metaphors concerning the social domain sometimes confuse this important distinction.

In a formal organisation such as a firm, System Two might concern procedures for coordinating the throughput of materials at various stages of processing (eg. from iron ore to stainless steel; from cotton to finished clothing). Mechanisms such as time-tables, or conventions such as "drive on the right", also fit here. Without entering into a discussion of whether a human activity system can be usefully regarded as a viable system in Beer's usage, as far as my presentation of the ENS is concerned, there is no implication of any "higher" System (ie. Systems Three, Four or Five). This is not a comment upon Beer's own model, but a statement situating my design and its "claims".

I am just focussing upon one particular composite unity (a human activity system), and indicating one particular structure of such a unity (actual human

individuals and their relations). For other people, the ENS might well be situated as a System Two in terms of their own indicated "higher" Systems. For example, it will serve as a marvellous medium for the exchange of ideas and the encouragement of research - System Four of the VSM. Similarly, one can imagine the system serving as a medium for both System Three and Five functions. The system would provide a vehicle for marketing on the one hand, the expression of opinion in the public domain on the other.

However, as far as I am concerned at this juncture, a human activity system is not a "formal" organisation, with identifiable functions or intermediate structures. It concerns the consensual flow of a community of observers, in the course of their natural drift. Whereas upon the distinction of a formal organisation one might attempt to identify and list specific anti-oscillatory mechanisms and processes, a human activity system is indicated as it is because one cannot identify a precise set of mechanisms or elements, and one doesn't set out to do so. A human activity system may be imagined as permeating the interstices of indicated formal social organisations, in a continuum that provides the cognitive grounding for the entailed distinctions - ie. the conceptual space of the observer.

From my own standpoint, the ENS isn't intended to serve any higher function than as System Two. Such a System

Two function may well be situated recursively, and one may describe the space for distinction-making in either personal or institutional terms (eg. orienting between individuals or orienting between firms). But such a shift in scale, does not imply any "higher" function (in the sense of more intelligent). This is why I have always insisted that I am focussing upon the interstices of social organisation, rather than attempting to explicate the VSM as it brings forth an organisational domain of a particular sort.

Just to clarify this, and explain why I am stressing this issue. There are no claims for the ENS to be intelligent (ie. as in "Artificial Intelligence"). It is not intended to help the user make the "right" decision. It is not intended to be sensitive to either "inside and now" or "outside and then" to use Beer's descriptions of Systems Three and Four. There is no claim for an inbuilt wisdom. If one were to regard Beer's model as describing an evolutionary progression from most simple, to aggregate to multicellular to complex organic unity as one "rises" from System One to Five, then the ENS "stops" at System Two. It is a primitive mechanism, not a sophisticated one.

Despite such an apparent limitation in an age where greater and greater claims are made for spurious categories of intelligence, it must be remembered that hitherto there has simply been no infrastructure for such a mechanism.

History "leapfrogged" the participative process (which is what System Two is about), and arrived at a culture of representation, centralisation and specialisation (both in relation to insights into cognition and mind, and in relation to political activity).

In the West at least, spiritual, cultural and productive processes have been perceived as concerning higher human functions. Civilisation, it is held, has been torn from nature, or imposed upon forces which would otherwise be anarchic or uncontrolled. The society, the group, or the culture has hegemony, over and above any "natural" processes. Role and function have dominated.

Language has increasingly been associated with "head", and more specifically "mind", as have intelligence or wisdom (contrast such conventional insights with Maturana 1985, Maturana and Guilloff 1980). In the social domain, there has consistently been top-down organisational hierarchy, and a glossing over of "lower" functions. A whole range of "-isms", whether concerning church, nation gender or intelligence, develop discourse which makes it seem as if one might arrive at an indicated higher function without the lower. Exclusion and polarity have been dominant.

In such a tradition, the making of distinctions has tended to entail reinforcing formal social structures rather

than dissolving them by making them visible as recurrent consensual marks. Closely associated to such views, there arose the unthought view that coherence and order, understood as necessary for survival, was evidenced by higher mental functions rather than that so-called higher functions gave evidence of already existing coherences.

The notion of human activity system or consensuality had no part in earlier societies. Such notions emerged with appreciation of solo observing, although in some systems thinking the crucial function of the solo observer in the process has tended to be overlooked (Checkland 1981; Vickers 1983).

