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Soft Systems Methodology: A Thirty Year Retrospective[a]

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INTRODUCTION

Although the history of thought reveals a number of holistic thinkers — Aristotle, Marx, Husserl among them — it was only in the 1950s that any version of holistic thinking became institutionalized. The kind of holistic thinking which then came to the fore, and was the concern of a newly created organization, was that which makes explicit use of the concept of 'system', and today it is 'systems thinking' in its various forms which would be taken to be the very paradigm of thinking holistically. In 1954, as recounted in Chapter 3 of *Systems Thinking*, *Systems Practice*, only one kind of systems thinking was on the table: the development of a mathematically expressed general theory of systems. It was supposed that this would provide a meta-level language and theory in which the problems of many different disciplines could be expressed and solved; and it was hoped that doing this would help to promote the unity of science.

These were the aspirations of the pioneers, but looking back from 1999 we can see that the project has not succeeded. The literature contains very little of the kind of outcomes anticipated by the founders of the Society for General Systems Research; and scholars in the many subject areas to which a holistic approach is relevant have been understandably reluctant to see their pet subject as simply one more example of some broader 'general system'!

But the fact that general systems theory (GST) has failed in its application does not mean that systems thinking itself has failed. It has in fact flourished in several different ways which were not anticipated in 1954. There has been development of systems ideas as such, development of the use of systems ideas in particular subject areas, and combinations of the two. The development in the 1970s by Maturana and Varela (1980) of the concept of a system whose elements generate the system itself provided a way of capturing the essence of an autonomous living system without resorting to use of an observer's notions of 'purpose', 'goal', 'information processing' or 'function'. (This contrasts with the theory in Miller's *Living Systems* (1978), which provides a general model of a living entity expressed in the language of an observer, so that what makes the entity autonomous is not central to the theory.) This provides a good example of the further development of systems ideas as such. The rethinking, by Chorley and Kennedy (1971), of physical geography as the study of the dynamics of systems of four kinds, is an example of the use of systems thinking to illuminate a particular subject area.

This paper provides an example of the third kind of development: a combination of the two illustrated above. We set out to see if systems ideas could help us to tackle the messy problems of 'management', broadly defined.

In trying to do this we found ourselves having to develop some new systems concepts as a response to the complexity of the everyday problem situations we encountered, the kind of situations which we all have to deal with in both our

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professional and our private lives. The aim in the research process we adopted was to make neither the ideas nor the practical experience dominant. Rather the intention was to allow the tentative ideas to inform the practice which then became the source of enriched ideas — and so on, round a learning cycle. This is the action research cycle whose emergence is described in *Systems Thinking*, *Systems Practice* and whose use and further development is the subject of *SSM in Action*.

The action research programme at Lancaster University was initiated by the late Gwilym Jenkins, first Professor of Systems at a British university, and Philip Youle, the perspicacious manager in ICI who saw the need for the kind of collaboration between universities and outside organizations which the action research programme required. Thirty years later that programme still continues, and with the same aim: to find ways of understanding and coping with the perplexing difficulties of taking action, both individually and in groups, to 'improve' the situations which day-to-day life continuously creates and continually changes. Specifically, the programme explores the value of the powerful bundle of ideas captured in the notion 'system', and they have not been found wanting, though both the ideas themselves and the ways of using them have been extended as a result of the practical experiences.

The progress of the 30 years of research has been chronicled and reflected upon since 1972 in about 100 papers and four books — which will be referred to in the remainder of this chapter by the initials of their titles. The nature of the books is summarized briefly below.

Systems Thinking, *Systems Practice* (*STSP*) (Checkland 1981) makes sense of systems thinking by seeing it as an attempt to avoid the reductionism of natural science, highly successful though that is when investigating natural phenomena; it describes early experiences of trying to apply 'systems engineering' outside the technical area for which it was developed, the rethinking of 'systems thinking' which early experience made necessary, and sets out the first developed form of SSM as a seven-stage process of inquiry.

Systems: Concepts, *Methodologies and Applications* (*SCMA*) (Wilson 1984, 2nd Edn 1990) describes the response of a professional control engineer to experiences in the Lancaster programme of action research; less concerned with the human and social aspects of problem situations, it cleaves to the functional logic of engineering and presents an approach which Holwell (1997) argues is best viewed as classic systems engineering with the transforming addition of human activity system modelling.

Soft Systems Methodology in Action (*SSMA*) (Checkland and Scholes 1990) describes the use of a mature SSM in both limited and wide-ranging situations in both public and private sectors; it moves beyond the 'seven-stage' model of the methodology (still useful for teaching purposes and — occasionally — in some real situations) to see it as a sense-making approach, which, once internalized, allows exploration of how people in a specific situation create for themselves the meaning of their world and so act intentionally; the book also initiates a wider discussion of the concept of 'methodology', a discussion which will be extended below.

Information, *Systems and Information Systems* (*ISIS*) (Checkland and Holwell 1998) stems from the fact that in very many of the Lancaster action research projects the creation of 'information systems' was usually a relevant, and often a core, concern; it attempts some conceptual cleansing of the confused field of IS and IT, treating IS as being centrally concerned with the human act of creating meaning, and relates experiences based on a mature use of SSM to a fundamental conceptualization of the field of IS/IT; it carries forward the discussion of SSM as methodology but less explicitly than will be attempted here.

It is important to understand the nature of these books if the aim of this chapter is itself to be properly understood. The less than impressive but nevertheless sprawling literature of 'management' caters in different ways for several different audiences. There is an apparent insatiable appetite for glib journalistic productions, offering claimed insights for little or no reader effort — *Distribution Management in an Afternoon*: that kind of thing. Such books are more often purchased than actually read. There is also a need for textbooks which systematically display the

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conventional wisdom of a subject for aspiring students. These need to be updated periodically in new editions. And also, more austerely, there are books which carry the discussion which is the real essence of any developing subject, and try to extend the boundaries of our knowledge. The books described above are of this kind. It is not usually appropriate — as it is with textbooks — to update them in new editions. They are 'of their time'. But it is useful on republication to offer reflections on the further development of the ideas as new experiences have accumulated since the books were written. That is what is done here for *STSP* and *SSMA*.

A particular structure is adopted. First, the emergence of soft systems thinking is briefly revisited. Then the methodology as a whole is considered, since the way in which it is thought about now is very different from the view of it in the 1970s, when it was a redefined version of systems engineering. This consideration of the methodology as a whole frames reflection on the separate parts which make up the whole (Analyses One, Two, Three; CATWOE; rich pictures; the three Es, etc.). This in turn yields a richer understanding of both the whole and its context. Such a structure, in which an initial consideration of the whole leads to an understanding of the parts, which in turn enables a richer understanding of the whole to be gained, is itself an example of Dilthey's 'hermeneutic circle' (Mueller-Vollmer 1986; Morse 1994, Chs 7 and 8). Here, it is a modest reflection of the same process through which SSM was itself developed, a process which tried to ensure that both whole and parts were continually honed and refined in cycles of action.

THE EMERGENCE OF SOFT SYSTEMS THINKING

The Starting Position

In the culture of the UK the word 'academic' is more often than not used in a pejorative sense. To describe something as 'academic' is usually to condemn it as unrelated to the rough and tumble of practical affairs. This was certainly the outlook of Gwilym Jenkins when he moved to Lancaster University in the mid-1960s to found the first systems department in a UK university. He did not want a department which could be dismissed as 'academic'. He rejected the idea that the name of the department should be Systems Analysis, in favour of a Department of Systems Engineering. 'Analysis is not enough', he used to say heretically. 'Beyond analysis it is important to put something together, to create, to ''engineer'' something.' Given this attitude it was not surprising that he initiated the programme of action research in real-world organizations outside the university. The intellectual starting point was Optner's concept (1965) that an organization could be taken to be a system with functional sub-systems — concerned with production, marketing, finance, human resources, etc. Jenkins' idea was that the real-world experiences would enable us gradually to build up knowledge of systems of various kinds: production systems, distribution systems, purchasing systems, etc. and that this knowledge would support the better design and operation of such systems in real situations. History did not, however, unfold in this way. Instead, the practical experiences led us to reject the taken-as-given assumption underlying the initial expectation, so taking the thinking in a very different direction. In doing this we had to distinguish between two fundamentally different stances within systems thinking: the two outlooks now known as 'hard' and 'soft' systems thinking.

At the outset, by formulating a research aim to uncover the fundamental characteristics of systems of various kinds, we were making the unquestioned assumption that the world contained such systems. Along with this went a second assumption that such systems could be characterized by naming their objectives. It seems obvious, for example, that 'a production system' will have objectives which can be expressed as: to make product X with a certain quality, at a certain rate, with a certain use of resources, under various constraints (budgetary, legal, environmental, etc.). Given such an explicit definition of an objective, then a system can in principle be 'engineered' to achieve that end. This is the stance of classic systems engineering (as described in Chapter 5 of *STSP*). This was what constituted

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'systems thinking' at the time our research started, and its origins, as far as application to organizations goes, lie in the great contribution to management science made by Herbert Simon in the 1950s and 1960s (Simon 1960, 1977), which propounded the clarifying (but ultimately limited) concept that managing is to be thought of as decision-taking in pursuit of goals or objectives.

The Learning Experience

We found that although we were armed with the methodology of systems engineering and were eager to use its techniques to help engineer real-world systems to achieve their objectives, the management situations we worked in were always too complex for straightforward application of the systems engineering approach. The difficulty of answering such apparently simple questions as: What is the system we are concerned with? and What are its objectives? was usually a reason why the situation in question had come to be regarded as problematical. We had to accept that in the complexity of human affairs the unequivocal pursuit of objectives which can be taken as given is very much the occasional special case; it is certainly not the norm. A current long-running example of the surprising difficulty in using the language of 'objectives' in human affairs is provided by the arguments which wax and wane over the Common Agricultural Policy (CAP) of the EEC. The Treaty of Rome boldly declares that the CAP has three equally important objectives: to increase productivity in the agricultural industry; to safeguard jobs in the industry; and to provide the best possible service to the consumer. No wonder the CAP is a constant source of never resolved issues: progress towards any one of its (equally important) objectives will be at the expense of the other two! This is typical of the complexity we meet in human affairs as soon as we move out of the more straight-forward area in which problems can be technically defined: e.g. 'increase as much as possible the productivity of this phthalic anhydride plant', or 'make a device to produce radio waves with a 10 cm wavelength'. (If you insisted on using the language of 'objectives', you would have to conclude that the objective of the CAP is constantly to maintain and adjust a balance between the three incompatible objectives which is politically acceptable — which is not a very useful definition for 'engineering' purposes.)

It was having to abandon the classic systems engineering methodology which caused us to undertake the fundamental thinking described in Chapters 2–4 of *STSP*. And it was this rethink which led ultimately to the distinction between 'hard' and 'soft' systems thinking.

Four Key Thoughts

The process of learning by relating experience to ideas is always both rich and confusing. But as long as the interaction between the rhetoric and the experienced 'reality' is the subject of conscious and continual reflection, there is a good chance of recognizing and pinning down the learning which has occurred. Looking back at the development of SSM with this kind of reflective hindsight, it is possible to find four key thoughts which dictated the overall shape of the development of SSM and the direction it took (Checkland 1995).

Firstly, in getting away from thinking in terms of some real-world systems in need of repair or improvement, we began to focus on the fact that, at a higher level, every situation in which we undertook action research was a human situation in which people were attempting to take purposeful action which was meaningful for them. Occasionally, that purposeful action might be the pursuit of a well-defined objective, so that this broader concept *included* goal seeking but was not restricted to it. This led to the idea of modelling purposeful 'human activity systems' as sets of linked activities which together could exhibit the emergent property of purposefulness. Ways of building such models were developed.

Secondly, as you begin to work with the idea of modelling purposeful activity — in order to explore real-world action — it quickly becomes obvious that many interpretations of any declared 'purpose' are possible. Before modelling can begin choices have to be made and declared.

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Thus, given the complexity of any situation in human affairs, there will be a huge number of human activity system models which *could* be built; so the first choice to be made is of which ones are likely to be most relevant (or insightful) in exploring the situation. That choice made, it is then necessary to decide for each selected purposeful activity the perspective or viewpoint from which the model will be built, the *Weltanschauung* upon which it is based. Thus when David Farrah, a director of the then British Aircraft Corporation asked us to use our systems engineering approach to see how the Concorde project might be improved, possible relevant systems might have included 'a system to manage relations with the British Government' (since they were funding it) or 'a system to sustain a European precision engineering industry' (since Concorde would help to stimulate such activity). Thinking like systems engineers at the time (What is the system? What are its objectives?) Dave Thomas and I in fact proceeded only with the most basic and obvious of possible choices: 'a system to carry out the project'. Neither did the second choice give us pause: how would we conceptualize that project? Again, with our systems engineering blinkers firmly in place, it did not occur to us to think of it as anything other than an engineering project. But given its origins, at a time when President de Gaulle of France was vetoing British entry into the European Common Market, a defensible alternative world-view would be to treat it as a *political* project. On the day the Concorde project agreement was signed the British Government let it be known that it expected Britain to join the European Community within a year, while de Gaulle a few weeks later told a press conference that it was probable that negotiations for British entry might not succeed; in fact he made the supersonic aircraft project a touchstone of Britain's sincerity in applying for membership (Wilson 1973, pp. 31–32). So a model of the project based on a political world-view might be as useful as — or perhaps more useful than — the more obvious one based on a technical world-view.

The learning here was that in making the idea of modelling purposeful activity a usable concept, we had to accept that it was necessary to declare both a world-view which made a chosen model relevant, and a world-view which would then determine the model content. Equally, because interpretations of purpose will always be many and various, there would always be a number of models in play, never simply one model purporting to describe 'what is the case'.

This moved us a good way away from classic systems engineering, and the next key thought in understanding our experience recognized this. It was the thought which can now be seen to have established the shape of SSM as an inquiring process. And that in turn established the 'hard/soft' distinction in systems thinking, though that too was not immediately recognized at the time.

We had moved away from working with the idea of an 'obvious' problem which required solution, to that of working with the idea of a *situation* which some people, for various reasons, may regard as problematical. We had developed the idea of building models of concepts of purposeful activity which seemed relevant to making progress in tackling the problem situation. Next, since there would always be many possible models it seemed obvious that the best way to proceed would be to make an initial handful of models and — conscious of them as embodying only pure ideas of purposeful activity rather than being descriptions of parts of the real world — to use them as a source of questions to ask of the real situation. SSM was thus inevitably emerging as an organized *learning system*. And since the initial choice of the first handful of models, when used to question the real situation, led to new knowledge and insights concerning the problem situation, this leading to further ideas for relevant models, it was clear that the learning process was in principle ongoing. What would bring it to an end, and lead to action being taken, was the development of an accommodation among people in the situation that a certain course of action was both desirable in terms of this analysis and feasible for these people with their particular history, relationships, culture and aspirations.

SSM thus gradually took the form shown in Figure 1.3 of *SSMA* (p. 7), repeated with some embellishment here as Figure A1. This was the form of representation of SSM which eventually took hold, and is the one now normally used. The

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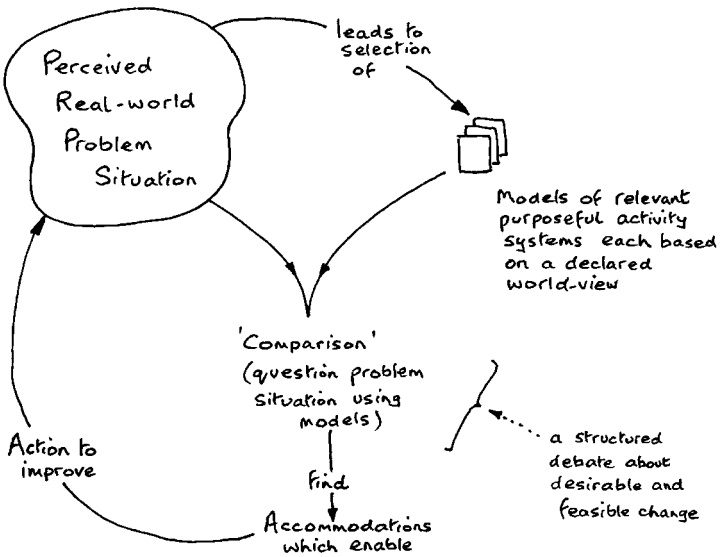

Principles

- real world : a complexity of relationships
- relationships explored via models of purposeful activity based on explicit world-views
- inquiry structured by questioning perceived situation using the models as a source of questions
- 'action to improve' based on finding accommodations (versions of the situation which conflicting interests can live with)
- inquiry in principle never-ending ; best conducted with wide range of interested parties ; give the process away to people in the situation

Figure A1. The inquiring/learning cycle of SSM

initial version of it was the 'seven-stage model' which is shown in Figure 6 in *STSP*, p. 163 and Figure 2.5 in *SSMA*, p. 27. This version, though still often used for initial teaching purposes, has a rather mechanistic flavour and can give the false impression that SSM is a prescriptive process which has to be followed systematically, hence its fall from favour.

These three key thoughts capture succinctly the learning which accumulated with experience of using SSM, and they make sense of its development. The fourth such thought, that models of purposeful activity can provide an entry to work on information systems (which are less than ideal in virtually every real-world situation) is not our concern here, this aspect of SSM's use being the detailed subject of *ISIS*.

Hard and Soft Systems Thinking

Our final concern in this section is the major thought which came from these particular experi-

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ences of relating systems thinking to systems practice: the 'hard'–'soft' distinction. This was first sharply expressed in a paper written two years after the publication of *STSP* in 1981 (Checkland 1983). It took some time for this idea to sink in!

In systems engineering (and also similar approaches based on the same fundamental ideas, such as RAND Corporation systems analysis and classic OR) the word 'system' is used simply as a label for something taken to exist in the world outside ourselves. The taken-as-given assumption is that the world can be taken to be a set of interacting systems, some of which do not work very well and can be engineered to work better. In the thinking embodied in SSM the taken-as-given assumptions are quite different. The world is taken to be very complex, problematical, mysterious. However, our coping with it, the process of inquiry into it, it is assumed, can itself be organized as a learning *system*. Thus the use of the word 'system' is no longer applied to the world, it is instead applied to the process of our dealing with the world. It is this shift of systemicity (or 'systemness') from the world to the process of inquiry into the world which is the crucial intellectual distinction between the two fundamental forms of systems thinking, 'hard' and 'soft'.

In the literature it is often stated that 'hard' systems thinking is appropriate in well-defined technical problems and that 'soft' systems thinking is more appropriate in fuzzy ill-defined situations involving human beings and cultural considerations. This is not untrue, but it does not *define* the difference between 'hard' and 'soft' thinking. The definition stems from how the word 'system' is used, that is from the attribution of systemicity.

