

**SYSTEMS THINKING -
A STUDIE OF ALTERNATIVES OF
R. FLOOD, M. JACKSON, W. ULRICH, AND G. MIDGLEY**

Tage Frandberg

Member of International Society for the Systems Science

tage.frandberg@mailbox.swipnet.se

ABSTRACT

The call for papers for this special issue under the heading "Critical Systems Thinking" (Jackson, Flood, Midgley, Mingers, Ulrich) aroused my interest because my approach to systems thinking differs from theirs - and raised questions which I welcome the opportunity to respond to. For the purposes of this paper, in the following I will select and discuss some implications of certain of the terms and concepts used in the systems thinking of the above-mentioned authors, such as metaphor, critical system, systems approaches. The wide range of literature available means that, to a great degree, the decision as to the questions one wishes to highlight is dependent on what one's aims and purposes are; the questions chosen cannot be seen as providing a representative account of the respective authors' wide-ranging systems thinking. I have attempted to point out differences and similarities in various kinds of systems thinking, especially in relation to how I myself interpret and apply systems thinking. The following is necessarily restricted to presenting just a few of the subjects which over a number of years I have found it interesting and relevant to discuss. I am aware that readers may raise any number of legitimate objections, and claim that it is not possible to deal with such a voluminous body of material in this way, or that there is every reason to spotlight other questions than those I have selected for consideration. My article can and does not claim to do anything other than aim at best to serve as a platform for discussion.

Keywords: *Living Systems Thinking, Critical Thinking, Metaphors*

INTRODUCTION

I endeavour to apply in practice the thinking embodied in James G. Miller's "Living Systems" (1978), and in the work with which it has been supplemented and extended over the years. Miller posits the existence of concrete systems and abstracted systems; there is a reality that exists as a system irrespective of the way we think about it (see also Whitehead, 1925, pp 88-90). In the preface Miller writes that he has been inspired by Whitehead's "philosophy of organism" (see Whitehead (1925) and Whitehead (1929 repr. 1978)), and quotes Whitehead (according to Miller 1978, p xiii.): "Science is taking on a new aspect which is neither purely physical, nor purely biological. It is becoming the study of organisms." The final sentence of (Miller 1978, p 1051) again quotes from Whitehead, in stating that process is the reality: "each actual entity is itself only describable as an organic process. It repeats in microcosm what the universe is in macrocosm. It is a process proceeding from phase to phase, each phase being the real basis from which its successor proceeds." My website, <www.living-systems.nu>, is an example of the application of Living Systems. The following sections present some thoughts on a few concepts in systems thinking which I wanted to share with the research community.

CRITICAL THINKING

Jackson (2000, p 355) illustrates in Chapter 10 The Origins of Critical Systems Thinking and in the two following chapters he gives further illustrations of critical thinking. To begin with, two quotes are taken from Jackson (2000, p 357): "Critical awareness, incorporating social awareness, became one of the central principles of critical systems thinking and remains so to this day"; and (p 316): "A critical approach to systems design means planners making transparent to themselves and others the normative content of designs. All designs and proposed designs must be submitted to critical inspection and not presented scientifically as the only objective possibility." There are grounds for questioning the word critical in the terms Critical Systems Thinking. It is in fact not really necessary to emphasize the word 'critical', since ever since the time of Socrates critical thinking has been a characteristic of scientific thought. It can be said that the first attempts to think using systems ideas can be attributed to the Ancient Greeks. Socrates established "critical" thinking as a tool to use when we seek to verify our assumptions.

The mediaeval thinker Thomas Aquinas is still today held up as an example of the thinking of the Catholic Church. What he strove to do was to apply thoughts, in an ordered and carefully reasoned way, to explain his decisions. Thomas Aquinas is still by the Catholic church seen as an important thinker because he could combine Christian faith and science.

The Renaissance has often been viewed as a sudden awakening from the darkness of the Middle Ages, but in recent times this viewpoint has been questioned. It has been pointed out that the thirteenth century was a very active period - although the "Black Death", the plague which struck Europe in the fourteenth century and almost halved its population, understandably affected the development of scientific thought. The Swedish historian Michael Nordberg, in his book "Den dynamiska medeltiden (The Dynamic Middle Ages Nordberg 1984, 1995) writes: "I would maintain that most of what characterizes the intellectual heritage, the attitudes and mentality of modern Western Europe is to be found, in its fundamental features, fully developed and formulated in the fourteenth century, and that it represented a logical and organic progression from the material and conceptual conditions created by the preceding century."