Historically, membership of social groups has always entailed solidarity with formal social structures rather than a dynamic consensual flow realising and realised by the making of distinctions. Despite romantic notions sometimes expressed about small-scale, less developed cultures, the one commonality between them all is relative lack of freedom, lack of individuality, lack of choice in the making of distinctions. This is not stated critically, because the very explicit constraints themselves may be argued to contribute stability and well-being.

To his surprise, when Kropotkin travelled through the Russian steppes in the second half of the nineteenth

century, he witnessed overwhelming evidence of cooperation in both nature and the small scale societies he came across, instead of "nature red in tooth and claw". It was from this that he derived his insights into anarchism. However, the insight into "natural" harmony, the benefits of cooperative enterprise and complementarity rather than polarity, was never been able to overcome the connotations of "natural" competition and "survival of the fittest", popularised by some interpreters of Darwin, and dominating the discourses of both state socialism and state capitalism.

What all this amounts to saying, is that the making of distinctions is the prerequisite for observing any life form or anything else for that matter, and doesn't concern epistemology. Such distinctions don't "follow" epistemology, which merely is the play of higher recursive orders of distinctions, sometimes obscuring the concrete actions which these are coordinating (3.4).

Today, with the technology to automate large scale industrial and service processes, and to de-centralize both production processes and coordinating mechanisms (eg. institutions), for the first historical moment the ontological grounding of the observer can be indicated as distinct from formal social structures, even though these continue to be the terms of consensual interactions in the social domain (3.7 and 3.8).

7.2.1 The redundancy of potential command

It was not chance alone that determined that the acronym for the Enabling Network System (ENS), echoes the acronym for the central nervous system (CNS). The implication is that rather than being seen as a tool for either one of the two extremes of social revolution or enhanced efficiency, the ENS is better understood as a mechanism encouraging "the redundancy of potential command" in the social domain (Beer 1981: 232-233; McCulloch 1965). McCulloch's imagery invited insight as to the distributed means by which the nervous system functions so effectively, and the necessary and inevitable presence of "slack", replacing the traditional notion that for maximal efficiency there is required a strict hierarchy, a one-to one correspondence and a minimum of "waste".

The principle of the redundancy of potential command, implies that the presence of redundancy doesn't entail waste, as it is precisely such redundancy which enables effective functioning for such a composite unity as the nervous system. This principle provided the grounds for Pask's early work on self-organizing systems (Pask 1962), presently directs research into so-called "neural networks" or connectionist models (report by Keith Devlin on work of David Rumelhart and James McClelland - "The Guardian 7-1-88; Feldman and Ballard 1982), and leads to insight into the

non-representational mode of operation of the nervous system commented on by Rorty (Rorty 1980) and referred to by Francisco Varela as the "hermeneutic" or "enactive alternative" (Varela 1986).

From my own perspective and in the context of the social domain, operationalizing McCulloch's principle (ie. granting positivity to it in a consensual domain), will in itself tend to lessen the claims by formal social structures emerging from the dominant paradigm of one Universe and the explanatory mode of Objectivity (6.3), loosen the tentacles of "power/knowledge" (6.3.1), and encourage an appreciation of the multiplicity of realities and the positivity of objectivity-in-parenthesis (3.3).

In practical terms, this dramatically increases sensitivity to change. Without the grounding of an infrastructure (ie. System Two), this sensitivity would result in violent oscillations. Indeed, one could argue that the rise of institutional forms was crudely to supply such anti-oscillatory mechanisms. However, one of the consequences of the precise crudity of such mechanisms was the insensitivity of institutional processes, and their breakdown in the face of rapid change. In literature, this has been apparent since the times of Dickens, and is more specifically commented on in the work of Kafka. In the more recent discourse of management science, it has become glaringly

obvious when macro social systems have been confronted with the increasing speed and complexity of problems in the contemporary world (Ackoff 1974a, 1974b; Drucker 1969, 1980).

An Enabling Network System isn't just a tool to be taken up and used by alternative social organisations and groupings, but will also service the needs of formal social apparatus' in the expression and development of their purposes. It is a tool which will bring forth alternative organisational styles within the conventional context, structures more in tune with the realities of the contemporary age, gradually becoming emancipated from the legacy of a dominant industrial mode of production.

For example, let me briefly touch on demographic changes in the West. Increasingly there is scarcity of skilled personnel, the need for more flexible training and education, the provision of retraining once or several times during one person's "working" (or, indeed, leisure!) life. Where until recently jobs have been thought of "for life", now the individual is for life, and a job is transient. Once a teacher, a scientist, a technician, a train driver, will no longer signify always teacher, scientist, technician, train driver (See for discussion of these issues, Handy 1985; Jenkins and Sherman 1979, 1981; Merritt 1982; Robertson 1985; Toffler 1971, 1981).