Experience shows that this distinction is a slippery concept which many people find it very hard to grasp; or, grasped one week it is gone the next. Probably this is because very deeply embedded within our habits is the way we use the word 'system' in everyday language. In everyday talk we constantly use it as if it were simply a label-word for a part of the world, as when we talk about the legal system, health care systems, the education system, the transport system, etc. even though many of these things named as systems do not in fact exhibit the characteristics associated with the word 'system' when it is used properly. This day-by-day use unconsciously but steadily reinforces the assumptions of the 'hard' systems paradigm; and the speaking habits of a lifetime are hard to break!

As the thinking about SSM gradually evolved, the formation of this precise definition of 'hard' and 'soft' systems thinking did not arrive in the dramatic way events unfold in adventure stories for children ('With one bound, Jack was free!'). Rather the ultimate definition is the result of our feeling our way to the difference between 'hard' and 'soft', as experience accumulated, via a number of different formulations. These have been spotted and extracted by Holwell (1997, Table 4.2, p. 126) who collects eight different ways of discussing the hard/soft distinction between 1971 and 1990. These begin unpromisingly — judged by today's criteria — by assuming that 'hard' and 'soft' systems (roughly, determinate and indeterminate respectively) exist in the world. The shift in thinking comes between the publication of *STSP* and *SSMA*, its very first explicit appearance being in Checkland (1983), a paper which can now also be seen as part of the developments which have made the phrase 'soft OR' meaningful.

The eventual definition of the hard-soft distinction is succinctly expressed in Figure 2.3 of *SSMA* (p. 23), but this diagram is over-rich for many, and so here it is supplemented by Figure A2, a further attempt to make clear the difference between hard systems thinking and soft systems thinking. Understanding this idea is the crucial step in understanding SSM.

SOFT SYSTEMS METHODOLOGY — THE WHOLE

Learning from books or lectures is relatively easy, at least for those with an academic bent, but learning from experience is difficult for everyone. Everyday life develops in all of us trusted intellectual structures which to us seem good enough to make sense of our experiences, and in general we are reluctant to abandon or modify them even

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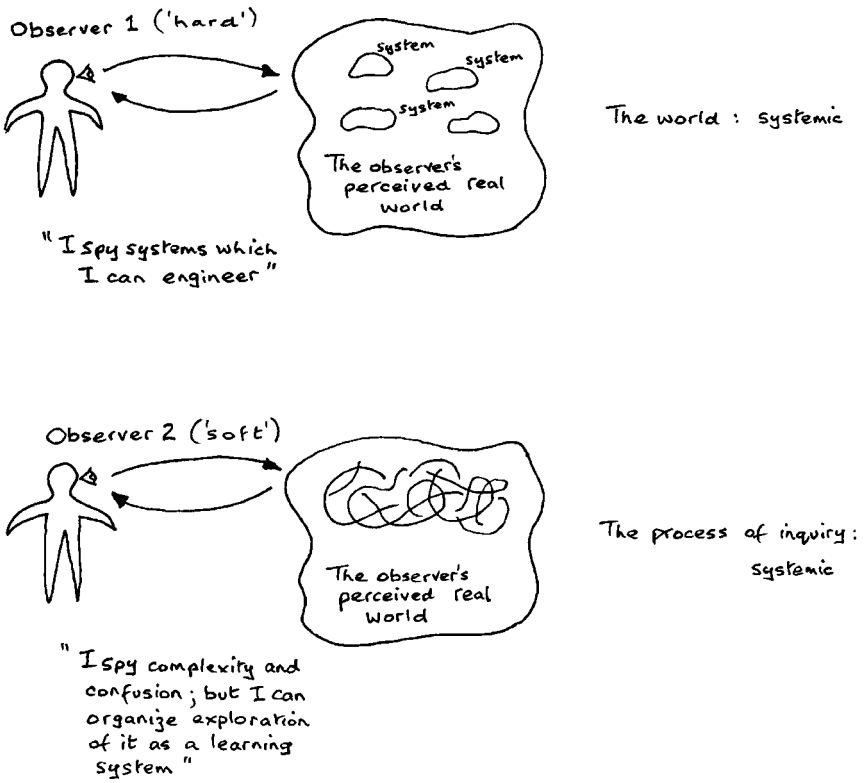

Figure A2. The hard and soft systems stances

when new experience implies that they are shaky. Even professional researchers, who ought to be ready to welcome change in taken-as-given structures of thinking, show the same tendency to distort perceptions of the world rather than change the mental structures we use to give us our bearings. So we were lucky in our research programme that the failure of classic systems engineering in rich 'management' problem situations, broadly defined, was dramatic enough to send us scurrying to examine the adequacy of the systems thinking upon which systems engineering was based. (The early experiences are described in *STSP*, Chapter 7.) But in spite of this it is still the case that the story of our learning is also the story of our gradually managing to shed the blinkered thinking which we started out with as a result of taking classic systems engineering as given.

Holwell (1997) has an appendix to her thesis which collects four different representations of SSM between 1972 and 1990 and correctly suggests that these 'show how the methodology has become less structured and broader as it has developed' (p. 450). It is useful briefly to review this changing perception of the methodology as a whole before moving on to a consideration of its parts.

1972 — Blocks and Arrows

The first studies in the research programme were carried out in 1969, and the first account of what became SSM (though that phrase was not used at the time) was published three years later in a paper: 'Towards a systems-based methodology for real-world problem solving' (Checkland 1972). The paper argues the need for methodology 'of practical use in real-world problems' [*sic*](p. 88), reviews the context provided by the systems movement, introduces the case for action

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research as the research method, describes three projects in detail, refers to six others, and describes the emerging methodology. It finishes with the very important argument that any methodology which will be used by human beings cannot, as methodology, be *proved* to be useful:

> Thus, if a reader tells the author 'I have used your methodology and it works', the author will have to reply 'How do you know that better results might not have been obtained by an *ad hoc* approach?' If the assertion is: 'The methodology does not work' the author may reply, ungraciously but with logic, 'How do you know the poor results were not due simply to your incompetence in using the methodology?' (p. 114)

With reference to human situations, neither of these questions can be answered. Methodology, as such, remains undecidable.

Nearly 30 years later the paper has a somewhat quaint air, though not embarrassingly so. Apart from the reference noted above to 'real-world problems', rather than problem *situations*, the main inadequacy now is in the legacy of hard systems thinking which leads to reference being made to both 'hard systems' and 'soft systems' as existing in the real world; thus we find a few remarks of the kind: 'In soft systems like those of the three studies under discussion. . . .' (p. 96). Such statements would not have been made a few years later. Also the methodology is presented as a sequence of stages with iteration back to previous stages, the sequence being: analysis; root definition of relevant systems; conceptualization; comparison and definition of changes; selection of change to implement; design of change and implementation; appraisal.

The focus on implementing *change* rather than introducing or improving *a system* is a signal that the thinking was on the move as a result of these early experiences, even if the straight arrows in the diagrams and the rectangular blocks in some of the models do now cause a little pain!

1981 — Seven Stages

By the time the first book about SSM was written (*STSP*, 1981) the engineering-like sequence of the 1972 paper was being presented as a cluster of seven activities in a circular learning process: the 'seven-stage model', versions of which are Figure 6 in *STSP* (p. 163) and Figure 2.5 in *SSMA* (p. 7). In this model the first two stages entail entering the problem situation, finding out about it and expressing its nature. Enough of this has to be done to enable some first choices to be made of relevant activity systems. These are expressed as root definitions in stage three and modelled in stage four. The next stages use the models to structure the further questioning of the situation (the stage five 'comparison') and to seek to define the changes which could improve the situation, the changes meeting the two criteria of 'desirable in principle' and 'feasible to implement' (stage six). Stage seven then takes the action to improve the problem situation, so changing it and enabling the cycle to begin again. The arrows which link the seven stages simply show the logical structure of the mosaic of actions which make up the overall process; it has always been emphasized that the work done in a real study will not slavishly follow the sequence from stage one to stage seven in a flat-footed or dogged way. Thus, to give one example, the stage five 'comparison' cannot but enhance the finding out about the situation, leading to new ideas for 'more relevant' systems to model. Similarly, the process can take a real-world change being implemented to be an example of stage seven; you can then work backwards to construct the notional 'comparison' which would lead to *this* change being selected, thus teasing out what world-views are being taken as given by people in the situation.

The seven-stage model of SSM has proved resilient, not least because it is easy to understand as a sequence which unfolds logically. This makes it easy to teach, and that too helps explain its resilience. Certainly it has three virtues worth noting before we begin to undermine it in what follows.

Firstly — an intangible, aesthetic point, but an important one — its fried-egg shapes and curved arrows begin to undermine the apparent *certainty* conveyed by straight arrows and rectangular boxes. These are typical of work in science and engineering, and the style conveys the implication: 'this is the case'. The more organic style of the seven-stage model (and of the rich pictures

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and hand-drawn models in *SSMA*) is meant to indicate that the status of all these artefacts is that they are working models, currently relevant *now* in *this* study, not claiming permanent ontological status. They are also meant to look more human, more natural than the ruled lines and right angles of science and engineering.

Secondly, it is a happy chance that the learning cycle of this model of the process has seven stages. Miller's well-known account of laboratory experiments on perception (1956) suggests that the channel capacity of our brains is such that we can cope with about seven items or concepts at once, hence the title of his famous paper: 'The magical number seven, plus or minus two: some limits on our capacity for processing information'. (He reminds us that there are seven days of the week, seven wonders of the world, seven ages of man, seven levels of hell, seven notes on the musical scale, seven primary colours. . . .) Irrespective of whether or not seven is truly a crucial number in human culture, the comfortable size of the model of the SSM process does mean that you can easily retain it in your mind. You do not have to look it up in a book, and this is very useful when using it flexibly in practice.

Another feature of the seven-stage model worthy of note is that the stages of forming most definitions and building models from them (stages three and four) were separated from the other stages by a line which separates the 'systems thinking world' below the line from the everyday world of the problem situation above the line. This distinguishing between the everyday world and the systems thinking *about* it was intended to draw attention to the conscious use of systems language in developing the intellectual devices (the activity models) which are consciously used to structure debate. The purpose of the line was essentially heuristic, and its elimination from the 1990 model of SSM will be discussed later in this paper.

Finally, as far as the 1981 model is concerned, it was important at that stage of development to think about what it was you had to do in a systems study if you wished to claim to be using SSM. This problem was first addressed by Naughton (1977). He was tackling the problem of teaching SSM to Open University students, and for the sake of clarity in teaching, distinguished between 'Constitutive Rules' which had to be obeyed if the SSM claim was to be made, and 'Strategic Rules' which allowed a number of options among which the user could choose. Versions of these rules endorsed in *STSP* are given in Table 6 (p. 253). This was a very useful development in its time, though this is another area which will be further discussed in the light of current thinking.

In summary, formulation of SSM in the 1981 book was at least rich enough to enable it to be taught and used; accounts began to appear of uses of SSM by people other than its early developers. See, for example, Watson and Smith (1988) for an account of 18 studies carried out in Australia between 1977 and 1987.

1988 — Two Streams

All of the action research which developed and used SSM was carried out in the spirit of Gwilym Jenkins' remark quoted earlier, that 'Analysis is not enough'. The overall aim in all the projects undertaken was to facilitate action, and it was always apparent that making things happen in real situations is a complex and subtle process, something which will not happen simply because some good ideas have been generated or a sophisticated analysis developed. Ideas are not usually enough to trigger action and that is why industrial companies value highly their 'shakers and movers': they are a much rarer breed than intelligent analysts. So, although a debate structured by questioning perceptions of the real situation by means of purposeful activity models was always insightful, moving on to action entailed broader considerations.

In the very first research in the programme, for example, in the failing textile company described in Checkland and Griffin (1970) and in *STSP* (p. 156), we were brought into the situation by a recently appointed marketing director. He had been brought into the company because the crisis due to falling revenues and disappearing profitability had at last been recognized by a relatively unsophisticated and rather inbred group of managers. This was the first instance in that

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company's history of appointing a senior manager from outside. The newcomer was thus not part of what had become a closed tribe, and though his previous experience gave him many ideas relevant to improving company performance, his effectiveness was profoundly affected by suspicion of the 'off-comer'. Understanding that, and taking it into account in influencing thinking in the company was crucial to initiating action.

It was thus important always to gain an understanding of the culture of the situations in which our work was done. For some years this was done informally, but — we hoped — with insights from experience, since all the original action researchers developing SSM were ex-managers rather than career academics — who are often naïve about life in unsubsidized organizations.

During those years much reflection went on concerning how we went about 'reading' situations culturally and politically, and it was a significant step forward when SSM was presented as an approach embodying not only a logic-based stream of analysis (via activity models) but also a cultural and political stream which enabled judgements to be made about the accommodations between conflicting interests which might be reachable by the people concerned and which would enable action to be taken. This two-stream model of SSM (*SSMA*, Figure 2.6, p. 29) was first expounded at a plenary session of the Annual Meeting of the International Society for General Systems Research in 1987, and was published the following year (Checkland 1988).

This version of SSM as a whole recognizes the crucially important role of history in human affairs. It is their history which determines, for a given group of people, both what will be noticed as significant and how what is noticed will be judged. It reminds us that in working in real situations we are dealing with something which is both perceived differently by different people and is continually changing.

Also, it is worth noting that this particular expression of SSM as a whole omits the dividing line between the world of the problem situation and the systems thinking world. It had served its heuristic purpose.

1990 — Four Main Activities

Published in 1981, *STSP* covered broadly the first decade of development of SSM. The seven-stage model gave a version of the approach which was by then sufficiently well founded to be applied in new real-world situations, large and small, in both the public and the private sector. That was what happened during the second decade of development, some of those experiences being described in *SSMA*. They cover action research in different organizational settings (industry, the Civil Service, the NHS) and include involvements which took from a few hours (ICL, Chapter 6, pp. 164–171) to more than a year (Shell, Chapter 9).

When it came to expressing the shape of the methodology in the 1990 book, the seven-stage model was no longer felt able to capture the now more flexible use of SSM; and even the two-streams model was felt to carry a more formal air than mature practice was now suggesting characterized SSM use, at least by those who had internalized it. The version presented was the four-activities model (*SSMA*, Figure 1.3, p. 7) of which Figure A1 in this chapter is a contemporary form. This is iconic rather than descriptive, and subsumes the cultural stream of analysis in the four activities, which it implies rather than declares.

The four activities are, however, capable of sharp definition:

1. Finding out about a problem situation, including culturally/politically;
2. Formulating some relevant purposeful activity models;
3. Debating the situation, using the models, seeking from that debate both
   (a) changes which would improve the situation and are regarded as both desirable and (culturally) feasible, *and*
   (b) the accommodations between conflicting interests which will enable action-to-improve to be taken;
4. Taking action in the situation to bring about improvement.

((a) and (b) of course are intimately connected and will gradually create each other.)

A decade after *SSMA* was published this iconic

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model of SSM is still relevant. Why that is so will be discussed when we return to discussing the methodology as a whole. But first it is useful to review the evolving thinking about the parts which make up the whole.

SOFT SYSTEMS METHODOLOGY — THE PARTS

The gradual change in the way SSM as a whole has been thought about, described above, has been paralleled by more substantive changes to some of the separate parts which make up the whole. Many of these represent conscious attempts to improve and enrich such things as model building, or the uses to which rich pictures are put; some have entailed dropping earlier ways of doing things, for example the shift away from using 'structure/process/climate' as a framework for initial finding out about a situation (*STSP*, pp. 163, 164, 166), or the deliberate dropping of the 'formal system model' (*STSP*, Figure 9; *SSMA* pp. 41, 42). But whether the changes to the parts were additions or deletions, they were never made by sitting at desks being 'academic'. They have always been made as a result of experiences in using the approach in a complex world, and they have played their part in changing perceptions of SSM as a whole. This section will review the changes to the parts of SSM, the review being structured by the four activities which underpin the mature icon for SSM which is Figure A1 here.

Finding Out about a Problem Situation

Rich Picture Building

Making drawings to indicate the many elements in any human situation is something which has characterized SSM from the start. Its rationale lies in the fact that the complexity of human affairs is always a complexity of multiple interacting relationships; and pictures are a better medium than linear prose for expressing relationships. Pictures can be taken in as a whole and help to encourage holistic rather than reductionist thinking about a situation.

Producing such graphics is very natural for some people, very difficult for others. If it does not come naturally to you, it is a skill worth cultivating, but experience suggests that its *formalization* via use of ready-made fragments, such as is advocated by Waring (1989) is not usually a good idea, except perhaps as a way of making a start. Users need to develop skill in making 'rich pictures' in ways they are comfortable with, ways which are as natural as possible for them as individuals.

As far as use of such pictures is concerned, we have found them invaluable as an item which can be tabled as the starting point of exploratory discussion with people in a problem situation. In doing so we are saying, in effect 'This is how we see this situation at present, its main stakeholders and issues. Have we got it right from your perspective?' For example, when researching the subtle relationship between a health authority and one of its acute hospitals a few years ago (during the short-lived experiment with 'contracting' in the NHS) we assembled from a great many semi-structured interviews a somewhat large and complicated picture — though even very elaborate pictures are of course selections. (Bryant (1989) is correct to emphasize that 'Selection of the key features of a situation is a crucial skill in developing a picture' (p. 260).) The picture in question became known as 'the briar patch', since that was the impression it gave at first glance! Nevertheless it was found extremely useful, in a second round of interviews, to talk people through it and ask them for both their comments about things we had got wrong, as they saw it, and for their views on what were the main issues concerning contracting (Duxbury 1994). Their responses not only improved the picture, and hence our holistic view of the situation, but also contributed to our understanding of the social and cultural features of the situation — the subject, in SSM of Analyses One, Two and Three (discussed below).

In recent work in the Health Service a new role for rich-picture-like illustrations has emerged. In December 1997 the Government White Paper *The New NHS* (HMSO 1997) described a new concept

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of the NHS, which was to exhibit such features as: led from the front line of health care ('primary care' by family doctors and other local services); founded on evidence-based medicine, with national standards and guidelines; and supported by modern information systems. Achieving this, according to the Minister of Health responsible for it, involved 'a demanding ten year programme' of development (p. 5). In 1998 the necessary information strategy to support this vision was published, the two documents being coherently linked (Burns 1998). Together, these two publications represent the best conceptual thinking about the NHS for 20 years, though realizing the vision will be an immense and difficult task for medics who are usually not very interested in thinking deeply about *managing* their work (as opposed to its professional execution) and for an organization in which sophisticated 'informatics' skills are scarce.