From the time of Francis Bacon onwards, important philosophers such as Descartes, Copernicus, Galileo have had a major influence. The eighteenth century saw continuing extension of the implications of the concept of critical thought - for example, Adam Smith's "The Wealth of Nations" has been seen as part of these developments. Applying critical thinking to reason itself, Immanuel Kant wrote "Critique of Pure Reason", which has generally been seen as a milestone in development of critical thinking.

In a newspaper article (Svenska Dagbladet 2003 Nov 23) the Swedish professor Lars Lönnroth reviews the recently published book by the Danish professor Thomas Bredsdorff, "Den brokede oplysning" (The Used Enlightenment - The reason of emotions and the emotions of reason in 18th-century Nordic literature): "The eighteenth century is often described in reference books as the "Age of Enlightenment" - but what does the word "Enlightenment" really mean in this context? It is used to refer to a distancing from the authority of the church and the monarchy, and this distancing is generally explained to be a consequence of the growing trust in scientific reason and open social debate carried on in a spirit of tolerance". Even if this ethos was one of many contributing factors, the standpoint of this book is that the "Enlightenment" is part of a multifaceted process which also included a good deal of superstition and narrow-mindedness.

During the nineteenth century Auguste Comte attempted to apply scientific methods in the field of social science, and founded the school known as Positivism. The positivistic approach has been subjected to severe criticism in modern times because it claims that social phenomena can be described using methods of the natural sciences, for example by means of mathematical description. Society is not a field of natural science, since people have created society and are a part of its structure; we cannot position ourselves outside society and observe it from an exterior vantage point. In fact, we cannot really do this in scientific contexts, either: we are not able to achieve a level of objectivity that allows us to make a claim that is completely free from the observer's angle. And what is more, if we could, such knowledge would not be of interest to us, according to the book "The View From Nowhere", by Thomas Nagel, (1986).

If we move on to the present day, we can read the interpretation of critical thinking presented by Ted Benton and Ian Craib (2001) in "Philosophy of Social Science - the

philosophical foundations of social thought". In the introduction to the chapter entitled "Critical Rationality - Introduction; Hegel, Marx and the Dialectic", they write (p 107): "If all human beings possess reason then any society which excludes people, on the grounds of a human characteristic such as race or sex, from rights and duties of citizenship, from exercising their reason as part of the collective life, is an irrational society". They further write that the home of critical theory is Frankfurt, where the Institute for Social Research was founded in 1923. They point to the background of Adorno's famous book, "Negative Dialectics", highlighting the fact that it involves a movement between parts and wholes, and pointing out that positivist social science is concerned with solving particular social problems.

Jackson places special focus on the Enlightenment and Kant; these represent liberation from domination by forces that we do not control, and from the dominance of the church but we are now trapped by the demand nature puts on us and we have to respond to.

Benton and Craib (2001, p 110) put forward the view that one can perhaps say that humanity has become dependent on an irrational perception of a triumphant science. They discuss the thinking of Habermas, which leads to the emancipatory interest and takes us back to critical theory (p 115). According to them, Habermas "tries to revise Marxism and to rule out the possibility of being dominated by the technical interest and by instrumental reason". Benton and Craib (2001, p 111) present the idea, derived from Adorno and Marcuse, "of an autonomous individual able to make more or less rational decisions of his or her own, able to analyze and criticize the different ideological discourses imposed upon him or her and able to stand out against the group or the crowd, thinking for him- or herself and arguing with others. The implication is that such a figure can provide the basis for a real and open democratic system." In principle, this sounds similar to the ideas propounded by Jackson (2000) and Ulrich (1983). Benton and Craib, (2001, p 116) conclude the chapter by saying "We have discussed the notion of the rational as a critical standard, as a form of permanent criticism, of permanent dialogue and a way to developing a consensus on truth and morality."

One writer who particularly emphasizes the left-wing possibilities of critical theory is Douglas Kellner, who in his book "Critical Theory, Marxism and Modernity" writes: "We have seen that Critical Theory provides a dialectical, totalizing social theory which describes the contours, dynamics and tendencies of the present age, as well as the possibilities for radical social transformation" (Kellner, 1989, p 230). He goes on to say on (p 233): "In view of current post-modern claims that modernity is now over and post-Marxism claims that classical and even neo-Marxism is no longer relevant to the theoretical and political tasks of the present age Critical Theory needs to address these critiques and to appraise which features of Marxism and modernity continue to be operative and which have been surpassed."