Sensitivity to demographic and skill changes, requires the implementation of mechanisms which might be described as bringing forth the principle of the redundancy of potential command in the social domain. It requires an enabling infrastructure, rather than a "brute" increase in investment or increase in education (education for what?). It requires a technological grid of connectivity, rather than an increase in social, emotional or intellectual solidarity.

What such a system does, is to lay the grounding for the decentralization of organisational processes, while enhancing the potential for these novel disseminated unities to generate synergy in respect of some whole. Instead of the notion that the whole is somehow greater than the part (State, Family, Firm, Church etc.), we are entering the historical turning point for which the multiplicity of realities brought forth by distinct parts is understood to generate a whole, which in itself never attains the status of a formal social structure (ie. Reality or Truth).

7.2.2 Variety engineering

This touches upon the tension that Richard Rorty identifies between public and private interests, and perhaps goes some way towards explaining how a single person may integrate both domains (Rorty 1989). In the explanatory mode of Objectivity, I would describe such a resolution by saying

that the relations between the components of any one human activity system are being intensified, thus enabling maximum variety of actual structural realisation of the entailed human activity system, leading to the greatest expression of multiversa.

From the point of view of the explanatory mode of objectivity-in-parenthesis, this is said somewhat differently. In respect of a formal system concerned with enabling the making of distinctions (ENS), there is the enhanced potential for orthogonal intersection of distinct and otherwise nonintersecting phenomenal domains in the bodyhoods of the observers making the indications and effecting their distinctions. This is because of the "visibility" of distinct public and formal "markers" in one consensual space (ie. increased orders of recursion of consensual processes are possible. See 3.8.2 - "The identity of the observer").

This is the case whether such an observer is one of the long-term unemployed, or for example, the personnel manager for a large institution seeking new employees in a particular area. In either case, and whatever the different goals and concrete outcomes, what is being encouraged is insight into the complementarity play of arbitrary yet historically-situated distinction making, and the emergence of the solo observer (6.2.2).

The relationship between Enabling Technology and the ENS concerns "variety engineering" (Beer, Espejo). Where Enabling Technology can be described as an amplifier of variety for the observer, the ENS acts as an attenuator along the dimension of the particular Enabling Technology in respect to which it is situated (ie. it secures closure). One might say that Enabling Technology opens the door to hitherto unguessed new pastures and fruits, while an ENS provides a map which makes sense of such pastures, identifies edible fruits allowing their recognisability (their take-up as consensual terms).

The entailed variety engineering is understood to take place in terms of bodyhood dynamics, concerning the conceptual dance or play of the indication and distinction of whole and part as they emerge out of the intersection of hitherto nonintersecting phenomenal domains (6.2.1).

For example, a transport system is not a transport system by individual roads or railways having been constructed, any more than a city is a social system by houses having been built. Their positivity as wholes (ie. the emergence of consensual domains resonating and enabling further distinctions in respect of such unities as the newly constituted simple unities they are), is a function of their indication as associative nets (eg. "entailment mesh" - Pask 1984; Pask and Gregory 1987), which conceptually mark out

"city" or "transport system" for the observer in a particular consensual region. Thus do such wholes become cognitive entities.

7.2.3 The languaging of reality

It is important to recognise that the disenfranchised, alienated and destitute are not thus primarily because of physical exclusion from material goodies. This exclusion and its persistence, is a result of their not being party to particular consensual regions, of their not being enabled to bring forth particular realities. Their material situation, sleeping on the streets under newspapers and "discovered" by the politicians, the forces of law-and-order, and the researchers, can be described as a symptom of consensual disenfranchisement (eg. Fanon 1968; Freire 1972).

As it is indicated, a unity is languaged into being. The dominant explanatory mode of Objectivity, confuses the complexity of languaging processes and the domain of descriptions and explanations with the "emergence" of novel phenomena, pointing to complexity "out there". Complex or simple processes, are realised in their being languaged. The arrival of a cognitive entity, whether "matchstick" or "society", is constituted among other things in its complexity, through the dimensions of orthogonal intersection

realised in the bodyhood of the observer making the mark. The mark itself depends on a linguistic domain within the horizons of consensual coordinations of actions, else it is not constituted and witnessed as such.