The White Paper and the information strategy are documents of 86 and 123 pages respectively; absorbing their message is not an easy task for people as busy as health care professionals and Health Service managers. We have found it exceptionally useful, in work commissioned by the centre of the NHS on the information system implications of the new concept for acute hospitals, to turn these excellent but overwhelming documents into picture form. (The documents themselves, being products of a Government service in which prose rules, contain only a handful of rather unadventurous diagrams.) For the White Paper, Figure A3 gives the basic shape of the concept, while Figure A4 adds much more detail to this simple picture. The information strategy, more complicated at a detailed level than the White Paper, was converted into a suite of eight pictures covering its core processes and structures, as well as the intended technical solution: electronic patient records which gradually evolve into each person's lifelong electronic health record. These picture versions of long documents have been very useful in conceptualizing our work, and no NHS audience sees them without asking for copies. This experience does suggest that there is a useful role for pictures of this kind wherever there is detailed written exposition of plans and strategies — at least until the happy times when such documents will themselves use seriously the medium of pictures as well as words.

Figures A3 and A4 can be seen as representations of combined structures and processes which enable the relation between the two elements to be debated. But the use of 'structure', 'process' and 'the relation between them' as a *formal* framework for 'finding out' in SSM, emphasized in the 1972 paper and in *STSP* (pp. 163, 164, 166), has not survived. I believe personally that I still use that framework *mentally*, without giving it much focused thought, but its more formal use, as described in 1972, has fallen into disuse. This seems to be because when you are faced with the energy and confusion which greet you whenever you enter any human problem situation, that particular framework seems highly abstract, a long way away from enabling you to grapple with pressing issues. However, as always with methodology, if it seems useful to you, then use it!

Analyses One, Two and Three

In addition to rich picture building, other frameworks which help to make the grasp of the problem situation as rich as possible are provided by Analyses One, Two and Three (*STSP*, pp. 194–198, 229–233; *SSMA*, pp. 45–53). Analysis One is an examination of the intervention itself, and its development was a direct result of our experience of research for the late Kenneth Wardell, a respected mining engineering consultant in that industry. (He is the 'Mr Cliff' of *STSP* (pp. 194–198).) This analysis is now a deeply embedded part of the thinking. The rich pictures will draw attention to the (usually) many people or groups who could be seen as stake-holders in any human situation, and Analysis One's list of possible, plausible 'problem owners', selected by the 'problem solver', is always a main source of ideas for 'relevant systems' which might usefully be modelled.

The freedom of the person or group intervening in a problem situation to answer the question: 'Who could I/we take the problem owner to be?' is important in achieving a grasp of the situation which is as holistic as possible. Thus in work which helped a community centre in

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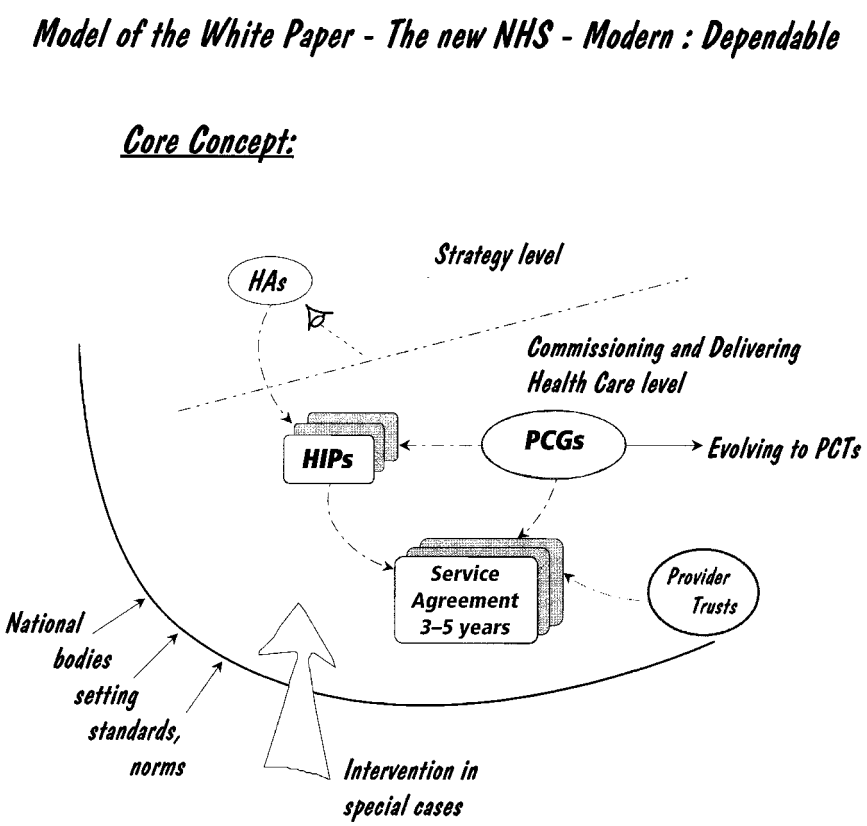

Figure A3. The core concept of the NHS White Paper 1997 (HA = health authority; HIP = health improvement plan; PCG = primary care group; PCT = primary care trust)

Liverpool to rethink its role in a run-down part of that city, it was relevant to consider Liverpool Social Services Department as one among many possible problem owners, even though at the time the relationship between the centre and the department had not surfaced as an issue for anyone in the department. This kind of choice is what trying to be 'as holistic as possible' entails — even though *the* whole will always remain an unreachable grail. To adopt the counter-view suggested by Bryant (1989) that to be a problem owner you have to be *aware* of owning the problem, would put a completely unnecessary constraint on interventions founded on soft systems thinking.

Analyses Two and Three, comprising a framework for the social and political analyses, are also now thoroughly embedded in praxis. Some commentators have suggested that they are less highly developed than some of the other parts of SSM, such as model building, but that is to misunderstand them. The roles/norms/values framework and the ongoing analysis of 'commodities which embody power' are certainly simply expressed. That is the point of them. You can keep them in your head, and they can constantly guide all of the thinking which goes on throughout an intervention. But though they are simple in expression they reflect one of the main underlying conclusions from the whole 30 years of SSM development: that to make sense of it you have to adopt the view argued in Chapter 8 of *STSP* (pp. 264–285), namely that social reality is no reified entity 'out there', waiting to be investigated. Rather, it is to be seen as continuously socially constructed and reconstructed by individuals and groups (the latter never perfectly coherent). This represents an intellectual stance

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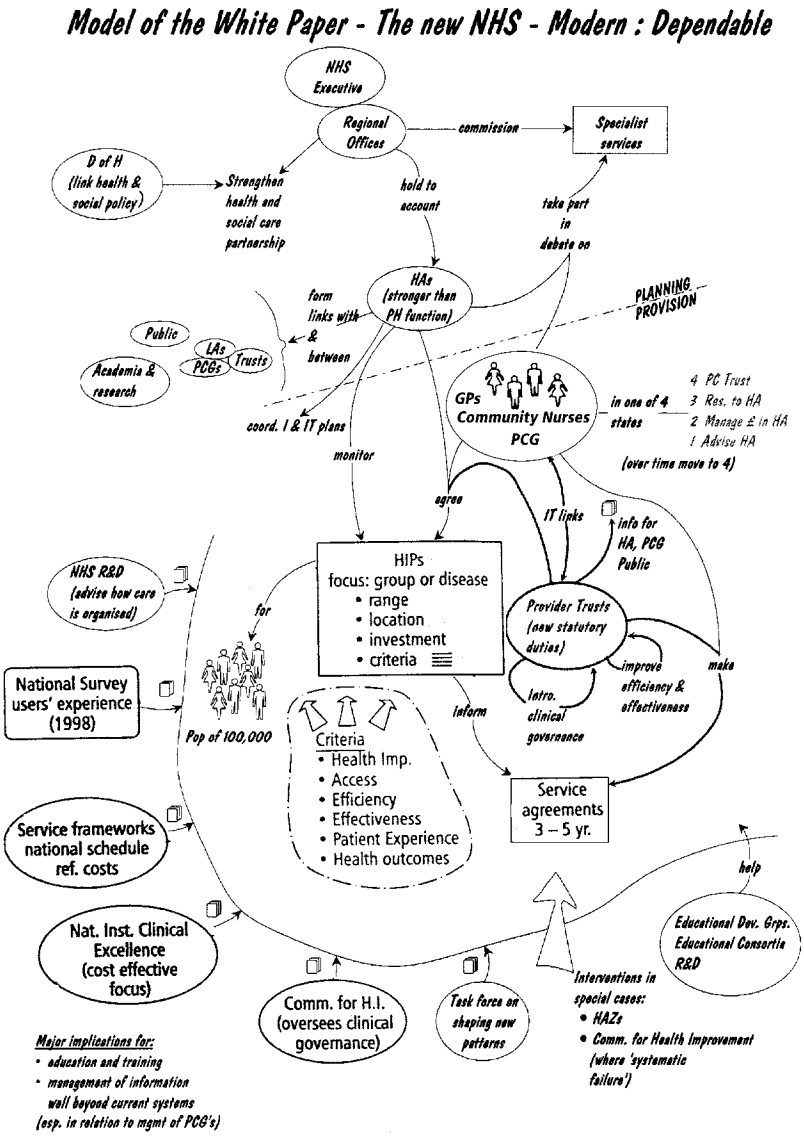

Figure A4. The White Paper concept of the New NHS 1997 (D of H = Department of Health; HAZ = health action zone; HI = health improvement; PH = public health)

defined by such features as: deriving from the work of Max Weber; articulated, for example, in the sociology of Alfred Schutz; and underpinned by the philosophy of Edmund Husserl (Luckmann 1978, pp. 7–13). In practical terms, the usable framework which underpins Analyses Two and Three was found in the autopoietic model teased out of the work of Vickers on 'appreciative systems' (Checkland and Casar 1986). That will be discussed further towards the end of this chapter.

Analysis Three moves beyond the model of an appreciative system but is compatible with it. (The appreciative system model describes a social process; Analysis Three covers one of the main determinants of the *outcomes* of that process: the distribution of power in the social situation.) This analysis is avowedly practical, a highly sig-

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nificant contribution to the development of SSM from the action research carried out by Stowell in a light engineering company and in an educational publisher (Stowell 1989). He reviews the extensive social science literature on 'power', but his main aim is not to add to that literature — which is strong on words, less interested in action — but to find practical ways of enabling open discussions to take place on topics which are usually taboo, or emerge only obliquely in the local organizational jokes. These are discussions focused on power, its manifestations and the pattern of its distribution.

Analysis Three is not based on an answer to the question: What is power? It works with the fact that everyone who participates in the life of any social grouping quickly acquires a sense of what you have to do to influence people, to cause things to happen, to stop possible courses of action, to significantly affect the actions the group or members of it take. The metaphor of the 'commodities' which embody power is used to encourage discussion of these matters. Views can be elicited on what you have to possess to *be* powerful in this group or this organization. Is it knowledge, a particular role, skills, charisma, experience, clubbability, impudence, commitment, insouciance ... etc? Recent history of the organization or group can be questioned and/or illustrated in these terms, all with the aim of finding out as deeply as possible how this particular culture 'works', what change might be feasible and what difficulties would attend that change. Stowell (1989) describes the use of the metaphor 'commodity' thus:

> 'Commodity', then, is the proposed means of providing organisational members involved in change with a practical means of addressing power. Acknowledging, with Giddens, 'that speech and language provide us with useful clues as to how to conceptualise processes of social production and reproduction', what has been suggested within this thesis is an idea by which the notion of power can be articulated in terms which are appropriate to a given organizational culture and which can be understood by those most affected (p. 246).

The aspiration of openness here is admirable, but do not be surprised if Analysis Three has to be carried out with great sensitivity and tact. In many human situations there is not the confidence necessary for open discussion of issues hinging on power.

Before moving on from the 'finding out' activity, it is worth reiterating that 'finding out' is never finished; it goes on *throughout* a study, and must never be thought of as a preliminary task which can be completed before modelling starts.

Building Purposeful Activity Models

The Role of Modelling in SSM

The purposeful activity models used in SSM are *devices* — intellectual devices — whose role is to help structure an exploration of the problem situation being addressed. This is not an easy thought to absorb for many people, since the normal connotation of the word 'model', in a culture drenched in scientific and technological thinking, is that it refers to some representation of some part of the world outside ourselves. This is the case, for example, for models as used within classic operational research. If an operational researcher builds a model of a production facility, then there is a need, before experimenting on the model to obtain results which can be used to improve the real-world performance, to first show that the model is a 'valid' representation. This might be done by showing that the model, fed with the last six months' input, can generate something which is close to the actual output produced over that period. But models in SSM are not at all like this. They do not purport to be representations of anything in the real situation. They are accounts of concepts of pure purposeful activity, based on declared world-views, which can be used to stimulate cogent questions in debate about the real situation and the desirable changes to it. They are thus not models *of* ... anything; they are models *relevant to debate* about the situation perceived as problematical. They are simply devices to stimulate, feed and structure that debate.

In the early stages of SSM's development, devices of only one type were built. Blinkered by our starting position in systems engineering, we tended only to make models whose (systems) boundaries corresponded to real-world organ-

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izational boundaries. This self-imposed limitation derived, we can now see, from the systems engineers' view that the world consists of interacting systems. Thus, working in, say, a manufacturing company with a conventional functional organization structure, we would make models of a production system, an R&D system, or a marketing system. These would map on to Production, R&D and Marketing departments. But organizations have to carry out, corporately, many more purposeful activities than the handful which can be institutionalized in an organization structure. For example, suppose the manufacturing company in question to be in the petrochemicals business. Such companies, in order to survive in a science-based international business full of very smart competitors, have to be technological innovators. In a systems study carried out in just such a company (the study being concerned with improving relations between R&D and other functions) it was found very useful to make a model based on the core idea of *innovating* in that industry. That model (a ... system ... to innovate ... in the petrochemical industry ...) had a boundary which did not coincide with the organizational boundaries of the (functionally defined) existing departments. Not surprisingly, many of the activities in that model were actually taking place in the company: some in R&D, some in Production, some in Marketing. Also, some of the activities in the model were missing in the real situation. The great value of the model was that its boundary *cut across* the organizational boundaries of the actual departments. This was very helpful in stimulating discussion and debate within the company, when the model was used to question the existing situation.

Models which map existing organization structures (such as 'a system to carry out R&D' in this example) are thought of as 'primary task' models; models like that of the innovation system are 'issue-based' — the notional issue here being that somehow or other this particular company has to ensure that it has the ongoing capability to innovate. This primary task/issue-based distinction (*SSMA*, p. 31) has been found to be a source of confusion for many. This is probably because the distinction is not absolute. The petrochemical company, if its thinking had been a little different, *might* well have brought together people with the appropriate skills and expertise to staff an Innovation Department. Had they done so the issue-based model here would then have been a primary task model. Pragmatically, to make sure that the useful provocation provided by models whose boundaries cut across existing organization boundaries is not neglected, the rule from experience is simple: make sure that you do not think only in terms of models which map existing structures. This will help ensure that the modelling fulfils its intended role in SSM: to lift the thinking in the situation out of its normal, unnoticed, comfortable grooves.

Root Definitions, CATWOE and Multi-level Thinking

To build a model of a concept of a complex purposeful activity for use in a study using SSM, you require a clear definition of the purposeful activity to be modelled. These definitional statements, SSM's 'root definitions', are constructed around an expression of a purposeful activity as a transformation process T. *Any* purposeful activity can be expressed in this form, in which an entity, the input to the transforming process, is changed into a different state or form, so becoming the output of the process. A bold sparse statement of T could stand as a root definition, for example 'a system to make electric toasters', but this would necessarily yield a very general model. Greater specificity leads to more useful models in most situations, so the T is elaborated by defining the other elements which make up the mnemonic CATWOE, as described in *STSP* (Chapters 6, 7, Appendix 1) and *SSMA* (Chapter 2; illustrated *passim*).

These are not abstruse ideas; the skills required for model building are not arcane: logical thought and an ability to see the wood *and* the trees; also, any model should be built in about 20 minutes. Nevertheless there are classic errors which recur time and time again. The most common error, often found in the literature, is to confuse the input which gets transformed into the output with the resources needed to carry out the transformation process. This conflates two different ideas: input and resources, which coherency

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requires be kept separate. Also, when people realize that there is a formula (an abstract one) which will always produce a formulation which is at least technically correct, namely: 'need for X' transformed into 'need for X met', they seize on this with glee. Unfortunately, they then often slip into writing down such transformations as 'need for food' transformed into 'food'. What a fortune you could make in the catering industry if you knew how to bring off that remarkable transformation! It is evidently not easy to remember that in a transformation what comes out is the same as what went in, but in a changed (transformed) state.

In recent years experience has shown the value of not only including CATWOE elements in definitions but also casting root definitions in the form: do P by Q in order to contribute to achieving R, which answers the three questions: What to do (P), How to do it (Q) and Why do it (R)? [This formulation was, alas, initially given in terms of XYZ rather than PQR (*SSMA*, p. 36). Using P, Q and R avoids the chance that Y may be confused with why?] The simplest possible definition is of 'a system to do P'. 'Do P by Q' is richer, answering the question: how? And also forcing the model builder to be sure that there is a plausible theory as to why Q is an appropriate means of doing P. For example: 'communicate (P) by letter writing (Q)' is certainly plausible, but would provoke examination of the reasons for doing this communication (i.e. the R question) by this chosen means. In this particular case, the question of required timing would have to be thought about. This could lead to examining, for example, whether there was a case for replacing the cultural resonance which goes with writing a letter to someone by the more brutal but quicker e-mail.

The formal aim of this kind of thinking prior to building the model is to ensure that there is clarity of thought about the purposeful activity which is regarded as relevant to the particular problem situation addressed. The idea of levels, or layers (or 'hierarchy', though that word tends to carry connotations of authoritarianism which are not relevant here) is absolutely fundamental to systems thinking. Much human conversation is dogged by the confusion which follows from the common inability to organize thoughts and expression consciously in several layers. Thus, the Chair of the Tennis Club Social Committee opens a meeting by saying that the committee needs to decide whether or not to organize the club fête this year, given the wet day last July and the unfortunate arrival of a gang of unruly bikers! As you begin to think about this, sitting in committee, you are surprised (but should not be) that the first member to speak says: 'My sister and I will do the cake stall as usual'. Systems thinkers are adept at consciously separating 'whether' from 'what' and 'how'.