SYSTEM

Jackson and Flood (1991, p 2), at the beginning of their book "Creative Problem Solving" write: "the concept 'system' is used not to refer to things in the world but to a particular way of organizing our thoughts about the world", and "second, we consider the notion of 'system' as an organizing concept." This is a simplification compared to Ulrich's (1983) description of systems and system-oriented concepts which, in the book's subject index, lists approximately 150 references. If I had to choose one description from these it would be the one by Ulrich (1983, p 34): "The present study is an attempt to elaborate the epistemological and heuristic foundations of a critical or dialectical, systems approach to socially rational planning, a systems approach that aims not at an objective, theoretical solution of practical reason but only at a critical solution".

The previous definition comes close to, if my understanding is correct, Miller's view of systems (remembering that Miller's thinking was inspired by Whitehead's "Process Philosophy") and the one which is given by Benton and Craib (2001, p 120): "So, realists in the theory of knowledge are committed to the existence of a real world, which exists and acts independently of our knowledge or beliefs about it. However, they hold that this external world is in principle knowable, and to some (discoverable) extent open to being changed on the basis of such knowledge as we are able to achieve. And these are the four features of critical realism:

1. Critical realism holds that we can make sense of cognitive practices such as the sciences only on the assumption that they are about something which exists independently. It does not pronounce on whether the truth claims of any particular science at any particular time are true – only the science concerned can make and evaluate such claims.

2. Critical realism shares with most contemporary philosophy a reflexivity about the conditions of possibility for thought, or language, to represent something outside itself; as we will see critical realism differs from empiricists in theorizing knowledge as a social process which involves variable 'means of representation'.

3. Critical realism differs from some other forms of realism in regarding the surface appearance of things as misleading as to their true character. This is why knowledge has to be a process and 'achievement': work has to be done to get beyond misleading appearances. This is why it is sometimes called a 'depth' realism as distinct from the 'empirical' realism of the empiricists.

4. Most importantly, critical realists' insistence on the independent reality of the objects of our knowledge, and the necessity of work to overcome misleading appearances, implies that current beliefs will always be open to correction in the light of further cognitive work (observations, experimental evidence, interpretations, theoretical reasoning, dialogue, and so on). Critical realism is thus 'fallibilist', in contrast to idealist and relative theories of knowledge which insulate themselves from the possibility of being proved wrong by doing away with the idea of a knowable independent reality."

The outlook represented by this quote differs from what Midgley (2000, p 35) has to say: "Churchman made it clear that boundaries are social or personal constructs that define the limits of the knowledge that is to be taken as pertinent in an analysis." In the chapter "Process Philosophy" Midgley, (2000, p 89 ff) discusses these issues in a number of sections under the heading "4.13 Some Consequences of Process Philosophy for Speaking about Reality",. In the chapter entitled "Boundary Critique" Midgley (2000, p 149) discusses "Key differences between Churchman, Ulrich and Myself", although Midgley seems in agreement with Churchman in his view of reality as a social construction. Midgley develops the content of "Systemic Intervention" in a way that causes me to reappraise my choice as to the way to apply Living Systems.

METAPHORS

This section looks at some of the metaphors used by systems thinkers in their analyses Jackson and Flood (1991, p 14) say "If one of the metaphors brings difficult issues into focus particularly clearly, then we shall argue (you will find in Chapters 2 and 3) that it is sensible to use a systems methodology to tackle the issues, which is consistent in its approach with the metaphor employed. For example, if looking at an organization as an organism best informs us of the issues in question (opportunities and constraints, difficulties and problems, organization and environment etc.) then a methodology which assumes and operates as though organizations are like organisms should be chosen." I find it hard to understand this image, since the authors have prior to this Jackson and Flood (1991, p 2) claimed that "Systems thinking does not refer to things in the world" - yet now they are at least postulating the existence of organizations.

There are similarities here with Gareth Morgan (1986), who in his well-known book "Images of Organization" explains how metaphors can be used to describe an organization as being like a machine (the closed systems view), like an organism (open systems view), like a brain (learning systems view), like a culture (emphasis on norms and values), like a team (unitary political systems) or like a prison (coercive political systems). Morgan (1986, p 341) explains how "For example a bureaucratic organization is simultaneously machine-like, a cultural and political phenomenon, an expression of unconscious preoccupation and concerns, an unfolded aspect of a deeper logic of social change, and so on. It is all these things at one and the same time." It may be valuable to apply this metaphor, but in a given, specific situation one has to decide how one is to view the organization as a whole - and then it is necessary to realize how complex an organization is, so that one is not tempted to treat it as if it only consisted of the proposed metaphor. If one also takes into account the time aspect, the problem becomes even more difficult to deal with; over time, an organization can change the relationship between the different and aspects represented by

the metaphors. The following figure based on Flood and Jackson (1991, p 42) shows a grouping of systems methodologies based upon assumptions they make about problem contexts.