From my own perspective (ie. this is my reality), a key modern problem concerns the ontology of understanding and communication, rather than any inherent complexity of social or other phenomena (which would invite epistemological enquiry). This is perhaps Maturana's intention in suggesting that the word "cybernetics" should be disentangled from connotations of control, and instead be held to describe "the science and art of understanding" (Maturana 1988a). Such understanding is not a matter of complexity in the sense of glimpsing a more complex Reality, so much as bringing forth the space for the interaction of more varied realities. From the perspective of a hermeneutics of distinction, this is what the so-called "information revolution" is essentially about.

The handling of complexity in the modern world, is not by the specification of ever more varied or complex formal social structures (which are symptomatic), but concerns the flow of communication and an understanding of the exchange of realities in the course of the dance of language and our behavioural experience. This description makes no claims for the neutrality of information. Such

claims revolve around notions that a neutral domain of signals might lead to purer representation of some Reality. In the context of hermeneutics as presently understood, nothing is neutral. For instance, tyranny is understood not in terms of subverting neutrality, but in investing systems of signs with implicit or explicit status as pointing towards some Reality. The obverse of such an indicated Reality is not neutrality, but the multiverse (ie. multiplicity of realities).

Thus the ENS consists of the provision of a means to realise alternative modes of action, consequent on the play of distinctions. It is not distinctions in themselves which are crucial (ie. the emergence of complexity or Reality), but their play (ie. realities).

7.3 ENS - Definition

An interactive computer system, supporting the specification and expression of needs by individuals, groups, both public and private interests - a framework of connectivity. The system will not be one more database of stored information to be accessed "atomically" by the user. Rather, it will constitute an orienting medium, allowing users to explore and develop their own interests and needs, in the course of their consensual flow in respect of stored information and their domain of actions.

7.4 Technical

A common carrier in the domain of information, with access via an expert system query mode. The user with either a clear or unclear need, can identify and extract information having bearing upon and encouraging clarification of, such needs. Queries by the user will themselves alter the relations entailed in the data-directory, serving as input as well as triggering output.

The structural model for such a system is best suggested by HYPERMEDIA systems (Brand 1987; Nelson 1987), situated in the context of a CONVERSATIONAL DOMAIN (Pask 1975, 1987, Pask and Gregory 1987). Both "Apple" and "NeXT" are currently moving rapidly to accommodate such systems in the environment of micro computers with the integration of CD ROM (eg. John Sculley's report at the MacWorld Exhibition, Boston, August 1989 - reported in "The Guardian" 17-8-89).

The fullest version of THOUGHTSTICKER, the package developed out of Pask's Conversation Theory, has so far been on a powerful Symbolics machine. However, presently Pask is developing versions on Macintoshes at the Faculty of Educational and Andragological Studies, University of Amsterdam. In other words, the technology envisaged is

presently available, even if the economics entailed is still prohibitive for the scale of implementation required.

The ENS does not require the richness and complexity of an actual Paskian conversational domain. The key to the handling of complexity is by the design of a semi-structured system that is situated within the configurations provided by the cross-referencing of a small number of categories. For a full implementation of Conversation Theory, such as THOUGHTSTICKER, the categories themselves are not bounded in number, though each will be organisationally closed.

In the ENS, it is these limited number of categories which form the key "objects" for searches. As Action Technologies' "COORDINATOR" demonstrates, marvellous economies can be achieved by the situation of words or phrases in one particular context rather than another, without any attempt to dive into problems of semantics (eg. parsing).

7.5 Niche

Initially a region in the U.K. - but the system itself has no upper limits. As the structure will be modular, any one region of activity (a node for such a system) can be replicated an indefinite number of times.

7.5.1 Clients

One of the strengths of the data structure I have developed, is that it manages matching of skills and jobs, with a general procedure for the matching of any expressed interest to an apposite need (hence it is described as a "common carrier", similar to the French Teletel system, to transport systems, to the telephone system). Thus, the same data structure will be utilised in a similar fashion, whether the client is an institution dealing with employment and problems to do with demographic trends, or a single parent seeking to set up a child minding group.

It so happens that the finance-generating motor is likely to be institutional or organisational users. In the following descriptions these "macro users" are sometimes stressed more than they should be. This should not cloud the principle that the system is for the purpose of bringing forth the redundancy of potential command in the social domain. As far as the design of the system is concerned, the

macro user has no priority over the individual. Costing practice and operational criteria will be achieved, whereby the macro user benefits sufficiently from the effectiveness of the ENS, to subsidise the individual user, bringing forth the scenario that I call "Stage Three" (7.7.3).