In selecting some hopefully relevant systems to model, there are in principle always a number of levels available, and it is necessary to decide for each root definition which level will be that of 'the system', the level at which will sit the T of CATWOE. This makes the next lower level the 'sub-system' level: that of the individual activities which, linked together, meet the requirements of the definition. The next higher level is then defined automatically as that of the 'wider system': the system of which the system defined by T is itself only a sub-system. In SSM this higher level is the level at which a decision to stop the system operating would be taken: it is the level of the system 'owner', i.e. the O of CATWOE. Thus, this intellectual apparatus of T, CATWOE, root definition and PQR, ensures that the thinking being done covers at least three levels, those of system, sub-systems and wider system. It prevents the thinking from being too narrow, and stimulates thoughts about whether or not to build other models. For example it might be decided also to model at the wider-system level, or to expand some of the individual activities in the initial model by making them sources of further root definitions. (Figure 8.14 in *SSMA*, p. 231, for example, shows a model in which activity 1 has been expanded into four more detailed activities. Similar structuring is shown in Figure 5.6, p. 136, and Figure 7.8 of *ISIS*, p. 209 shows a simple model in which most of the activities have been expanded in this way.) Figure A5 summarizes the importance of thinking consciously at several different levels, and also makes the point that different people might well make different judgements about which level to take as that of 'the

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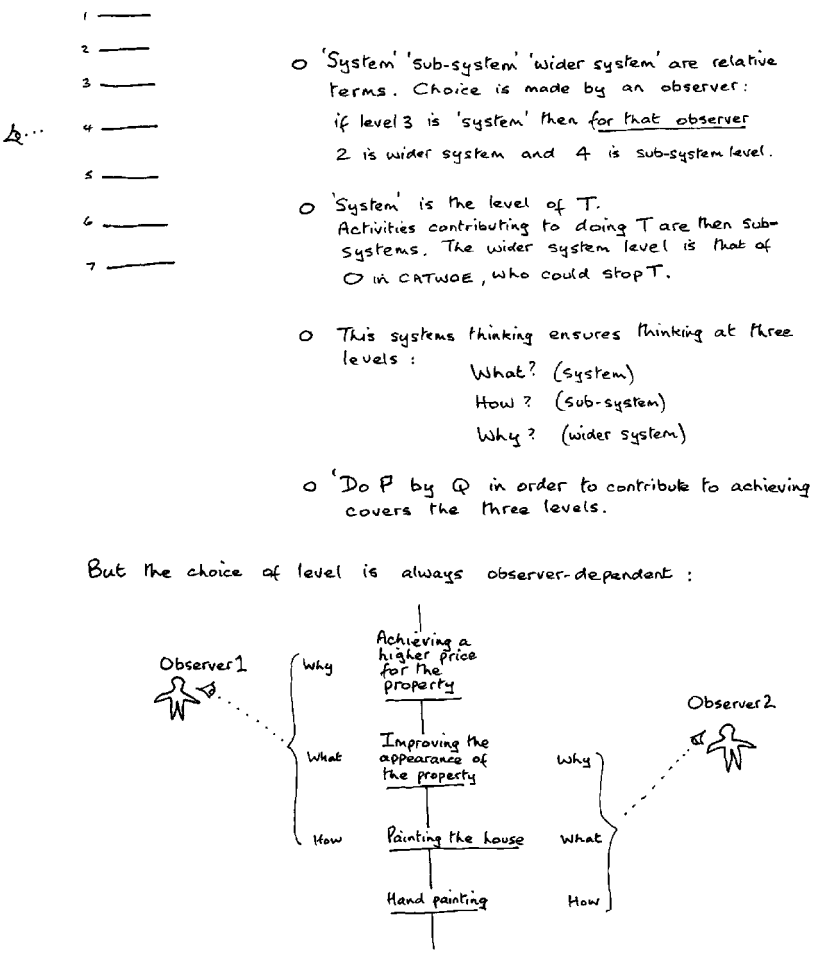

Figure A5. Systems thinking entails thinking in layers defined by an observer

system'. 'What' and 'how', 'system' and 'sub-system' are relative, not absolute concepts.

Measures of Performance

It is obvious from the form of SSM (as in Figure A1) that it would be possible to use the approach without creating *systems* models as the devices used to shape the exploration of the situation addressed. It would be possible to use instead models based on theories of, say, aesthetics, psychology, religion, or even, if you were foolish enough to abandon rationality completely, astrology! We use systems models because our focus is on coping with the complexity in everyday life, and that complexity is always, at least in part, a complexity of interacting and overlapping relationships. Systems ideas are intrinsically concerned with relationships, and so systems models seem a sensible choice; and since they have been found, time after time, to lead to insights, they have not been abandoned.

Now, the core systems image is that of the whole entity which can adapt and survive in a changing environment. So our models, to use systems insights, need to be cast in a form which in principle allows the system to adapt in the light of changing circumstances. That is why models of purposeful activity are built as sets of linked activities (an operational system to carry out the T of CATWOE) together with another set of

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activities which monitor the operational system and take control action if necessary. Since there is no such thing as completely neutral monitoring, it is necessary to define the criteria by which the performance of the system as a whole will be judged. Hence the core structure of the monitoring and control sub-system is always the same: a 'monitor' activity contingent upon definition of the criteria by which system performance will be judged, and an activity rendered as 'take control action' which is contingent upon the monitoring. This can of course be augmented if justified in particular cases — as in the model in *STSP*, p. 291. The basic structure is seen in many of the models in *SSMA* and *ISIS*.

For many years the concept of 'measures of performance' was felt to be sufficient for use in models, but was then enriched by an analysis which flows from the consideration that SSM's models are simply logical machines for carrying out a purposeful transformation process expressed in a root definition. Measuring the performance of a logical machine can be expressed through an instrumental logic which focuses on three issues: checking that the output is produced; checking whether minimum resources are used to obtain it; and checking, at a higher level, that this transformation is worth doing because it makes a contribution to some higher level or longer-term aim. This gives definitions of the '3Es' which will be relevant for every model: the criteria of efficacy (E_1), efficiency (E_2), and effectiveness (E_3), first developed in 1987 (Forbes and Checkland 1987; Checkland *et al*. 1990; *SSMA*, pp. 38, 39). This core set of criteria can be extended in particular cases — for example by adding E_4 for ethicality (is this transformation morally correct?) and E_5 for elegance (is this an aesthetically pleasing transformation?). Since it will not be possible to name the criteria for effectiveness without thinking about the aspirations of the notional system owner (O in CATWOE), this analysis is another contribution which prevents the modeller's thinking being restricted only to one level, that of the system itself.

Model Building

Given the preliminary thinking expressed in root definition, CATWOE, the three Es and PQR, assembling an activity model ought not to be too difficult: simply a matter of assembling the activities required to obtain the input to T, transform it, and dispose of the output, ensuring that activities required by the other CATWOE elements are also covered; then link the activities according to whether or not they are dependent upon other activities. And the task ought not to be an elaborate one either, given the oft-proved value of the heuristic rule that the overall activity of the operational sub-system should be captured in Miller's (1968) 'magical number' 7 ± 2 individual activities (any of which can if necessary be made the source of a more detailed model). Nevertheless some people manage to make model building a task fraught with difficulty. This is probably because there are in fact subtle features of the process which are masked in the simple account just given.

These subtleties are illustrated by the fact that, for example, the distribution manager of a manufacturing company is probably not the person who will find it very easy to build a model from a root definition of a system to distribute manufactured products. The difficulty for such a person is to focus only on unpacking and displaying the *concept in the root definition*; the tendency will be to slip into describing the real-world arrangements for distributing products in his or her own company. Equally, inexperienced users, fresh-from-school undergraduates especially, find all such models difficult to build because they know so little about real-world arrangements. The fact is — and this is where the unobvious difficulties of modelling lie — it is not usually possible to construct a model *exclusively* on the basis of a root definition, CATWOE, three Es and PQR; real-world knowledge *does* inform model building, but, crucially, must not dominate it. The craft skill is to build a model using a background of real-world knowledge without including features of typical practice which are not justified by the root definition, CATWOE, 3Es and PQR. As always with craft skills, practice, practice, practice is the watchword.

Because most practitioners initially 'feel their way' to a method of modelling comfortable for them, it may be helpful to provide some templates which derive purely from the logic of the

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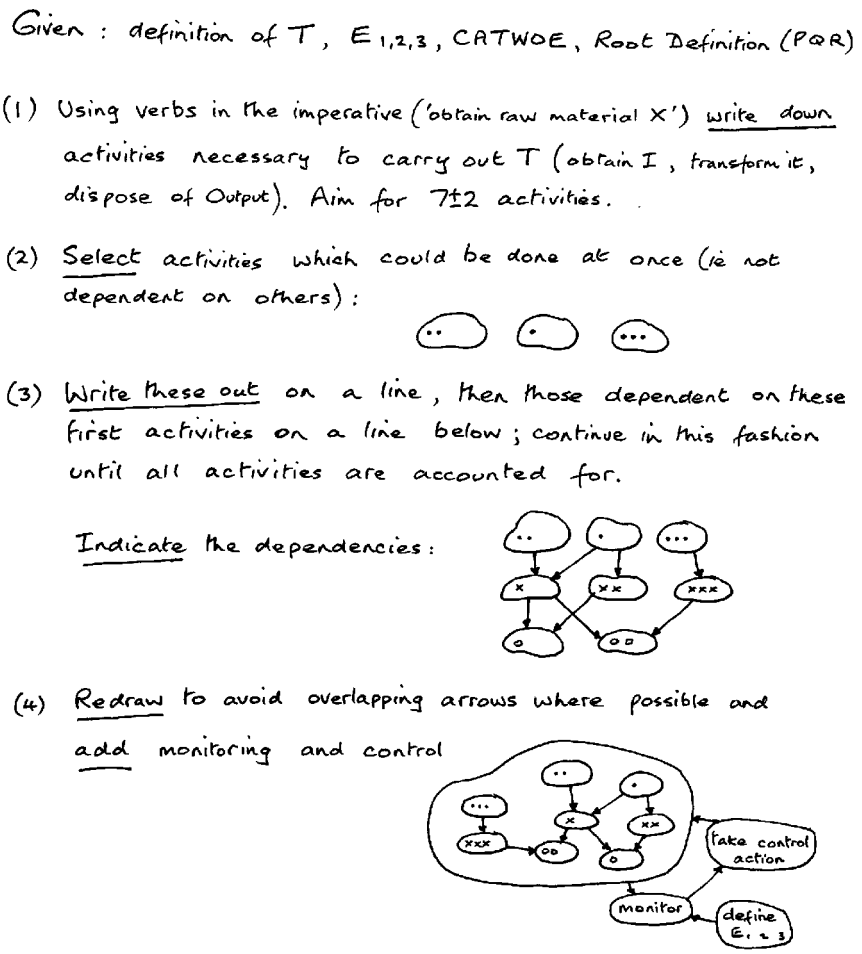

Figure A6. A logical procedure for building activity models

process and which may provide help for those just starting to use the process of SSM. Two such templates are provided here; they are meant to be abandoned as experience grows.

Figure A6 sets out a logical procedure for modelling purposeful activity systems in a series of steps; Figure A7 expresses the process in Figure A6 as a partial activity model. These are self-explanatory, though it may be remarked with reference to Figure A6 that although the stages can be carried out on a computer screen, there is a good case, as long as you can manage it in good visual style, for producing the final model in hand-drawn form. The reason for this is psychological, and is the same as that for drawing egg or cloud shapes rather than rectangular boxes: it acknowledges the models' role as pragmatic devices, not definitive once-and-for-all statements. In Figure A7 the process form emphasizes the exercise of judgement during modelling. Iteration around activities 2, 3, 4 continues until it is felt that the minimum but necessary cluster of activities has been assembled; the wider iterations around activities 1 to 6, and around 1–6–4–5 represent the checks that the model is *defensible* in relation to the concept being expressed.

Once a model is constructed by such a process, the golden rule for 'reading' a model — something which the many people unconsciously straitjacketed in linear thinking find difficult — is always to start from the activities which are not

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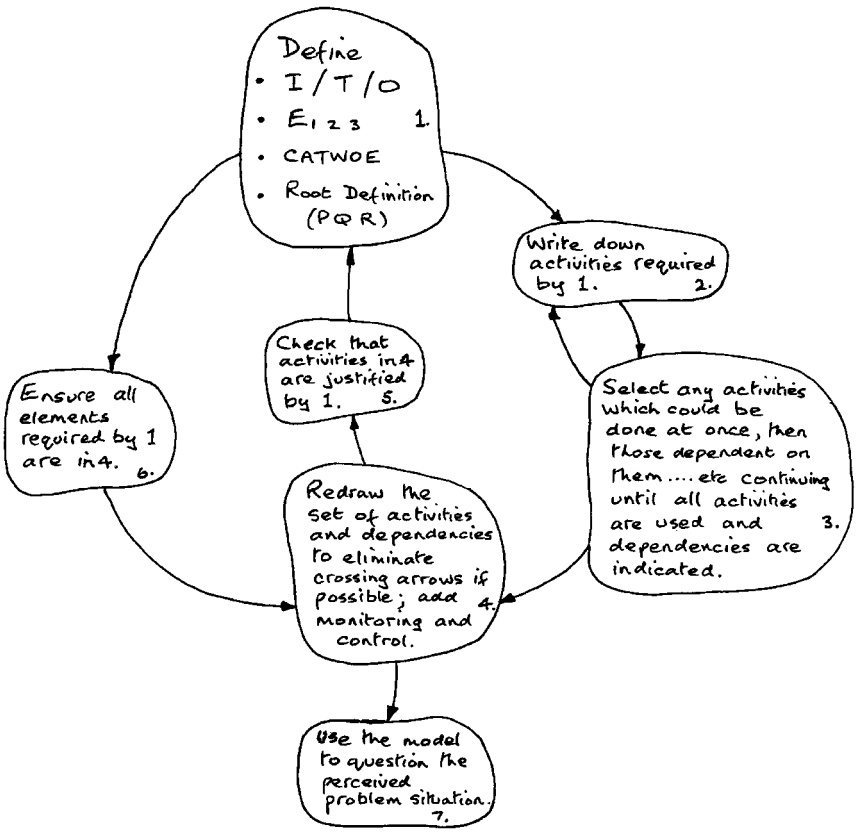

Figure A7. The process of modelling in SSM, embodying the logic of Figure A6.

dependent upon other activities but have others dependent upon them, i.e. those which have arrows from them but none to them.

Finally, on modelling, a few remarks about the formal system model are in order (*STSP*, pp. 173–177; *SSMA*, pp. 41–42). As formulated in Figure 9 of *STSP* (p. 175) this was useful when we were acquiring a sense of what is meant to treat purposeful activity seriously as a systems concept. In *SSMA* it is said that it can now be 'cheerfully dropped' (p. 92). Its language was the problem. Since it was built using concepts such as boundary, sub-systems, decision-takers, resources, etc. the unfortunate effect of its use was to reinforce the wrong impression that the devices called 'human activity systems' are in some way to be thought of as would-be descriptions of real-world purposeful action. Since that is a main source of misunderstanding about SSM, and since what it offers conceptually is captured in CATWOE, the 3Es and PQR, it can indeed be 'cheerfully dropped'. The same argument speaks against the phrase 'human activity system', but that is probably too deeply embedded to be prised out of SSM and ditched. The best antidote to these dangerous phrases is undoubtedly to encourage the use of Arthur Koestler's neologism for the abstract concept of a whole, namely 'holon' (Checkland 1988). That is what models in SSM are: holons for use in structuring debate.

Exploring the Situation and Taking Action

As human beings experience the unrolling flux of happenings and thoughts which make up day-to-day life, both professional and private, they are all the time likely to see parts of that flux as 'situations', and certain features of it as 'problems', or 'issues'. These concepts and this kind of

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language — of 'situations', 'issues', 'problems' — are very commonly used in everyday talk, but they are subtle concepts, and we need to beware of giving them a status they do not deserve. We must not reify them; they do not exist 'out there', beyond ourselves, as we can assume 'that beech tree' and 'that dog scratching itself' do. 'This situation', and 'this problem' indicate dispositions to think about (parts of) the flux in particular ways, and they are themselves *generated by human beings*; also, no two people will see them in *exactly* the same way. If, for example, the senior managers of a company all agree in discussion that they have a problem due to the failure of a new product to build up sales following its launch, no two of them will have precisely the same perception of this situation and/or this problem. What is more, some among those who 'agree' about the situation/problem may privately be seeking to ensure the failure of the new product in order that more resources can then come their way! (Remember, we can never know for sure what is going on inside the head of another person; and we cannot assume that their words necessarily reveal it.)

These are bleak thoughts, but necessary ones if applied social science is to be pursued with adequate intellectual rigour. They mean that neither problem situations nor problem types can be classified and made the basis of pigeon holes into which particular examples may be slotted, for one person's 'major issue' or 'serious problem' may well be another's unruffled normality. Both the existence of a problem situation and its interpretation are human judgements, and human beings are not like-thinking automata.

A result of this is that the later stages of a study using SSM cannot be pinned down and as sharply defined as the early stages, in which a situation can be tentatively defined and explored, plausible 'problem owners' named, 'relevant' systems selected and models built. The many uses of SSM described in *STSP*, *SSMA*, *SCMA* and *ISIS*, as well as the many accounts in the literature from people outside the Lancaster group, reveal the variety which is possible. This ranges from quick, short, tactical studies to much longer ones oriented to strategy. Because of this, comments on the later parts of SSM are bound to be generalizations from experiences which are very diverse, those generalizations being themselves subject to change as the flux of experience rolls on. Nevertheless a few very broad generalizations from a rich mass of experience can be entertained.

The initial ways of using models, described in *STSP* (pp. 177–180) and *SSMA* (pp. 42–44 and *passim* in the cases described), are still the most common way of initiating the 'comparison' stage of SSM, in which well-structured debate about possible change is sought. Most common, at least as an *initiator* of debate, is the completion of charts in which questions derived from the models brought to the debate are answered from perceptions of current reality on the part of people in the situation addressed. But do not expect the debate to be tidy or predictable; be deft, light on your feet, ready to follow where the debate leads, unready to follow any dogmatic line.

Looking back over experiences in the last decade, an emerging pattern can be discerned in which there are two common foci of the later stages of SSM, during which the driving principle is to bring the study to some sort of conclusion. The first of these is the original one: SSM as an action-oriented approach, seeking the accommodations which enable 'action to improve' to be taken. This is exemplified in the work in 'Index Publishing and Printing Company', described in *STSP*, pp. 183–189. Here action was taken to improve the working relationships between publishers and printers, who represent two very different cultures. A new process to deal with issues surrounding the decision 'where to print' was established, and a new unit to carry out the work was set up. The second focus, very prevalent in the great complexity which characterizes the public sector, is on SSM as a sense-making approach. This is exemplified in recent work in the NHS, and is discussed below.