		PARTICIPANTS		
		Unitary	Pluralist	Coercive
S Y S T E M S	S I M P L E	S-U OR, SA, SE, SD	S-P SSD, SAST	S-C Critical Systems Heuristics
	C O M P L E X	C-U VSM GST Socio-tech Contingency Theory	C-P Interactive planning SSM	C-C ?

Figure 1. A grouping of systems methodologies based upon assumptions they make about problem contexts (After Flood and Jackson, 1991:42)

According to their argument, they provide a very convenient means of grouping available systems approaches. Midgley (2000, p 217) however writes: "I will explain why I (along with most other critical systems thinkers) chose to abandon research into the System of Systems Methodologies after recognizing its initial promise." In principle, one can raise the same objections against the classifications in the matrix of methodologies as one can against the metaphors used to describe organizations: it's everything at once. There are differences in certain characteristics, but perhaps equally many characteristics are shared. An example of this is provided by Midgley (2000, p 238), who writes: "System Dynamics practitioners have therefore changed their understanding of 'system' to one that is much closer to that embraced by Churchman (1979), Checkland (1981) and Ackoff (1981), and presumably this new way of using it makes it equally applicable to unitary and pluralist contexts." This is in near agreement with the perspective from which I have understood and applied System Dynamics. It differs from the way Flood, Jackson and Ulrich have described system dynamics, although Jackson (2000) has toned down his criticism of it. Ulrich (1983) in a footnote says that this technique belongs to "uncritical heuristics", and Flood and Jackson (1991, p 82), writing on System Dynamics, say that what soft systems thinkers "cannot forgive is its attempt to present itself as an objective and neutral approach in the domain of social systems where "objectivity" (at least in the usual sense of that word) and "neutrality" are simply impossible to obtain." Systems Dynamics has not claimed to be describing reality in an objective or neutral fashion Systems Dynamics is a tool to communicate and compare the result of different points of view of how reality is perceived.

What Figure 1 really shows is how difficult it is to create systems thinking which is possible to apply with reference to "systems of system methodologies". Starting from slightly different points of departure, Midgley (2000, p 104) presents a similar view, enumerating the factors that count against using methodological pluralism: "(i) that it is not theoretically coherent

because different methods embody contradictory assumptions of different paradigms; (ii) that it is not culturally feasible because academic research communities have vested interests in promoting single methodologies and methods; (iii) that it is not psychologically feasible because it requires too much intellectual effort from interveners."

Benton and Craib (2001) devote three chapters to a discussion of empiricism and positivism, and give a modified picture of positivism when they write, in the book's Conclusion: "It would be difficult to rule out of court this sort of investigation - it is one of the ways we find out about what is going on in society, although it does not necessarily explain what is going on. Historically, such studies have been important guides to political reform and the amelioration of social problems, and social research organized along positivist lines still has its role to play." In the heading to Chapter Two - "The Critical Theory of Jurgen Habermas, Toward a Transformed Transcendental Approach", Ulrich (1983, p106) quotes Jurgen J. Habermas, 1971 a:vii). "That we disavow reflection is positivism". Flood and Jackson (1991, p 223) have the same quotation (taken from J. Habermas), in the Preface to "Knowledge and Human Interests" Finally, 'heuristics' refers to a process of uncovering objectivist deceptions and of helping planners and concerned participants to unfold problems through critical reflection. In Jackson (2000, p 356) we can read "At best , therefore, hard systems thinking will prove ineffective in the great majority of problem situations. At worst there will be a temptation to distort situations so that they "fit" the demands of methodology."