Some of the clients of the system:

- 1: Currently unconnected bulletin board services;
- 2: Development agencies;
- 3: Business in the Community;
- 4: Employment Agencies;
- 5: Social Services;
- 6: Continuing education;
- 7: Charities;
- 8: Yellow Pages;
- 9: Pollsters;
- 10: Any person or organisation seeking contact with some other;
- 11: Any individuals/groups/organisations with a perceived problem of isolation or lack of resources, and an ill-structured methodology for breaking out of isolation and effecting contacts.

7.6 Argument

Presently in the United Kingdom, a great deal of interest and funding is being devoted to regional development and the encouragement of small-scale business and enterprise, as a means of overcoming some of the problems accompanying de-industrialization. This is not just the passing whim of one particular National government, but symptomatic of a major organisational shift in the social and economic forms of the "developed" nations in an "information" age (eg. Charles Handy - "The Future of Work", Handy 1985; James Robertson - "Future Work", Robertson 1985; Alvin Toffler - "Future Shock", "The Third Wave", Toffler 1971, 1981).

Such a shift also has profound emancipatory potential for the "undeveloped" nations. For the first time we can envisage that it will be unnecessary for "Third World" countries to pass through the equivalent of the western Industrial Revolution, in order to be equals on the world stage (see the example of "Africar" - 6.5.1.1).

The fundamental shift can be characterized by the availability of a technological infrastructure to enable networks whose purpose is to facilitate the raising of funds, the provision of communication, and exchange of ideas, personnel, advice, expertise. Enabling Network System (ENS) aims squarely at this niche.

7.7 Implementation

After the development of a demonstration prototype, the project would commence with a working prototype in a region considered to be a development area by likely funding bodies (ie. funds will be more readily available for the purpose of encouraging and supporting local services and small-scale industries).

There are three dimensions to the implementation of ENS. Loosely complementarities, in practice these would probably be sequential.

7.7.1 Stage one

Institutions and agencies involved in developmental issues are currently uncoordinated, and for the most part, uncomputerised. Where there is computerization (eg. Yellow Pages in the Reading area), for the most part it entails a translation of existing filing methods into a number-crunching medium, rather than a redesign of the actual methodology of the services involved.

The ENS would offer such bodies a service consisting of up-to-date and immediately accessible information, that is relevant to themselves in their function of effectively servicing queries from their own clients, and coordinating

developmental issues. Such information might concern contacts for an enterprise, whether potential clients, partners or financial backers. This service would also suggest new ways of filing and accessing information in ways most productive to the client and to the entailed organisation.

Although focussed locally, such a dimension of the project has national implications, as such regional nodes are parts of a macro-grid (ie. a national or supra-national (such as EEC) infrastructure).

This area of operations is visualised as the bread and butter function for the emerging ENS, whose more sophisticated functions are described below. There are already existing network systems in place which might accomodate such a system, such as "COMPUNET".

7.7.2 Stage two

The above is intended to lead into and enable the second, more ambitious function. This service would enable individuals/groups of any kind or persuasion, to locate other individuals/groups in the particular domain which a query addresses (eg. the setting up of a support group, small business, co-operative, discussion group, pressure group etc.). Its full implementation would require far more financial outlay that is conceptualized for Stage One, for

which high level software (eg. a PROLOG data structure and a flexible query language), together with the networking of the entailed micros is all that would be needed.

For Stage Two there would be the need of a hardware medium to support something equivalent to a 4th. Generation Data Processing Package, or a HYPERMEDIA system. This medium is envisaged as being spread across a range of powerful micros, to be accessed by locally-based interfaces, situated in regional agencies, public libraries, colleges of further education etc.. In effect, this would entail the provision of a Distributed Data Base (eg. Chris Date), or Ted Nelson's vision for Project Xanadu (Nelson 1987).

Initially, this stage could be set in motion as a powerful and flexible bulletin board, accessed by a team of operators in response to spoken, written or telephoned queries. This would provide information and experience to allow the evolution of a full implementation (see below).

The long-term strategy of Stage Two, is to offer individuals and groups, an interactive medium, which would allow them to "chase out" other individuals or areas of relevance to themselves, in a process that at the same time aided themselves in defining what precisely it was that interested them. My own image for this is Pask's THOUGHTSTICKER (Pask and Gregory 1987).

The vision underlying this, is that enactment of connectivity will itself engender local and regional systems of interaction and co-operation, even though such an ENS will reverberate with national and international interests and information (ie. global interests). The assumption is that there are always like-minded individuals, however small the catchment area or diverse the apparent areas of interest, and that one of the symptoms and causes of contemporary alienation is that such individuals do not in practice "discover" one another. For example, one can easily imagine subscribing to some small circulation journal on an esoteric topic, ignorant of the fact that three miles down the road, someone else is subscribing to the same journal.