In the first (action-oriented) case the change sought can usefully be thought about in terms of structural change, process change and changes of outlook or attitude. Normally in human affairs any explicitly organized change will entail all three, and the relationship and interactions between the three need careful thought. Of course the easy option to take — in the public sector for

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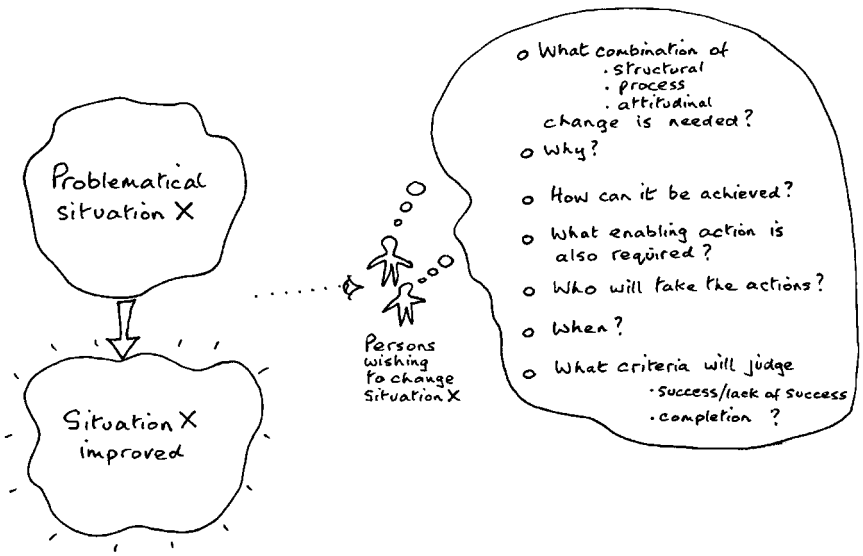

Figure A8. Thinking about desirable and feasible change

Government or, in other organizations, for senior managers — is to impose *structural* change; and that is often done without serious attention to the other two dimensions: process and attitude. The long series of changes imposed by the UK Government on the Health Service, for example, give a good illustration of imposed *structural* change with relatively little attention to the process and attitudinal change also required (Ham 1992; Rivett 1998; Webster 1998). [It has been significant, recently, that an experienced commentator on the Health Service, Chris Ham, has detected that 'the obsession with structural change that has dominated health policy in recent years has given way to a focus on how staff and services can be developed....' (Ham 1996). That is a much-needed change.]

In general, thinking about desirable and feasible change can initially be structured in the way shown in Figure A8. A most important feature of this is the need in human affairs to think not only about the substance of the intended change itself but also about the additional things you normally have to do in human situations to *enable* change to occur. (In introducing a clinical information system in a big acute hospital, for example, a project described in *ISIS* (pp. 192–198), its instigator Peter Wood, Chairman of the District Health Authority had already spent several years preparing the ground with hospital consultants inevitably suspicious that such systems could lead to greater control of their clinical activity by hospital managers.)

The second broad category of use to which SSM-style activity models can be put is to use them to make sense of complex situations (though that sense making may of course also lead on to action being taken). It is significant that this category of use has grown markedly in the last decade of SSM development, as concepts such as 'organization', 'function', 'profession' and 'career' have all become more fluid.

Sense-making use of models is well illustrated in recent research in the NHS. The work has been described in some detail in Checkland (1997) and in *ISIS*, pp. 165–172 and will only be sketched in here. Setting out to research the new 'contract'-based relationship between purchasers of health care for a given population and providers of that care (such as acute hospitals, for example) a research team from Lancaster University Management School, using SSM, first built an activity model of the contracting process (Figure 6.2 in *ISIS*). The concept expressed in this model did not rely at all upon observation of the NHS. It reflected simply the interests of the multi-disci-

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plinary research team: information support, organization change, etc. This model was used as a source of structure for open-ended interviews with more than 60 NHS professionals. This produced a daunting mass of interview material. This was analysed by extracting from it the nouns and verbs used by NHS professionals in describing the contracting process and their expectations of it during its first year. These nouns and verbs were fashioned into the elements of an activity model, and these elements were combined to make an activity model relevant to the contracting process as it was initially being interpreted by both purchasers and providers of health care. (This 'backwards' modelling — not based on a root definition but teased out of the interview material — represented an innovation within SSM. See *ISIS*, pp. 165–172.) The difference between the first model (based on the researchers' world-views) and the second one (based on the world-views of NHS professionals) defined the learning achieved in this first phase of the research. This led to 10 pieces of action research in the NHS, and eventually to another sense-making model which helped to unpack and illuminate the purchaser-provider relationship.

This second sense-making model sought to flesh out coherently the complex interactions between a particular purchaser (a health authority) and a particular provider (an acute hospital), interactions to which we had had access over a two-year period. In order to find our way to a model which would richly express all we had observed, 47 previous models relevant to NHS purchasing/providing were first examined (Duxbury 1994). (These came from earlier SSM-based work in the NHS.) This established what language had been found relevant to describing purchasing or providing. This language, together with the recorded observations of what had happened in the present experience between the collaborating hospital and their local health authority, yielded an activity model which makes sense of all that had been observed. The derivation of the model [Figure 8.4 in the book about research in the NHS edited by Flynn and Williams (1997)] was a subtle process. The guide to that process was the question: What activity model could generate all the happenings observed over the two-year period? Its role was to provide a coherent frame for the 10 further pieces of action research at NHS sites.

This completes the necessarily tentative discussion of the variegated later stages of SSM-based studies or projects. Enough has been said to illustrate that the just described sense-making use of activity models calls for rather more than a slavish adherence to the apparently prescriptive seven-stage model of SSM! It also illustrates the fact that the role of methodology, properly interpreted as a set of guiding principles, is not to produce 'answers': that it can never do on its own; it is to enable you, the user, to produce better outcomes than you could without it.

This examination of the parts of SSM is now complete, and we can return to a re-examination of the methodology as a whole, a re-examination which we may hope is made richer by this examination of the parts.

SOFT SYSTEMS METHODOLOGY — THE WHOLE REVISITED

In the earlier section which examined SSM as a whole the focus was on the way in which its representation changed as experience of use accumulated and the different parts of it gradually became more sophisticated. This indicated a shift from the rather biff-bang 'engineering' atmosphere of the 1982 paper to the 'four-activities' model of Figure A1, with its deliberate reticence about the 'hows' and its avoidance of any implication of a prescription to be followed. Having now examined the parts of SSM in their developed form, a re-examination of the whole can try to address the question of what it is which characterizes the approach, making it more than the sum of its parts. This requires an examination of three things: the fundamental notion of *methodology*, as opposed to *method*; the question of what *constitutes* SSM (what you must do if you wish to claim to be guided by it in a particular study); and what happens to SSM when it is internalized in the practice of experienced users — at which point it is apparently a world away from the original formulation in the 1972 paper.

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Methodology and Method: the LUMAS Model

The word 'methodology' was originally used to mean 'the science of method', which technically makes the concept of '*a* methodology' meaningless. I remember clearly the day in the early 1970s when my colleague, the late Ron Anderton, said to me: 'You're misusing the word ''methodology''; you can't have *a* methodology, the word refers to the whole body of knowledge about method', to which I replied: 'We'll have to change the way the word is used, then.' The deplorable arrogance of that reply stemmed from the fact that I was at that time just becoming aware that, outside the study of social facts, as Durkheim (1895) advocated, the normal scientific method is inadequate as a way of inquiring into human situations; and I was starting to see systems thinking as a holistic reaction against the reductionism of natural science. This meant that the principles of scientific investigation, as used to underpin investigation of natural phenomena, would not adequately support our work. We needed a different methodology, that is a different set of principles. Happily for me, the way that the word 'methodology' is now used has indeed changed, and in the late 1990s Oxford dictionaries of current English now define it not only as 'the science of method' but also as 'a body of methods used in a particular activity' (*Concise Oxford Dictionary of Current English*, 1996). This latter definition makes the crucial distinction between 'methodology' and 'method', and it is the failure to understand this which characterizes much of the secondary literature on SSM.

As the structure of the word indicates, methodology, properly considered, is 'the logos of method', the *principles of method*. When those principles are used to underlie, justify and inform the things which are actually done in response to a particular human problem situation, those actions are at a different level from the overarching principles. Methodology in that situation leads to 'method', in the form of the specific approach adopted, the specific things the methodology user chooses to do in that particular situation. If the user is competent then it will be possible to relate the approach adopted, the specific 'method', to the general framework which is the methodology. And if the methodological principles are well thought out and clearly expressed, then a repertoire of regularly used methods which are found to work will emerge over time as experience is gained. (And of course some methods, over time, in some fields of study, acquire the status that they can — if skilfully employed — guarantee a particular result; they become *techniques*. Examples are the simple algebraic technique which enables you to solve any pair of simultaneous equations, or the physical technique which will cause a cricket ball to 'swing' (move sideways) in mid-air as it is bowled, this latter being a rather more difficult technique to master! Given the multiple perceptions which define and characterize human situations, it is extremely unlikely that any of the methods used within a methodology like SSM could become techniques in the sense used here.)

Since methodology is at a meta level with respect to method (i.e. *about* method) this argument means that no generalizations about methodology-in-use can ever be taken seriously. Thus to read commentators who declare that SSM is 'managerialist', or 'radical', or 'conservative', or 'emancipatory', or 'authoritarian' tells you something about the writer — that they have confused methodology with method — but it tells you nothing about SSM. SSM may exhibit any of these characteristics, as *method*, when it is used by particular users in particular situations. In fact whenever a user knowledgeable about a methodology perceives a problem situation, and uses the methodology to try to improve it, the three elements in Figure A9 are intimately linked: user; methodology as words on paper, and situation as perceived by the user. Any analysis of what happens, carried out by an outsider, would have to embrace all three elements and the interactions between them. This would include converting the methodology (as a set of principles) into a specific approach or 'method' which the user felt was appropriate for *this* particular situation at a particular moment in its history. What happens whenever a methodology is used is shown in the LUMAS model which is Figure A10. Here a user, U, appreciating a methodology M as a coherent set of principles, and perceiving a problem situation S, asks himself (or herself): *What can I do*?

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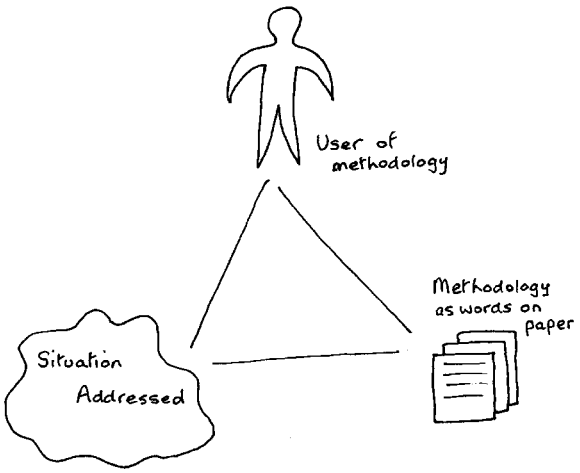

Figure A9. Three interacting elements always present in methodology use

ISIS can be seen as enactments of this process, which accepts that what the user can do depends upon the nexus consisting of U, U's perceptions of M, and U's perceptions of S (Tsouvalis 1995). Never imagine that any methodology can itself lead to 'improvement'. It may, though, help *you* to achieve better 'improvement' than you would without its guidelines. But different users tackling the same situation would achieve different outcomes, and an outside observer can form sensible judgements not about M, as if it could be isolated and judged on its own, but about LUMAS as a whole. The model in fact pictures the process by which SSM was developed.

SSM's Constitutive Rules

In the early 1980s Atkinson researched SSM in use. His work included a very detailed exam-

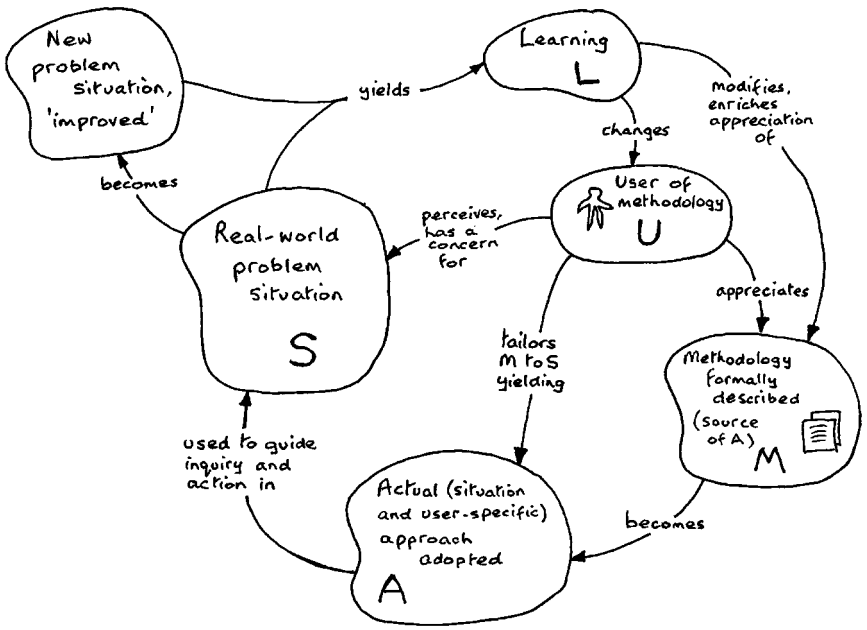

Figure A10. The LUMAS model: Learning for a User by a Methodology-informed Approach to a problem Situation

He or she then tailors from M a specific approach, A, regarded as appropriate for S, and uses it to improve the situation. This generates learning L, which may both change U and his or her appreciations of the methodology: future versions of all the elements LUMAS may be different as a result of each enactment of the process shown. All the systems studies described in *STSP*, *SSMA* and

ination of three completed systems studies in which different people had made use of SSM as their guiding methodology. He found their uses to show interesting differences. His shorthand summary for the three modes of use he observed were: 'liberal' (eclectic, problem-oriented); 'professional' (SSM as a management consultant's expertise, not necessarily shared with clients);

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and 'ideological' (the work dominated by an ideological commitment to help cooperatives become more effective). This kind of observation supports the argument developed in the previous section, that methodology use will always be user-dependent. But at the same time that he is noting these differences Atkinson (1984) also observes that the studies all show 'a family resemblance', which raises the questions: What then *is* SSM, the source of this resemblance? and What must a user do if he or she wishes to claim to be 'using SSM'? In *SSMA* the statement is made (p. 58) that

> … *mouldability* by a *particular user* in a *particular situation* is the point of methodology. …

which prompts us to ask what it is that gets shaped into the different forms which different users and different situations evoke.

This question had been addressed before Atkinson did his research, being raised initially by Naughton (1977) in the context of *teaching* SSM. In his commentary on SSM written for Open University students, Naughton argued that there were 'Constitutive Rules' which had to be followed if a claim to be using SSM was to be accepted as valid, and 'Strategic Rules' which 'help one to select among the basic moves'; for example the user might choose (or not) to use the structure/process/climate model in doing the initial exploration of the problem situation. These rules, deriving from the seven-stage model of SSM, were very helpful at the time, and were endorsed in *STSP* (pp. 252, 253). By the time that *SSMA* was written, however, the seven-stage model was no longer the preferred expression of SSM as a whole, and a new set of constitutive rules were proposed (*SSMA*, pp. 284–289). These defined five characteristics of uses of SSM and set out its epistemology (rich pictures, CATWOE, etc.). A use of SSM was one which could be described using these concepts and language.

In 1997, in the most cogent exegesis of SSM carried out so far, Holwell found these 1990 rules to be at the same time 'both too loose and not extensive enough' (p. 398). They are too loose because they allow people who have done no more than draw a rich picture to claim they are using SSM (the literature contains such examples!). And they are too restrictive, in the sense of being not extensive enough, because they are silent on some basic assumptions which SSM always takes as given. To correct this, Holwell (1997) argues that the answer to the question: what is SSM? has to be made at three levels: the taken-as-given assumptions; the process of inquiry; and the elements used within that process. She writes:

> … there are three necessary statements of principle or assumption:
>
> (1) you must accept and act according to the assumption that social reality is socially constructed, continuously;
> (2) you must use explicit intellectual devices consciously to explore, understand and act in the situation in question; and
> (3) you must include in the intellectual devices 'holons' in the form of systems models of purposeful activity built on the basis of declared worldviews.
>
> Then there are the necessary elements of process. The activity models … are used in a process informed by an understanding of the history of the situation, the cultural, social and political dimensions of it … (the process being) about learning a way, through discourse and debate, to accommodations in the light of which either 'action to improve' or 'sense making' is possible. Such a process is necessarily cyclical and iterative. Finally, while not limited to this pool … a selection from Rich Picture, Root Definition, CATWOE … etc may be used in the process.

These arguments are well made, and this work gives us a solid basis for definitive constitutive rules for SSM. We need rules which are oriented to practice rather than teaching, and which can encompass the wide range of sophistication brought to the use of SSM. At one end of the spectrum is a naïve following of the seven stages in sequence. This is not necessarily wrong, simply something users quickly grow out of as the ideas take root in their thinking. Once internalized, SSM's concepts lead to the deft, light-footed and flexible use which characterizes the other end of the spectrum of sophistication. The two 'ideal types' of SSM use which define the spectrum are termed Mode 1 and Mode 2 in *SSMA* (pp. 280–284). The difference between them is very relevant to the question of SSM as a whole, and is discussed in the next section.

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Prescriptive and Internalized SSM: Mode 1 and Mode 2

SSM grew out of the failure of systems engineering — excellent in technically defined problem situations — to cope with the complexities of human affairs, including management situations. As systems engineering failed we were naturally interested in discovering what kind of approach *could* cope with problems of managing. So the research programme which yielded SSM was initially rather methodology-oriented. Then what happened was that as the shape of SSM emerged, as its assumptions became clearer, and its process and elements became firm, so the whole methodology became, for its pioneers, internalized. SSM became the way we thought about coping with complexity in real situations, and the research itself could become more problem-oriented. The process of internalization is a very real one for those for whom it is happening, but it is not an easy process to describe, certainly not as a series of steps recognized at the time they occur, for the steps are often not so recognized. The descriptions of the two ideal types of SSM use in *SSMA* enabled the 10 studies described in the book to be (subjectively) placed relative to each other on the spectrum between Mode 1 and Mode 2 (Figure 10.3 in *SSMA*; see also *ISIS*, pp. 163–172). This implicitly invited the reader to get a feel for what internalizing the methodology means, and to see whether he or she agrees with the placings.

Certain dimensions may be used to differentiate the two ideal types, recognizing that actual studies will never exactly match either of the two idealized concepts, but will reflect elements of both. Such dimensions are:

Mode 1		Mode 2
Methodology-driven	vs	situation-driven
Intervention	vs	interaction
Sometimes sequential	vs	always iterative
SSM an external recipe	vs	SSM an internalized model

and it follows from these that there will never be a generic version of what happens in 'near-Mode 2' studies precisely because they are situation-driven. Perhaps the best approach to understanding internalized SSM in action is through examples. One was given in the previous section (in which an activity model was teased out from the nouns and verbs used by Health Service professionals in talking about the then mandatory contracting process between purchasers and providers of health care). Another is now briefly described.