The immediate benefactors for this dimension would be so-called "minority groups", or people seeking to explore alternative life-styles: Eg. -

individuals wishing to form a group about an interest;

individuals involved in a caring situation, seeking mutual support and the benefit of mutual advice;

individuals looking to explore the implications of a novel idea, seeking finance, partners, employees, or other people with complementary skills etc..

7.7.3 Stage three

The development of a CONVERSATIONAL DOMAIN.

This has no upper limits, and is spread across (n) powerful micros, connected globally by dense local relations. This does not mean that there has to be a powerful micro for each user, merely that there is the need for distributed consensual configurations, reflecting regional characteristics, while "plugged into" a global context. We can envisage terminals of the simplicity of the French Minitel terminals, which "key into" the network, itself formed by linking local processors as the nodes of the global network by the relations between them. While it might be argued that such relations do not exist at present, the framework for them does exist, and the relations shortly will. The technical challenge then, is not so much the provision of such relations in themselves, but the utilization of such relations in a particular fashion.

The French experiment has demonstrated that the provision of simple, practically dumb terminals on a large enough scale, itself generates massive support infrastructures and opens up previously unguessed markets. From one point of view, we might describe the ENS as Teletel with an inherent structure that has been designed for enabling (in the sense of all the previous arguments). As I

have stated before, this is an infrastructure for connectivity. It takes the lessons of the Teletel system one stage further.

Terminals are interfaces for queries which themselves form the ongoing terms of the rising and falling Conversation. This conversation is not the play of atomic facts or hard "information", nor is it concerned with massive data bases that store such facts for their later "retrieval" in order to provide a (mythical) "real-time" picture (representation) of the way things are. No representation of Reality is aimed at. Of course, such massive data bases will among other things provide the "objects" for the system, for those users who require their aid.

However, the medium will encourage insight into the "fact" that the user will infer rather than discover facts. S/he will bring forth or distinguish such facts, as terms for a domain of actions. "Facts" are thus languaged into existence, as useful marks in the course of the expression of interests, rather than uncovered or discovered "out there". As previously mentioned, this deals with the tension between private and public interests analysed by Rorty (Rorty 1989).

The development of local autonomy can only emerge "on the back of" its closure in respect of a global network of relations. It is not just that each is the function of the

other, as is the meaning when, for example, Robin Horton writes about "closed societies" (Horton 1970). The word "global" as presently being used, does not imply "upper" or "whole system" (as "Nation", "World"). Global indicates an open and shifting field of relations. Historically, global has always fallen within the horizons of a society or culture that is closed in respect of other societies.

The emergence of autonomy does not come through the provision of experts from afar (except in the case of ongoing forms of distance learning), but by enabling autopoiesis of individuals-in-community. This "autopoiesis" is not itself along the dimension of, or in the domain of *communitas*, though its enablement will effect the quality of *communitas*. Such autopoiesis will only emerge in an anarchic social structure (eg. see Maturana's comments at the close of his Introduction to "Autopoiesis and Cognition" - Maturana and Varela 1980). In other words, a structure which is itself arisen out of and dynamically constituted by the realities of those individuals consensually orienting in respect of it.

Thus, autonomy implies provision of relations which bring forth/make visible, local interests in the context of other interests (ie. other realities), in the ongoing process or dance of change (ie. history). Their ongoing local development (ie. their realisation in the course of the structural dynamics of those coupled in respect of this

region of consensuality), can only be effected by the entailed observers concurrently being structurally coupled to one another in respect of some context. It is the assymmetric play of content and context, of part and whole, that opens the possibility of orthogonal "bodyhood" intersections of otherwise nonintersecting phenomenal domains, which is historicity.

Human "social" autopoiesis cannot occur in closed societies under the banner of one Reality, in communities which are closed to the realities of observers who may be described as constituting the general human activity system as the play of the multiplicity of languaged realities (ie. multiverse).

In unfolding the ENS, I'm not talking about the provision of information about the "real world", which is what many people see the democratic process to be concerned with. Manifestly, from one point of view flow of information is maximised, if by that we mean the disturbance of bodyhood dynamics through languaging. However, this is not the same as saying "more information". The more information we provide, the more problems of variety the observer is faced with. It is perhaps more useful to talk about providing the means of "reading a map" of interests, in order to pick out or identify consensual dimensions most compatible at a given moment with one's own interests, in a dynamic process of

interpretation which is the creation of one's own map (ie. a hermeneutics of distinction).

Such a map has constantly changing contours, as have one's own interests. What this map "points at" is not some actual territory, but the space for the play or emergence of distinct consensual regions. This is not to say that the map represents, reflects or describes such regions. For instance, it specifies no content for consensual interaction. Such a map is itself "information", in the sense of providing a space for the consensual dance. This is the significance I read into Conversation Theory.

Thus ENS is not, strictly speaking, a network. Rather, it is the means to enable a particular quality of networking. In such a manner may the ENS be described as providing the infrastructure for System Two of the VSM.

7.8 Conclusion/Closure

In nursing to light the "context" for Stafford Beer's Viable System Model, and situating its application and appreciation as concerning the ontology of the observer, I arrived at the point where I could demonstrate the sort of tools that might be brought forth consequent on the take-up of a hermeneutics of distinction (ie. the ENS). Such a conclusion was my original intent, although the form the conclusion would take remained opaque right up to the end (1.1).

The journey has been a difficult one, for as I hinted in the first chapter, I did not originally know where my path would lead me. Now I have arrived and I know, but I know not whither next. That is the way of things. We arrive where we in fact started, and know the place for the first time (2.1.1).

The path for the reader has no doubt also been difficult, but hopefully I dissolved many of my own ogres and fears in a fashion which encouraged rather than discouraged perseverance.

I wish to briefly comment on these difficulties. I always intended my writing to be an example of what Buckminster Fuller called "the design-science revolution"

(Buckminster Fuller 1981). The sympathetic resonance between "design" and "ontology" was one of the early factors that seduced me to pursue the course I followed, and to stubbornly persevere when the going got tough.

Now, Beer himself is profoundly uneasy with any talk of "ontology" (personal conversations). I find this ironic, as my interpretation of "economy in real-time" firmly situates it as ontology. I don't see how it can be understood and consensually taken up in any other form. Espejo also distances himself from my explication of "real-time". I am not clear why.

Irrespective of personalities, a crucial distinction would appear to be that between "commentary" and "bringing forth". The lack of clarity in the literature on this issue, gave me considerable problems as I attempted to develop my own discourse. In a way it was reading Richard Rorty that aided understanding of my own problem (Rorty 1980). The point that he nudges to light is that epistemology inevitably "finds itself" situated in terms of an ontology, whether this is explicitly stated or not. It seems to myself that Maturana explicitly acknowledges this constraint on our utterances (our languaging). Equally it is not clear that Beer or Espejo do.

This is perhaps an esoteric point. However, it was this which gave rise to such difficulties. As I have attempted to explain, I feel that it is this issue that underlies many of the problems experienced by students and practitioners in taking-up Beer's insights, and feeling confident of exploiting the tools he offers.

Computer packages have been and are being developed, that are directly indebted to Beer's insights into organisational structure and real-time (eg. Syncho's CYBERFILTER and VIPLAN). From the point of view of organisational analysis, these appear to be invaluable tools. Why then, was I seduced into an insight concerning an altogether different sort of computer system?

Partly, it must have something to do with my own prejudice against contemporary forms of organisational structure ("disciplinary grids" - Foucault), and a yearning for some sort of anarchic model of social interaction.

Beer has taken to describing "enabling networks" as relations in the fuzzy cloud to the left of his diagrammatic representation of the VSM (ie. in the environment of the System-in-Focus. It appears that what Beer intends when he uses the phrase "enabling networks", is something along the lines of the contemporary usage of "empowerment". In other words, the activation of social channels or movements, by

which individuals and groups will secure more emancipation from whatever it is that might be oppressing them. I have no argument with such a goal, but I see my own path as somewhat different.

This is because I have no faith at all in the emancipatory potential of social interaction per se. This is not said in order to disparage either human beings or social groups. Merely it's to suggest the possibility of other mechanisms which might have implications for such problematical dimensions of human social interaction.

Thus I am using "enabling" very differently from its more acceptable and recognisable guise. Ontology entails "bedding" so-called "higher" human functions in the so-called "lower" functions. While it might frequently be useful to distinguish higher from lower (eg. head from limbs, mind from brain, soul from body, boss from worker), such distinctions carry within them the seeds of tyranny and are usually to be found riding on the back of a Reality or Truth, marked out by the higher function, or in deference to it.