This example of near-Mode 2 use of SSM occurred at a one-day conference on 'Mergers in the NHS'. This was a topic of interest because the Health Service has seen many mergers in recent years — between district health authorities joining to form bigger purchasers of health care, between hospitals, and more recently between health authorities; and ministers have indicated that more such mergers will occur. In the morning the conference heard a number of talks from people who had been involved in mergers, in industry as well as the NHS, including in the case of the latter, examples from both a health authority and a hospital perspective. After lunch the participants split into small groups for discussion, this to be followed by a final plenary session to summarize the day. The organizers were anxious to avoid the usual problem in such circumstances: small-group discussions generate flip charts containing long unstructured lists of points made, usually covering several different (unstated) levels; and so everyone ends up unable to see any patterns which would help the audience to see and retain important lessons. To do better than this the people chairing the small groups were asked to structure the discussion by following an explicit agenda written out for them. Three of us spent the discussion period touring the various groups, trying to get a feel for the content and tone of the group discussions.

Alas for the well-laid plans, and in spite of the best efforts of those in the chair, what happened was what always happens when health professionals meet on occasions like this: uncontrollable discussion broke out and anecdotes were exchanged! The problem now to be solved during the afternoon tea-break was to prepare for the final plenary presentation and discussion in the absence of the hoped-for coherent responses

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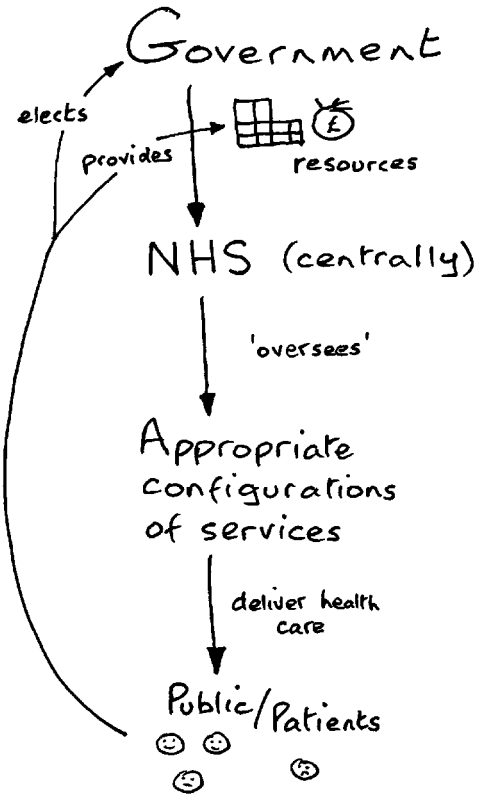

Figure A11. The simple model built to explore mergers in the NHS

from the groups. This is where SSM was helpful.

To provide a recognizable context for talk of mergers, a simple model relevant to the Health Service was jotted down, as shown in Figure A11. Here the public (who are occasionally patients of the NHS) both elect a Government and — in the UK — provide resources through direct taxation. Those resources are disbursed via NHS structures so that appropriate configurations of services can be made available to the public. Talk of 'mergers' can be thought about as talk about changes which will affect those configurations of services, changes which will involve any or all of: Health Authorities, hospitals, community service providers, family doctors and local authorities. The three of us who had spent the small-group discussion period touring the groups now annotated the model with our generic impressions of either the issues which were being discussed, or the issues which underlay the stories being told. These consolidated into five main points, and the final plenary session was opened by my displaying the model of Figure A11 and then adding the five main discussion points, as shown in Figure A12. This served to structure the final discussions. Feedback from delegates about the coherence of the day was good.

I can guarantee that this near-Mode 2 use of SSM was problem-oriented, not methodology-oriented. The fact that we had only the half-hour tea-break to prepare for the final discussion session concentrated the mind. Figures A11 and A12 represent the only explicit output from the work done in the tea-break, but I could retrospectively produce a conventional SSM-style model, together with root definition, CATWOE, E_1, E_2, E_3, etc., which would map Figure A11, as well as an issue-based root definition and model relevant to 'talk of mergers' (a system to decide the structural and service entailments of a configuration of health services considered desirable for population x in area y . . . etc.). None of that work was done at the time — or has been done since, for that matter; the internalization of SSM enabled the practical response to the 'tea-break problem' to be generated. Reconstructing the Mode 2-like use of SSM after the event, we can see that the small-group discussions three of us had dipped into were the source of a holistic impression of the work done in the small groups. We then made sense of that overall impression — for the purpose, on the day, of exposition — by means of the models in Figures A11 and A12.

It is inevitable that users of SSM will internalize its guidelines and use them in an increasingly sophisticated way. This is akin to learning physical skills: beginners at rock climbing treat each hold as a new problem, appearing clumsy as they make their jerky progress up a rock face. Experienced climbers who have internalized their skill, at whatever level they have attained, put together sequences of moves and appear to 'flow' up a climb. They are likely to believe that you cannot be said to be *truly* rock climbing until this internalization has occurred, and so it is with use of SSM. The more subtle nature of human situations will be revealed to sophisticated users while the novice is struggling to remember what Analysis Two is, and what CATWOE and E_1, E_2, E_3 mean.

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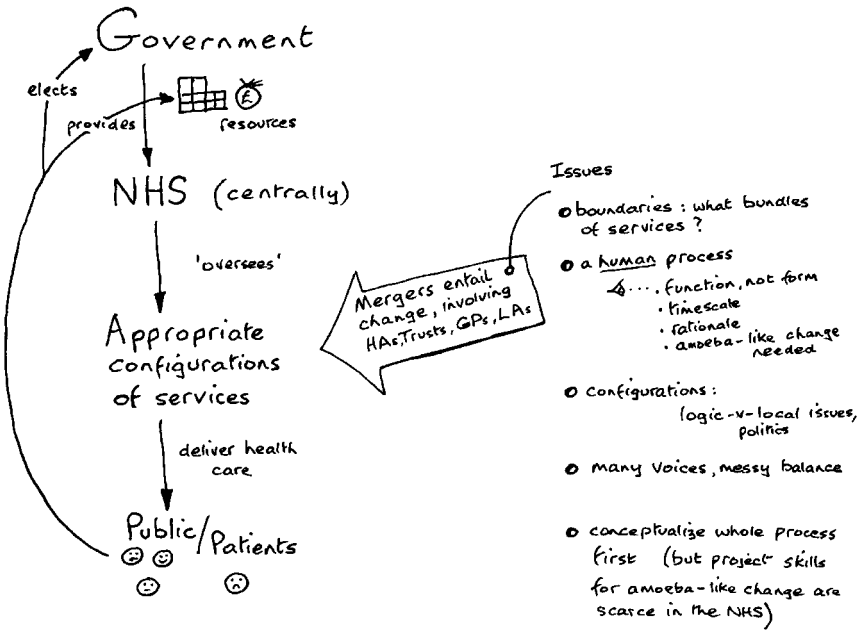

Figure A12. The NHS model annotated to structure presentation of merger issues

So the disappearance of near-Mode 1 use is to be welcomed, apart, that is, from the fact that it has its virtues for initial teaching purposes. Just as novice climbers need to be taken up easy climbs, and to have the next hold, and how to use it, pointed out to them, so people coming to SSM for the first time *need* to treat it as a series of stages, each with a definite output, just as Naughton declared in the original constitutive rules.

Finally, though, we cannot advise inexperienced users simply to seek out straight-forward problem situations to tackle, since *all* human situations have their subtleties!

SOFT SYSTEMS METHODOLOGY — THE CONTEXT

Before concluding, two aspects of the context of SSM's development are worth attention, since they have emerged as virtually inseparable from SSM as a way of conducting inquiry in human affairs. The two are: the 'action research' mode; and the assumptions about the nature of the social process which underpin SSM as a whole.

Action Research

The fact that the research which produced SSM started out from a base in systems *engineering* indicates that it was part of the strand of research which concentrates on situations in which people are trying to take action. From the start the researchers tried not simply to observe the action as external watchers but to *take part* in the change process which the action entailed; this made change, and how to achieve it, the object upon which research attention fastened. This puts the research into the 'action research' tradition stemming from Kurt Lewin's views, developed in the 1940s, that real social events could not be studied in a laboratory. This mode of research is discussed in *STSP*, pp. 146–154 and illustrated throughout *SSMA*. Here I shall focus only briefly on what experience and reflection have shown

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to be an important requirement of this kind of research, a requirement which is, surprisingly, almost completely neglected in the literature of action research. (It is discussed in *ISIS*, pp. 18–28, and Checkland and Holwell 1998a).

The point is this. For findings to be accepted as part of the body of 'scientific knowledge' they have to be repeatable, time and again, by scientists other than those who first discovered them. If you announce that you have discovered the 'inverse square law of magnetism', working in Berlin, then that finding has to be repeatable in Brazil, Barnsley, Brisbane and Bournemouth if the happenings in your experiments are to be accepted as 'scientific knowledge'. Apparent findings in human situations, however, no one of which is ever either static or exactly the same as any other human situation, cannot match this strong criterion. It is the public testability which makes 'scientific knowledge' different from other kinds of knowledge; though do not expect unanimity on any *interpretation* of the findings, since the interpreting is a human act, and can in principle be as various as the people who make the interpretations.

In the human domain, in the province of 'social science', the findings are of a different nature, as are the criteria by which they can be judged. Emile Durkheim (1895), who made up the word 'sociology', suggested that the concern of this new 'science of society' should be 'social facts'. 'Treat social facts as things' is his best-known dictum. Social facts refer to aggregates, and are defined by an observer: for example, the fraction of marriages which end in divorce in a given society, or the rate at which people commit suicide — which was the subject of a famous study by Durkheim himself. But action research in local situations is concerned not with social facts but with study of the myths and meanings which individuals and groups attribute to their world and so make sense of it. This is part of that other great strand within sociology, the interpretive tradition stemming from Max Weber (1904). This is relevant to SSM since the meaning attribution by individuals and groups leads to their forming particular intentions and undertaking particular purposeful action.

The question of the criteria by which findings of this kind can be judged is obviously a tricky one. I have heard sociologists argue that the criterion by which their findings can be judged can be no more than mere plausibility: do these findings make a believable story? But if this weak criterion is accepted there seems to be virtually no difference between writing novels and doing social research. Surely we can do better than that?

In between the strong criterion of repeatability (of the happenings) and the weak criterion of plausibility, we argue (Checkland and Holwell 1998a) that action research should be conducted in such a way that the whole process is subsequently *recoverable* by anyone interested in critically scrutinizing the research. This means declaring explicitly, at the start of the research, the intellectual frameworks and the process of using them which will be used to define what counts as knowledge in this piece of research. By declaring the epistemology of their research process in this way, the researchers make it possible for outsiders to follow the research and see whether they agree or disagree with the findings. If they disagree, well-informed discussion and debate can follow. Also, the learning gained in a piece of organization-based action research may concern any or all of: the area focused on in the research; the methodology used; or the framework of ideas embodied in the methodology. SSM is itself the result of 30 years of this kind of learning in real-world situations.

The Social Process: Appreciative Systems

Once a systems thinker has taken on board the idea of conceptualizing the world and its structures in terms of a series of layers, with any layer being justified by definable emergent properties at that level (see *STSP*, Chapter 3), it is always appropriate to think at more than one level. As discussed earlier, the 'apparatus' of SSM ensures that whatever level is taken by an observer or researcher to be that of 'system', the level above ('wider system') and that below ('sub-system') will always be taken into account, as Figure A5 illustrates. But the systems thinker also accepts that an observer, investigator or researcher will not only select the level which is to be that of

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'system' but will also interpret the nature of 'system' according to his or her own *Weltanschauung* or world-view (or, in SSM, deliberately select multiple world-views whose adoption might yield insights into the problem situation). These ideas of 'layers' and 'world-views' mean that developers of SSM could not avoid taking a position on both the nature of the methodology and the higher-level assumptions which it takes as given.

The methodology is taken to be a process of social inquiry which aims to bring about improvement in areas of concern by articulating a learning cycle (based on systems concepts) which can lead to action. This raises the question of what higher-level assumptions about the nature of social reality SSM implicitly takes as given: hence the discussion in Chapter 9 of *STSP*. The conclusion there is that in order to make sense of the research experiences it is necessary to take 'social reality' to be

> the ever-changing outcome of the social process in which human beings, the product of their genetic inheritance and previous experiences, continually negotiate and re-negotiate with others their perceptions and interpretations of the world outside themselves (pp. 283, 284).

This makes SSM in harmony with the sociology of Alfred Schutz and the philosophy of Edmund Husserl; but in practical terms it was Geoffrey Vickers' work on what he calls 'appreciative systems' which mapped most completely our experiences.

Vickers' theoretical work was done in his retirement after 40 years in what he always referred to as 'the world of affairs'. (He was a City lawyer, a civil servant, a member of the National Coal Board responsible for management, training and personnel issues, and a member of many public bodies — as well as a young subaltern who won the Victoria Cross on the day after his twenty-first birthday at the Battle of Loos in 1915.) In his retirement he set himself the task of making sense of all his experience, and wrote a series of books in which he developed his account of 'the social process' in terms of his theory of 'appreciation'. SSM's debt to Vickers is recorded in *STSP* (Chapter 8) but more work has been done since then, and is here summarized in the Appendix.

In essence: Vickers discovered systems thinking in his retirement, found it very helpful for sense-making purposes, and was amazed that the greatest use of systems ideas seemed to be made in a technical context, whereas he saw them as richly relevant to 'human systems'. In a taped interview at the Open University in 1982 he said:

> While I was pursuing these thoughts, everyone else who was responding at all was busy with man-made systems for guided missiles and getting to the moon or forcing the most analogic mental activities into forms which would go on digital computers. 'Systems' had become embedded in faculties of technology and the very word had become dehumanized (quoted in Blunden 1984, p. 21).

In his thinking he rejected first the 'goal-seeking' model of human life (the core of Simon's great contribution to management science) and then the cybernetic model because in it the course to which the Steersman steers is a 'given' from outside the system whereas in human affairs the course being followed is continuously generated and regenerated from inside the system. This led him to his notion of 'appreciation' in which, both individually and in groups, we all do the following: selectively perceive our world; make judgements about it, judgements of both fact (what is the case?) and value (is this good or bad, acceptable or unacceptable?); envisage acceptable forms of the many relationships we have to maintain over time; and act to balance those relationships in line with our judgements. [The Appendix contains our model of what Vickers meant by 'an appreciative system' (Checkland and Casar 1986), and links his work to SSM.]

In summary, SSM can be seen as a systemic learning process which articulates the working of 'appreciative systems' in Vickers' sense.

CONCLUSION

The saxophonist John Coltrane was the greatest innovator in the jazz idiom since Charlie Parker reminted the coinage of jazz expression in the mid-1940s. Playing with the Miles Davis Quintet, Coltrane took to playing long long solos which

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might last for 20 minutes or more. On one occasion at the Apollo in Harlem, when he eventually finished a very lengthy solo he was asked why he had gone on so. He replied 'I couldn't find nothing good to stop on', whereupon Davis said, 'You only have to take the horn out of your mouth.' Authors too face the problem of finding 'something good to stop on', and obviously all they have to do is lift the pen from the page. But that would not satisfy a systems thinker, who would want to effect some kind of closure. Hence this conclusion, which adds some final comments on what has been an enthralling 30-year research experience for this writer.

SSM has been ill-served by its commentators, many of whom demonstrably write on the basis of only a cursory knowledge of the primary literature. However, both life and this chapter are too short to expend time and energy on correcting these nonsenses; but it is probably worth illustrating the size of the problem by recording the spectacular example which Holwell found during her masterly exegesis of the secondary literature (1997, p. 335). It is from a book on information systems published in 1995. The authors refer to *STSP* but — all too typically — do not mention *SSMA*, even though it had been published for five years when they wrote their book.

> This methodology stems from the work of Checkland (1981) who took a radically different approach to the *analysis and design of information human activity systems*. Starting from the premise that *organizations* (and therefore their *subsystem information systems*) are *open systems that interact with their environment*, he *includes the human activity subsystems as part of* his modelling process. The methodology starts by taking a particular view *of the system* and incorporating subjective and objective impressions into a 'rich picture' *of the system* that includes the people involved, the problem areas, sources of conflict and other 'soft' aspects *of* the overall system. *A* 'root definition' is then formed *about the system* which *proposes improvements* to *the system* to *tackle the problems identified in the rich picture*. Using *the* root definition, *various conceptual models of the new system* can be built, compared and evaluated against the *problems in the rich picture*. A *set of recommendations* is then suggested to deal with the specific changes that are necessary to *solve the problems*.

The italics here are used to highlight fundamental errors: nearly 20 in less than 200 words! Cheerful stoicism seems to be the necessary response to a lack of understanding as profound as this. Pity the poor students.

Although the secondary literature often creates a barrier, it is not the only reason that *teaching* SSM is not straightforward. In teaching such a methodology you are teaching not what to think, but a *way of thinking* which the user can consciously reflect upon. Many people coming to SSM for the first time in a classroom have never before consciously thought about their own thinking, and there is some rearrangement of mental furniture entailed in this which many find strange. Certainly the biggest difficulty in understanding SSM is to absorb its shift from assuming 'systems' exist in the world (as in everyday language) to assuming that the process of inquiry into the world can be a consciously organized learning system.

This is to say that *process thinking* is very unfamiliar for many people, and there is no doubt that teaching a way of thinking is harder than teaching substantive factual material — which is why many MBA courses, which ought to focus on teaching 'how to think in problem situations', instead opt for current factual material about marketing, finance, and other common organizational functions. How strange process thinking is for some people was illustrated recently by a journalist, Matthew Parris, who described in *Literary Review* (December 1998) how much he hated a training week in Brussels to which he was sent as a junior Foreign Office employee. He found

> a suffocating respect for questions of process combined with a carefree disregard for questions of substance. They kept telling me how a policy was steered into being. I kept wanting to know whether the policy was any good. They looked at me as though I was missing the point.

Of course, he *was* missing the point. A systems thinker would know that the process of policy creation and policy content are entirely complementary, the process itself conditioning what might emerge as content. Both need to be thought about together; but this is not yet a familiar concept.

The other difficulty faced by teachers of SSM

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is overcoming the shock some people feel when they discover the rigour involved in building purposeful models, thinking out their measures of performance, and so on. (Perhaps there is a tendency for newcomers to equate 'soft' with sloppy or casual: as if anything will do.) But the rigour helps clear the mind, as well as ensuring that the devices which will structure debate are themselves defensible.