This message is clear in Beer's own writings, notably concerning his call for the System One/Five closure. However Beer is describing organisational processes rather than human ones. He is talking about the "organisational structure", organisational balances and mechanisms. This is

even more clearly the case in Espejo's writing and teaching. Indeed, this is the claimed strength and uniqueness of their approach to the handling of complexity in the social domain.

Such an approach is indubitably useful in identifying and bringing to light hitherto invisible communication bottlenecks, overloads or misunderstandings by the actors concerning the processes they are engaged in (see the examples in Espejo and Harnden (eds.) 1989). My cautionary note about such an approach is very different from more conventional criticism. The whole of my work cautions about prioritizing the Head, the Heart, the Mind, the Family, the State, the Firm, the Church or anything else. The biology of language and cognition demonstrates that the grounding of consensual interaction, whether recurrent or not (ie. viable or not), concerns our physiological processes, and the peculiar space for orthogonal intersection enabled by the nervous system and heightened by languaging.

If we firmly and consciously bracket hierarchical imagery and the models we orient in terms of, thus in turn bracketting any notions as to one Reality, then we open the consensual space for greater tolerance and acceptance of actions and phenomena which may or may not be pleasing to us.

In respect of Beer's model, what this means is that the engagement in the environment of the "lower" Systems (ie.

structural coupling of the organisationally closed System-in-Focus), is understood as generative of any engagement in the environment of the higher Systems (via System Four). As I have made clear elsewhere (Harnden 1989), System Four does not enable System Five to comment upon "outside and then". System Five is as "locked into" the organisationally closed unity, as any other System, merely (crucially) monitoring the Four/Three homeostat.

It is not that System Ones produce the System-in-Focus, as might sometimes appear to be the case to the unwary student or practitioner. It is the structural coupling of such systems in relation to a niche determined by their own dynamics, that produces the entailed composite unity and determines its ongoing trajectory. As I have mentioned previously, this concerns the notion of "real time". "Real time" is the One/Five loop, but in the sense that Five is generated in the course of structural drift. It emerges itself as "identity" or whatever else one might call it, through the organisational closure of such a structurally determined composite unity .

Beer's own approach to this problematic, his resolution of the difficulties thrown up by the apparent hierarchical nature of the model, and way it there tends to be interpreted, is to forgo the VSM and to embrace the discourse of Buckminster Fuller (Beer 1984b). Beer is still

working out the implications of this "idealisation" (following Russell Ackoff) of the model, which in essence concerns the notion of "organisational tensegrity". Imagining the organisation as an icosahedron, Beer describes organisational dynamics as the relations between "teams" which each have identical structures, and in respect of which the whole set-up at every level of recursion, is self-referential. This succeeds in firmly shifting away from hierarchical connotations.

The interesting point, is that in order to make such a switch, Beer is tending to surrender his original model. Essentially, the new model if developed in full, would be far more consonant with Maturana's notion of a composite unity that was structurally coupled to an environment, while its autopoiesis persists in the course of its natural drift.

To conclude: provided the VSM is grounded in imagery concerning structural coupling (eg. "the mind is not in the head" - Maturana 1985), then its hierarchical unfolding will always be bracketted as a convention alone. However, where such grounding is absent, where the notion of enabling resides in the environment rather than in the dynamics of the System-in-Focus itself, there will always be the temptation of sliding towards a transcendental ontology - towards scientism, positivism or metaphysical versions of religious engagement.

The clarification of these issues is not simple, whatever the good intentions of the teacher (eg. Beer and Espejo). It concerns reducing the claims of formal social structures (Head, Firm, Reality), and encouraging appreciation of the multiplicity of realities out of which consensual coordination of actions are generated and either recur or not.

This entails not merely a recognition that the whole conglomerate is produced by its divisions, and so on (ie. structural unfoldment according to the VSM); but insight that at any level of resolution one cares to distinguish (multinational, division, sector, department, shop floor), identity is a function of the consensual flow of the observers who are structurally realising such a function, including the observer making such an indication (oneself). This entails enabling the "voices" of such observers in the course of their realisation of the operational coherences that variously will alter those voices. It entails the bringing forth of multiple realities rather than striving for a fit with One Reality.

I hazard a guess that the next generation of management scientists will not be concerned to preserve and secure the boundaries of social enterprises, as if such enterprises were objectively discrete, monolithic entities. In the future, management science will concern orchestration

of decentralised processes of production and communication. In the post-industrial age, the preoccupation will be with the enabling of collaborative enterprises in spite of distances in space, in spite of the distinctness of individual realities. It will not concern organisational hegemony.

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