In the first heady days of the Gorbachev reforms in the USSR the Institute for Systems Analysis in Moscow wanted to hear about SSM, since the Institute's researchers were intriged by the idea of undertaking action research projects in Soviet industry. At the end of a week of lectures and seminars, the Director of the Institute, J. M. Gvishiani, said to me that he saw SSM as 'a rigorous approach to the subjective'. This struck me as a very insightful phrase. Both the primacy of the subjective in human affairs *and* the rigour in the thinking about process are important.

Oddly enough, the difficulties of teaching a systemic way of thinking in a classroom disappear when people learn it by using SSM in a real situation. But the situation has to be real for this to happen. There is a huge gap between real uses of SSM and 'pretend' uses on case studies in the classroom. Pretending to invest £10m., or deciding who to make redundant, in a case study, costs you nothing; doing it in real life is a world away from the pretence. But, when the use is real, our experience is that SSM is quickly grasped, and seems 'natural' to those using it. This adds weight to the argument in *SSMA* (p. 300) that the process of SSM reflects the everyday process we all engage in whenever we form sentences and entertain alternative predicates, comparing them with each other and with the perceived world in order to make judgements about action. SSM simply makes a special kind of predicate, in the form of models of purposeful activity, each of which expresses a pure world-view. It is a more organized, more holistic form of what we do when we engage in serious conversation.

But in observing that SSM, in use, seems natural, we need also to remind ourselves that its concern is with would-be purposeful action; and we should never forget how easy it is to overestimate the role of the purposeful in human life. Being able to act with intention, purposefully, is an important part of what makes us human. But it is only a part, and maybe not the most important part.

It has been argued above (and that argument is extended in the Appendix) that SSM can be seen as articulating 'the social process', in the form of what Vickers calls an 'appreciative system'. If, thinking systemically, we ask: what is the level above that of 'the social process'? then we are moving into very abstract realms indeed: in this case into the level at which the concern could be defined as 'being human'. This is two levels above that at which the concern is 'use of SSM', but it provides the ultimate context in which SSM is used.

This suggests several self-admonitory instructions for the user of SSM. We should be rigorous in thinking but circumspect in action. We should remember that many people painfully find their way unconsciously to world-views which enable them to be comfortable in their perceived world. Coming along with a process which challenges world-views and shifts previously taken-as-given assumptions, we should remember that this can hurt. So what right do we have to cause such pain? None at all unless we do it with respect and in the right spirit: no lofty hauteur. And we must remember, feet on ground, that all we can do with our 'natural' but intellectually sophisticated process of inquiry is learn our way to improved purposeful action, which is a ubiquitous part of human life but only a limited part of it, not the whole.

And so, to complete this paper, let us remind ourselves — using a true story — of what it means to be *fully* human, and end with that image.

In 1993 in south London a black teenager, Stephen Lawrence, was fatally stabbed in a racist attack by a group of white youths. Six years later, with no one found guilty of the murder, Sir William Macpherson delivered to the Home Secretary his report on the incompetence of the criminal investigation, precipitating national soul searching and debate about institutionalized racism in British society. A writer, Richard Norton-Taylor, brilliantly crafted a play — *The Colour of Justice* — from the transcript of the Lawrence

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tribunal; this was shown on BBC television in February 1999. The production contained one of those moments, exceptionally rare on television, when the viewer is transfixed and transformed. A witness described how he and his wife, returning home from a church meeting, came upon Stephen as he lay bleeding on the pavement. The wife cradled Stephen, as the young man's life ebbed away. Knowing that hearing is the last sense to go, she whispered in his ear 'You are loved'. When he got home, the man washed his bloodied hands into a container and poured the water on to the roots of a favourite rosebush. He said that he supposed that in some way Stephen lived on.

We should never entertain the idea, even for a moment, that a mere 'systems approach', or any 'systems methodology' could ensure that we behave as Louise and Conor Taaffe did on that April night in Eltham in 1993.

APPENDIX: SYSTEMS THEORY AND MANAGEMENT THINKING

Two inquiring systems developed since the 1960s — Vickers's concept of the appreciative system and the soft systems methodology, are highly relevant to the problems of the 21st century. Both assume that organizations are more than rational goal-seeking machines and address the relationship-maintaining and Gemeinschaft aspects of organizations, characteristically obscured by functionalist and goal-seeking models of organization and management. Appreciative systems theory and soft systems methodology enrich rather than replace these approaches.

Two rich metaphors provide a useful frame within which any consideration of the problems facing us in the late 20th century can, with advantage, be placed. As a result of the first industrial revolution, based on energy, and the current second one, based on information, the world is increasingly Marshall McLuhan's 'global village'. More and more problems need to be examined in a global rather than a local context and, as we do so, we need to remember that we are all of us, in Buckminster Fuller's great phrase, 'the crew of Spaceship Earth'.

Thanks to the material successes of the two industrial revolutions we are a crew with rising expectations of high living standards. But we are increasingly aware that the wealth-generating machine may not be able to meet those expectations without doing unacceptable damage to Spaceship Earth, which, together with the free supply of energy from our sun, is the only given resource we have.

This triangle — of expectations, wealth generation, and protection of the planet — will have to be managed with great care at many different levels as we enter the 21st century if major disasters are to be avoided. Unfortunately, our current ideas on *management* are rather primitive and are probably not up to the task. They stem from the technologically oriented thinking of the 1960s, and they now need to be enlarged and enriched. This may well be possible from the systems thinking of the 1970s and 1980s, which has placed that body of thought more firmly within the arena of human affairs.

This article will examine the legacy of thinking about management and organizations that we get from the 1960s and develop a richer view that stems from more recent systems thinking, especially Vickers's work on the theory of *appreciative systems* and work on soft systems methodology, which can be seen as a way of making practical use of Vickers's concepts. This, it is argued, is more relevant than the current conventional wisdom to managing the problems of the new century.

MANAGEMENT AND ORGANIZATION

In spite of a huge literature — some of it serious, much of it at the level of airport paperbacks — and courses in colleges and universities worldwide, the role of the manager and the nature of the process of managing remain problematic, whether we are concerned with trying to manage global, institutional, or personal affairs. Anyone who has been a professional manager in an organization knows that it is a complex role, one that engages the whole person. It requires not only the ability to analyse problems and work out rational responses but also, if the mysterious quality of leadership is to be provided, the ability to respond to situations on the basis of feelings and emotion.

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One of the reasons the manager's role remains obstinately problematic stems from our less than adequate thinking about the context in which managers perform, namely the organization. Some basic systems thinking indicates that if we adopt a limited view of organization then the conceptualization of the manager's role will inevitably also be rather threadbare. Thus a manager at any level occupies a role within a structure of roles that constitutes an organization. The activity undertaken by managers can be seen as a system of activity that serves and supports and makes its contribution to the overall aims of the organization as a purposeful whole. Now, if one system serves another, it is a basic tenet of systems thinking that the system that serves can be conceptualized only after prior conceptualization of the system served (Checkland 1981, p. 237). This is so because the form of a serving system, if it is truly to serve, will be dictated by the nature of the system served: That will dictate the necessary form of any system that aspires to serve and support it.

Now there is a conventional wisdom about the nature of organization that persists in spite of the fact that anyone who has worked within an organization knows that this image conveys only part of the story. The conventional model is that an organization is a social collectivity that arranges itself so that it can pursue declared aims and objectives that individuals could not achieve on their own. Given this view of organization, the manager's role is to help achieve the corporate goals, and it follows that the manager's activity is essentially rational decision making in pursuit of declared aims. This is the conventional wisdom even though intuitively we all have a rich sense that organizations in which we have worked are more than rational goal-seeking machines. The experienced day-to-day reality of organizations is that they have some of the characteristics of the tribe and the family as well as the characteristics necessary if they are to order what they do rationally so as to achieve desired objectives such as, in the case of industrial companies, survival and growth. In spite of this folk knowledge, the orthodoxy has been very strong, and we can see this both in the literature of organization theory and in that of management science.

Organization Theory

This is not the place to discuss the development of organization theory in any detail, but it is useful for present purposes to mark the general shape of this field as it emerges in such wide-ranging studies as Reed's (1985) *Redirections in Organisational Analysis*. The general shape is that of the establishment of an orthodoxy (the systems/contingency model that held sway from the 1930s to the 1960s) and the challenge to that orthodoxy since then, with no single dominant alternative. Nevertheless, the challenging models do, in general, have in common the fact that they see organizations not as reified objects independent of organizational members, as in the orthodox systems model, but as the continually changing product of a human process in which social reality is socially constructed: the title of Berger and Luckmann's (1966) well-known book — *The Social Construction of Reality* — neatly captures this alternative strand of thinking.

At a broad level of generalization, we can see the two major approaches as reflecting the two main categories of thinking about organizations on which a pioneering sociologist, Ferdinand Tönnies, built his account. In his major work *Gemeinschaft und Gesellschaft* (1887) (translated as *Community and Association* by Loomis 1955), Tönnies constructed models of two types of society or organization. There is the natural living community into which a person is born, the family or the tribe (Gemeinschaft), and there are the formally created groupings (Gesellschaft) that a person joins in some contractual sense, as when he or she becomes an employee of a company or joins a climbing club.

In general, the orthodox view of organizations emphasizes their Gesellschaft nature, that they are created to do things collectively (*achieve goals* is the usual language) that would be beyond the reach of individuals. The alternatives emphasize rather that all social groupings take on some flavour of Gemeinschaft: being in an organization is something like being part of a family. Intuitively, the lived experience of organizations that we all gradually acquire gives us the folk knowledge that organizations exhibit some of the characteristics of both models.

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That the orthodox view has been dominant can be seen by perusing college textbooks, which present students with the conventional wisdom. For example, in Khandwalla's (1979) *The Design of Organizations*, the view of organizations as open systems devoted to achieving corporate objectives is described as 'the most powerful orientation in organization theory today' (p. 251). Much attention is paid to well-known work aimed at correlating an organization's structure with its core tasks carried out in an environment with which it interacts (Lawrence and Lorsch 1967; Pugh and Hickson 1976; Woodward 1965; etc.). Reed's (1985) survey argues that 'systems theorists . . . had dominated organizational analysis since the 1930s' (p. 35) but that by the 1960s there was no common history or intellectual heritage. By the 1970s, a systems-derived approach was 'struggling to retain its grip on organizational studies' (p. 106). This does not mean that the orthodoxy has lost its adherents, however. In the same year that Reed's book was published, Donaldson (1985) brought out his *In Defence of Organization Theory*, the defence being of the 'relatively accepted contingency-systems paradigm' (p. ix).

Both Reed and Donaldson make much reference to a book that marks as much as any other the challenge to the orthodox systems view: Silverman's (1970) *The Theory of Organizations*. Silverman contrasts the systems view from the 1950s and 1960s with what he calls 'the Action frame of reference' in which action results from the meanings that members of organizations attribute to their own and each other's acts. Organizational life becomes a collective process of meaning attribution; attention is displaced away from the apparently impersonal processes by means of which, in the conventional model, a reified organization as an open system responds to a changing environment. Some of Silverman's subheadings convey the nature of his argument: Action not behaviour, Action arises from meanings, Meanings as social facts, Meanings are socially sustained, Meanings are socially changed.

This important work opens the way to various alternatives to the systems orthodoxy. Donaldson's discussion, for example, includes social action theory, the sociology of organizations, and the strategic choice thesis. Just as the orthodoxy draws on a positivist philosophy and a functionalist sociology, the alternatives are underpinned philosophically by phenomenology, and sociologically by an interpretive approach derived from Weber and Schutz.

It has to be said that the orthodox view provides a much clearer model of organization, and hence the manager's role, than is provided by the alternatives. Concentrating on the Gesellschaft aspects of an organization, the conventional view sees it as an open system seeking to achieve corporate objectives in an environment to which it has to adapt. Its tasks are analysed and assigned to groups within a functionalist structure, and the managers' role is essentially that of decision making in pursuit of corporate aims that also provide the standards against which progress will be judged. No similarly clear picture is provided by the alternatives, beyond the notion that organizations are characterized essentially by discourse that establishes the meanings that will underpin action by individuals and groups.

It is not at all surprising that that section of the management literature most concerned with intervening in, in order to influence and shape, real-world situations, namely management science, should itself focus on the orthodox systems model.

Management Science

In examining briefly the state of thinking in management science, it is useful to focus on the work of Herbert Simon. There are two reasons for this. First, it has been a dominating contribution in the field; second, in developing an approach based on the work of Vickers, we find that he explicitly contrasted his approach with that of Simon, drawing attention to the reliance of Simon on a goal-seeking model of human action that he himself was deliberately trying to transcend.

In the period after the Second World War, strenuous efforts were made to apply the lessons from wartime operations research to industrial companies and government agencies. In doing this, a powerful strand of systems thinking was developed — it would now be thought of as 'hard' systems thinking — concerned broadly

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with engineering a system to achieve its objectives. Systems were here assumed to exist in the world; it was assumed that they could be defined as goal seeking; and ideas of system control were generalized in cybernetics. These ideas mapped the orthodox stance of organization theory discussed in the previous section, and they conceptualized the manager's task as being to solve problems and take decisions in pursuit of declared goals. Indeed, this paradigm is succinctly expressed in Ackoff's (1957) assumption that problems ultimately reduce to the evaluation of the efficiency of alternative means for a designated set of objectives.

This is the field to which Simon has made such a significant and influential contribution, the flavour of which is captured in the title of his 1960 book: *The New Science of Management Decision*.

At a round table devoted to his work, Zannetos (1984) summarized Simon's legacy as 'a theory of problem solving, programs and processes for developing intelligent machines, and approaches to the design of organizational structures for managing complex systems' (p. 75).

Overall, Simon sought a science of administrative behaviour and executive decision making. In an intellectually shrewd move that has no doubt helped to make this body of work so influential, Simon wisely abandoned the notion that managers and administrators seek to *optimize*, replacing it with the idea of *satisficing*: the idea that the search is for solutions that are *good enough* in the perceived circumstances, rather than optimal (March and Simon 1958). Nevertheless, the flavour of hard systems thinking is retained in the claim that the search is 'motivated by the existence of problems as indicated by gaps between performance and goals' (p. 73).

Similarly in another of Simon's major contributions, the development with Newall of GPS (general problem solver), a heuristic computer program that seeks to simulate human problem solving, the whole work is built on the concept of problem solving as a search for a means to an end that is already declared to be desirable (Newall & Simon 1972). Simon (1960) stated,

> Problem solving proceeds by erecting goals, detecting differences between present situation and goal, finding in memory or by search tools or processes that are relevant to reducing differences of these particular kinds, and applying these tools or processes. Each problem generates subproblems until we find a subproblem we can solve — for which we have a program stored in memory. We proceed until, by successive solution of such subproblems, we eventually achieve our overall goal — or give up. (p. 27)

This is an especially clear statement of the thinking, derived from the systems theory of the 1950s, that has dominated management science and that underlies organization theory's orthodox model of what an organization is.

It is the argument here that this goal-seeking model, largely adequate though it was in the management science that contributed to post-Second World War industrial development, is not rich enough to support and sustain the management thinking now needed by the crew of Spaceship Earth, that spaceship having become akin to a global village.

An alternative, richer perspective is provided by the systems thinking of the 1970s and 1980s, and in particular by Vickers's development of appreciative systems theory and by an approach to intervention in human affairs that can be seen as making practical use of that theory, namely, soft systems methodology.

These are discussed in the next section, but it may be useful to point out at once that these are developments in what is now known as 'soft' systems thinking, as opposed to the hard systems thinking of the 1950s and 1960s that permeates both orthodox organization theory and Simonian management science. The usual distinction made between the two is that the hard systems thinking tackles well-defined problems (such as optimizing the output of a chemical plant), whereas the soft approach is more suitable for ill-defined, messy, or wicked problems (such as deciding on health care policy in a resource-constrained situation). This is not untrue, but it fails to make an intellectual distinction between the two. The real distinction lies in the attribution of systemicity (having the property of system-like characteristics). Hard systems thinking assumes that the world is a set of systems (i.e. is *systemic*) and that these can be *systematically* engineered to achieve objectives. In the soft tradition, the world is

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assumed to be problematic, but it is also assumed that *the process of inquiry* into the problematic situations that make up the world can be organized as a system. In other words, assumed systemicity is shifted: from taking the world to be systemic to taking the process of inquiry to be systemic (Checkland 1983, 1985b).

Thus in the following section both appreciative systems theory and soft systems methodology describe inquiring processes — the former with a view to understanding, the latter with a view to taking action to improve real-world problem situations.

Finally, we may note that soft systems thinking can be seen as representing the introduction of systems thinking into Silverman's action frame of reference, although the organization theory literature is apparently at present innocent of any knowledge of post-1960s developments in systems thinking (Checkland 1994).

APPRECIATIVE SYSTEMS THEORY

The Nature of an Appreciative System

The task that Vickers set himself in his 'retirement' after 40 years in the world of affairs was to make sense of that experience. In the books and articles that he then wrote he constructed

> an epistemology which will account for what we manifestly do when we sit round board tables or in committee rooms (and equally though less explicitly when we try, personally, for example, to decide whether or not to accept the offer of a new job). (G. Vickers, personal communication, July 1974)

In his thinking as this project developed, Vickers first rejected the ubiquitous goal-seeking model of human activity; then he found systems thinking relevant to his task; but he also rejected the cybernetic model of the steersman (whose course is defined from outside the system), replacing it by his more subtle notion of 'appreciation' (Vickers, 1965, is the basic reference). He expressed his intellectual history in the following terms in a letter to the present writer in 1974:

> It seems to me in retrospect that for the last twenty years I have been contributing to the general debate the following neglected ideas:
>
> (1) In describing human activity, institutional or personal, the goal-seeking paradigm is inadequate. Regulatory activity, in government, management or private life consists in attaining or maintaining desired relationships through time or in changing and eluding undesired ones.
>
> (2) But the cybernetic paradigm is equally inadequate, because the helmsman has a single course given from outside the system, whilst the human regulator, personal or collective, controls a system which generates multiple and mutually inconsistent courses. The function of the regulator is to choose and realise one of many possible mixes, none fully attainable. In doing so it also becomes a major influence in the process of generating courses.
>
> (3) From 1 and 2 flows a body of analysis which examines the 'course-generating' function, distinguishes between 'metabolic' and functional relations, the first being those which serve the stability of the system (e.g. budgeting to preserve solvency and liquidity), the second being those which serve to bring the achievements of the system into line with its multiple and changing standards of success. This leads me to explore the nature and origin of these standards of success and thus to distinguish between norms or standards, usually tacit and known by the mismatch signals which they generate in specific situations, and values, those explicit general concepts of what is humanly good and bad which we invoke in the debate about standards, a debate which changes both. (G Vickers, personal communication, 1974)

In developing the theory of appreciative systems and relating it to real-world experience, Vickers never expressed the ideas pictorially, in the form of a model, although this seems a desirable form in which to express a system. (His explanation for this lack was disarming: 'You must remember,' he said, 'that I am the product of an English classical education' [G. Vickers, personal communication, 1979]). What follows is an account of the model of an appreciative system developed by Checkland and Casar (1986) from the whole corpus of Vickers's writings.

From those writings we may highlight some major themes that recur:

- A rich concept of day-to-day experienced life (compare Schutz's [1967] *Lebenswelt*)
- A separation of judgments about what is the case, *reality judgments*, and judgments about what is humanly good or bad, *value judgments*

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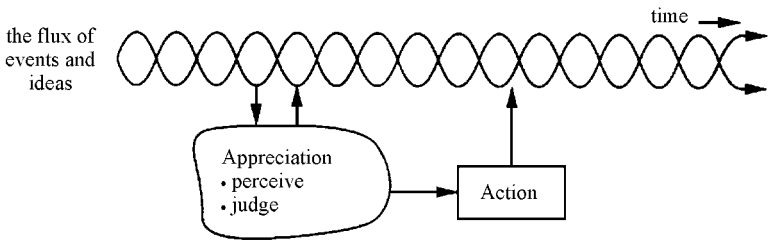

Figure A13. The structure of an appreciative system. SOURCE: Checkland and Casar (1986)

- An insistence on *relationship maintaining* as a richer concept of human action than the popular but poverty-stricken notion of goal seeking
- A concept of action judgments stemming from reality and value judgments
- A notion that the cycle of judgments and actions is organized as a system

The starting point for the model is the Lebenswelt, the interacting flux of events and ideas unfolding through time. This is Vickers's 'two-stranded rope', the strands inseparable and continuously affecting each other. Appreciation is occasioned by our ability to select, to choose. Appreciation perceives (some of) reality, makes judgments about it, contributes to the ideas stream, and leads to actions that become part of the events stream. Thus the basic form of the model is that shown in Figure A13. There is a recursive loop in which the flux of events and ideas generates appreciation, and appreciation itself contributes to the flux. Appreciation also leads to action that itself contributes to the flux.

It is now necessary to unpack the process of appreciation. From Vickers's writings we take the notion of perceiving reality selectively and making judgments about it. The epistemology of the judgment making will be one of relationship managing rather than goal seeking, the latter being an occasional special case of the former. And both reality and value judgments stem from standards of both fact and value: standards of what *is*, and standards of what is good or bad, acceptable or unacceptable. The very act of using the standards may itself modify them.

These activities lead to a view on how to act to maintain, to modify, or to elude certain forms of relevant relationships. Action follows from this, as in Figure A13.

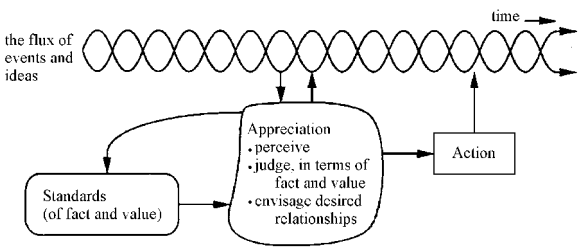

Figure A14. The structure of an appreciative system expanded. SOURCE: Checkland and Casar (1986)

The model also tries to capture Vickers's most important point and greatest insight, namely, that there is normally no ultimate source for the standards by means of which what is noticed is deemed good or bad, important or unimportant, relevant or irrelevant, and so on. The source of the standards is *the previous history of the system itself*. In addition, the present operation of the system may modify its present and future operation through its effect on the standards. These considerations, together with those already discussed, yield Figure A14 as a model of an appreciative system. The most difficult aspect to model is the dynamic one, but it should be clear from Figure A14 that the dynamics of the system will be as shown in Figure A15. The form of the appreciative system remains the same, whereas its contents (its *setting*) continually (but not necessarily continuously) change. An appreciative *system* is a process whose products — cultural manifestations — condition the process itself. But the system is not operationally closed in a conventional sense. It is operationally closed via a structural component (the flux of events and ideas) that ensures that it does not, through its actions, reproduce exactly itself. It reproduces a continually changed self, by a process that Varela

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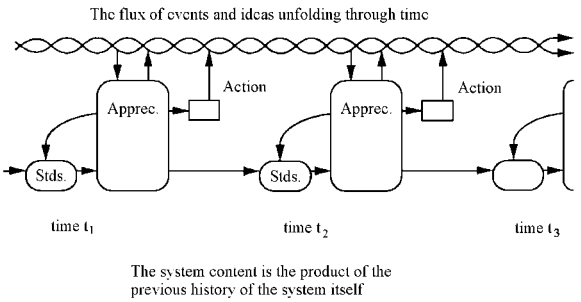

Figure A15. The dynamics of an appreciative system. SOURCE: Checkland and Casar (1986)

(1984) called the 'natural drift' of 'autopoietic systems' (Maturana & Varela 1980), systems whose component elements create the system itself. Through its (changing) filters the appreciative system is always open to new inputs from the flux of events and ideas, a characteristic that seems essential if the model is to map our everyday experience of the shifting perceptions, judgments, and structures of the world of culture.

Vickers's claim was that he had constructed an epistemology that can provide convincing accounts of the process by which human beings and human groups deliberate and act. The model in Figures A14 and A15 is a systemic version of the epistemology.

Checkland and Casar (1986) used it to give an account of the learning in a systems study of the Information and Library Services Department of what was then ICI Organics (a manufacturer of fine chemicals within the ICI Group), a study that has been described in detail elsewhere (Checkland 1985a; Checkland and Scholes 1990). This study was carried out by a group of managers in the function with some outside help in the use of soft systems methodology (SSM), which was the methodology used. It is a way of making practical use of the notion of an appreciative system, and it will be discussed briefly in the next section. It entails structuring a debate about change by building models of purposeful activity systems and comparing them against perceptions of the real world as a means of examining what the appreciative settings are in the situation in question and how they and the norms or standards are changing. In the study in question, there were three cycles of this learning process.

In the first cycle, the study team's interest and concern were to rethink the role of their function in a changing situation. They perceived many facts relevant to this, which resulted in 26 relevant systems. They selected and judged these facts in terms of a conception of a particular relationship and standards relevant to it: they accepted the relevance of a simple model that took as given that their function was a support to the wealth-generating operations of their company, and they implicitly made use of standards according to which a good version of this relationship would be to make efficient, effective, and timely provision of information to other parts of the company.

These considerations contributed to the ideas stream of the Lebenswelt and led to the action of exploring several perceptions of the relationship between the function and the rest of the company in greater depth. In this second methodological cycle, the focus was still on the relationship between function and company but the appreciative settings began to change. This can be expressed as a change in standards resulting from the first cycle of appreciation. The shift was in the concept of what would constitute a good relationship:

> The focus shifted from ILSD (Information and Library Services Department) as a reactive function responding quickly and competently to user requests and having the expertise to do it, to ILSD as a proactive function, one which could on occasion tell actual and potential users what they *ought* to know. (Checkland 1985a, p. 826)

In the third cycle, the new concept of ILSD was developed and, in the language of Figure A14, several hypothetical forms of relevant relationships were considered. This led to attention being given both to internal relationships within the function (How different would they have to be to sustain a proactive role?) and to the relationship between the function and the company. These considerations led to decisions on actions necessary to broaden the appreciative process. The actions taken were to make both internal (within ILSD) and external presentations of the results of the study. These events entered the company's Lebenswelt and had the effect of starting to bring about the change in the company's appreciative

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system, as evidenced by the remark made by the research manager at the external presentation, namely, that 'I have known and worked with ILSD for 20 years and I came along this morning out of a sense of duty. To my amazement I find I now have a new perception of ILSD' (Checkland 1985a, p. 830).

Finally, the company's subsequent allocation of significant new resources to ILSD can be described as illustrating its implicit adoption of new standards with respect to the Information and Library Services function, standards whose change stems from the recent history of the company's appreciative system, involving input of ideas and events from the systems study itself.

The Appreciative Process in Action: Soft Systems Methodology

It is not appropriate here to give a detailed account of SSM, which is described in numerous books and articles since the early 1970s. (The basic books describing its development are Checkland 1981; Checkland and Scholes 1990; and Wilson 1984; a burgeoning secondary literature may be sampled via, for example, Avison and Wood-Harper 1990; Davies and Ledington 1991; Hicks 1991; Patching 1990; and Waring 1989.)

SSM was not an attempt to operationalize the concept of an appreciative system; rather, after SSM had emerged in an action research programme at Lancaster University, it was discovered that its process mapped to a remarkable degree the ideas Vickers had been developing in his books and articles (Checkland 1981, chap. 8).

The Lancaster programme began by setting out to explore whether or not, in real-world managerial rather than technical problem situations, it was possible to use the approach of systems engineering. It was found to be too naïve in its questions (What is the system? What are its objectives? etc.) to cope with managerial complexity, which, we could now say, was always characterized by conflicting appreciative settings and norms. Systems engineering as developed for technical (well-defined) problem situations had to be abandoned, and SSM emerged in its place.

The development of SSM has been characterized by four points in time at which what can now be seen, with hindsight, as crucial ideas moved the project forward (Checkland and Haynes 1994). The first was the realization that all real-world problem situations are characterized by the fact that they reveal human beings seeking or wishing to take *purposeful action*. This led to purposeful action being treated seriously as a systems concept. Ways of building models of human activity systems were developed. Then it was realized that there can never be a single account of purposeful activity, because one observer's terrorism is another's freedom fighting. Models of purposeful activity could only be built on the basis of a declared Weltanschauung. This meant that such models were never models *of* real-world action; they were models *relevant to* discourse and argument about real-world action; they were epistemological devices that could be used in such discourse and debate; they were best thought of as *holons*, using Koestler's (1967) useful neologism, which could structure debate about different ways of seeing the situation. This led to the third crucial idea, that the problem-solving process that was emerging would inevitably consist of a learning cycle in which models of human activity systems could be used to structure a debate about change. The structure was provided by carrying out an organized comparison between models and perceived real situations in which accommodations between conflicting perspectives could be sought, enabling action to be taken that was both arguably desirable — in terms of the comparisons between models and perceived situation — and culturally feasible for a particular group of people in a particular situation with its own particular history. (The fourth crucial idea, not relevant here, was the realization that models of human activity systems could be used to explore issues concerning what information systems would best be created to support real-world action — which took SSM into the field of information systems and information strategy.)

Given these considerations, SSM emerged as the process summarized in Figure A16. This is a picture of a *learning system* in which the appreciative settings of people in a problem situation — and the standards according to which they make

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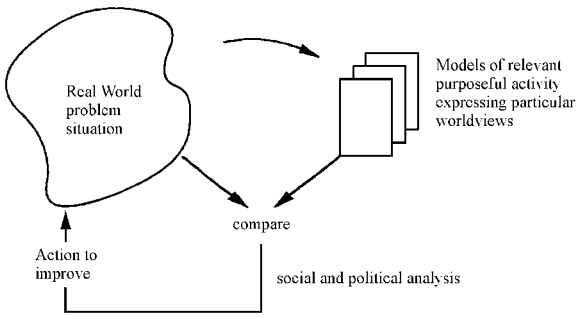

Figure A16. Soft systems methodology as a learning system. SOURCE: Checkland and Scholes (1990)

judgments — are teased out and debated. Finally, the influence of Vickers on those who developed SSM means that the action to improve the problem situation is always thought about in terms of managing relationships — of which the simple case of seeking a defined goal is the occasional special case.

CONCLUSION: THE RELEVANCE OF APPRECIATIVE SYSTEMS THEORY AND SSM TO MODERN MANAGEMENT

It is not difficult to envisage the situations in both industry and the public sector in which the thinking about problems and problem solving would be significantly helped by the models underpinned by hard systems thinking, namely the models that see organizations as coordinated functional task systems seeking to achieve declared goals and that see the task of management as decision making in support of goal seeking. These models would be useful in situations in which goals and measures of performance were clear-cut, communications between people were limited and prescribed, and in which the people in question were deferential toward the authority that laid down the goals and the ways in which they were to be achieved. But this image has never accurately described life in most organizations as most people experience it, and it has become less and less true since the end of the Second World War. Since that time the trends have been toward much increased capacity for communication, greater complexity of goals as economic interdependence has increased, much reduced deference toward authority of any kind, and the dismantling of monolithic institutionalized power structures. The dethronement of the mainframe computer by the now ubiquitous personal computer is at once both a metaphor for these changes and one of the catalysts for their occurrence.

In such a situation richer models of organization and management will be helpful, and it has been argued that those based on Vickers's appreciative systems theory and SSM have a role to play here. More important, they do not replace the older models but rather subsume and enhance them. In SSM, focusing on a unitary goal is the occasional special case of debating multiple perceptions and proceeding on the basis of *accommodations* between different interests. For Vickers, managing relationships is the general case of human action, the pursuit of a goal the occasional special case.

Vickers himself has usefully differentiated his stance from that of Simon in remarks that relate to the latter's *Administrative Behaviour* (Simon 1957):

> The most interesting differences between the classic analyses of this book and my own seem to be the following:
>
> (1) I adopt a more explicitly dynamic conceptual model of an organisation and of the relations, internal and external, of which it consists, a model which applies equally to all its constituent sub-systems and to the larger systems of which it is itself a part.
>
> (2) This model enables me to represent its 'policy makers' as regulators, setting and resetting courses or standards, rather than objectives, and thus in my view to simplify some of the difficulties inherent in descriptions in terms of 'means' and 'ends'.
>
> (3) I lay more emphasis on the necessary mutual inconsistency of the norms seeking realisation in *every* deliberation and at *every* level of organisation and hence on the ubiquitous interaction of priority, value and cost.
>
> (4) In my psychological analysis linking judgments of fact and value by the concept of appreciation, I stress the importance of the underlying appreciative *system* in determining how situations will be seen and valued. I therefore reject 'weighing' (an energy concept) as an adequate description of the way criteria are compared and insist on the

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> reality of a prior and equally important process of 'matching' (an information concept).
>
> (5) I am particularly concerned with the reciprocal process by which the setting of the appreciative system is itself changed by every exercise of appreciative judgment. (Vickers 1965, p. 22)

As an example of the relevance of SSM to current problems of managing complexity, we offer recent work done within the National Health Service (NHS) in the United Kingdom. (Some of this is described in Checkland and Holwell 1993; Checkland and Poulter 1994; and Checkland and Scholes 1990, chap. 4.)

In recent years the NHS has been subjected to several waves of government-imposed change. First there was the imposition of a system of accountable management, replacing the previous consensus management of teams of professionals. This had hardly settled down before it was replaced by an internal quasi-market. In this development the old district health authorities (into which the previous change had introduced district general managers) became purchasers of health care for a defined population, whereas hospitals and some general practitioners became providers of health care, the two being linked by contracts (although not legally binding ones) for particular services at a negotiated price. All these changes have entailed a considerable shift in appreciative settings for health professionals, and the NHS has been experiencing a period of considerable turmoil.

In the study described in Checkland and Scholes (1990), the problem was addressed of how a Department of Community Medicine in what was then a district health authority could evaluate its performance. Clearly the evaluation standards would depend completely on this department's image of itself and its role within the district. This is not a casual consideration, because concepts of community medicine range from *providing epidemiological data* to *managing the delivery of health care*. In this work, SSM-type models of purposeful activity relating to concepts of community medicine were built, with participation of members of the department, and eventually an evaluation methodology was developed. This was based on a structured set of questions derived from models that members of the department felt expressed their shared appreciative settings with regard to their image of the role of community medicine, which in their case was a very proactive interventionist one.

More recently, much work has been done in NHS hospitals and purchasing authorities as they assimilate and adapt to the purchaser-provider split (Checkland and Holwell 1993). The new appreciative settings have been explored with participants via models of notional systems to enact the purchaser and provider roles. These have served to structure coherent debate concerning the requirements of the new roles.

In a recent study in a large teaching hospital, the work was part of a project to recreate an information strategy for the hospital suitable to cope with the new arrangements (Checkland and Poulter 1994). In this work half a dozen teams of hospital workers representing the different professions were set up; members included clinicians, nurses, professionals from the finance and estates offices, and so on. Over a period of about 6 months, with a plenary meeting of team leaders every month, the teams discussed their activity and its contribution to meeting the requirements of the contracts for providing particular health care services that the hospital would in future negotiate with purchasers. Activity models were built and then used to structure analysis of required information support. This was related to existing information systems, and the information gaps identified helped in the formulation of the new information strategy.

One incident that occurred during this process may be recounted. It illustrates, in microcosm, the change of appreciative settings that can occur in the process of using SSM. It concerns a working group made up of nurses in the teaching hospital, led by a senior nurse. The group was building activity models relevant to providing nursing care, before using them to examine required information support.

Within SSM, when would-be relevant activity models are built, careful concise accounts of them as transformation processes are formulated (so-called Root Definitions). Various questions are asked in clarifying these definitions, one of which is 'If this notional system were to exist, who would be its victims or beneficiaries?' Nurses ask-

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ing this question naturally wish to answer, 'The patients'. That is what their whole ethos, education, and professionalism tell them. That illustrates why they are in the profession. It was therefore something of a shock to this group — brought to their attention by the structured requirements of the SSM process — to realize in discussion that under the new arrangements the *technically* correct answer is nearer to being 'The hospital contracts manager'. This is because, under the so-called internal market, each contract for a health care service that involves nursing care ought technically to include the cost of providing a certain level (and quality) of nursing care. The nurses' task is then to provide what the contract calls for. Beyond this, of course, there is a theory according to which the interests of patients will, in fact, best be met by the new purchaser–provider contracts.

But it is not easy for nurses to accept this. The senior nurse who described this incident at one of the plenary discussions said that this question, and the issue it exposed, occupied the team for much of one of their meetings. It gave her insight into the NHS changes and helped her to understand her own misgivings about a supposed internal market in health care. Geoffrey Vickers would have appreciated this story.

Given our self-consciousness and the degree of mental autonomy that we seem to possess as human beings, that part of our thinking that is beyond the unreflecting stream-of-consciousness involvement in everyday life can itself be thought about. This can be done by examining the mental models that we use to make sense of our worlds. It is entirely plausible that our perceptions will be coloured by those mental models. And it follows that they need both to be better than primitive and to change as our human and social world changes.

It has been argued here that the models of organization and management that have been useful since the 1950s need to be enriched. It has then been argued that appreciative systems theory and SSM can help to provide such enrichment. They do not replace the earlier functionalist and goal-seeking models: They enclose and enhance them in ways more appropriate to institutional life at the end of the century.

NOTE

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