SYSTEMS APPROACHES

Under the heading of part II of Jackson (2000), there is a description of four approaches: the functionalist approach, the interpretive systems approach, the emancipatory systems approach, and the post-modern systems approach. For each of these an account is given of its strengths and weaknesses. When they are presented and described in this way it is difficult to choose in a specific, individual situation. As it is now, it is difficult to make a choice for example in the creative phase of TSI, and then even more difficult to make a choice in the phase involving selection of methodology or method. In the implementation phase it is then hard to see if a different choice in the two preceding phases would have given a better result - i.e. would have been more efficient and effective. When, within an organization, one is faced with the task of dealing with problems at several levels and problems which are interconnected in complicated ways, it may prove very difficult to see which implementations, in different cases, lead to those solutions which are efficient and effective. In this context, Churchman (1982, pp 12-13) writes on the connectedness of problems of a decision: for example relating to the amount of stock to be kept, can have effects on the sales organization, the financial situation, the transport organization, etc. My understanding of Churchman is that one of the situations which it is most difficult to judge is to work out what alternative solutions would have implied in the way of sacrifices. We are perhaps not able to fully work out all the consequences of what at first sight seemed to be a "simple unitary" problem.

In Flood and Jackson (1991, p 42) they write: "It follows that the choice of systems methodology should be informed by the 'systems of systems methodologies', it should not be determined by it". It is not easy to understand what is actually implied by the word "logically" when they write: "we have logically grouped together what is otherwise a bewildering array of systems methodologies."

Midgley's view differs from that of Flood and Jackson; he claims that process philosophy allows theoretical pluralism and that methodological pluralism is based on theoretical pluralism. He develops this in Chapter 1, formulating a new approach to philosophical issues, and elaborates it further in Chapter 4, where he maintains that "process philosophy can provide the grounds for a new theoretical pluralism that will allow human beings to be centered or decentered in analyses, depending on the purposes and values being pursued." In Chapter 6 he relates "the systems idea to intervention, and suggest that systemic intervention is purposeful action by an agent to create change in relation to reflection on boundaries." Midgley claims that methodological pluralism is vital if we are to build a flexible and responsive intervention practice; he advocates pluralism at the methodological level and at the level of methods. However, his view differs in several respects

from those in Flood and Jackson (1991) and those in Ulrich (1983). He finds that these writers have limitations, Midgley's (2000) "Systemic Intervention", which is free from metaphors presented in matrix form, or in the form of flow diagrams as in Ulrich (1983, pp 341-342, "Table 6/4): Overall architectonic of our critically-heuristic approach to the design and assessment of purposeful systems."

LIVING SYSTEMS

Jackson (2000, pp 177-184) gives a résumé of Living Systems Theory. This omits the philosophy which inspired Living Systems, and describe Living Systems as consistent of eight systems levels and twenty critical subsystems. As an example of how Living Systems can be perceived he refers to Lane Tracy who is quoted "Because of their origins, organizations exhibit the same essential processes and structures that you and I display.". Living Systems did not take a biological system as a departure point. If Tracy's suggestion that organizations should be viewed as "life-forms" and managers should behave towards them as parents, or stewards, or physicians seems to presuppose a biological system. The fundamental premise of Living Systems is that all eight levels should be studied and "treated" outgoing from the entire theory of Living Systems. What would it look like if one was to give parental treatment to a cell, or a community?

Jackson also refers to Wilby (1995) where she wonders whether "any living system other than a living organism can be classed as a living entity", since there are other "components" which cannot be considered to be living. If one for various reasons feels unable to accept Living Systems as a theory, one should at least give an impression of having read the theory. When reading Wilby's comments on Living Systems, it is hard to find that they have reference to what "The Basic Concepts" (Miller, 1978 pp 9 - 50) presents as the foundations of living systems, and also to the content of "Structure and Process", (pp 61 -87), a section which has headings such as Subsystems, Relationships Among Subsystems or Components, System Processes, and Models and Simulation. Wilby writes: "Questions of power relations do not occur only regarding excess resources; they also must cover questions of coercion and the more subtle forms of intimidation, pressures, and conflict from both inside and outside the organization." The reason why Tracy has not included these issues is perhaps owing to the views stated by Miller (1978, p 894): "except for economics, present-day social sciences lack the solid theoretical base and precise methodology necessary for understanding and conceptualizing the system so that these indicators can be useful in producing desirable social change. Perhaps general living systems theory can contribute to this"; and on p 893 "For a decade or two the study of societies as systems has been dominated in several disciplines by the abstract system concepts of Parsons and others, with results at this level similar to those identified at the level of organization (see pages 19, 20, 598, and 765). That is, variables of the system under consideration have been neglected in favor of variables relating to persons occupying roles in it. Matter-energy processing by societies has been underemphasized."

POST-MODERNISM

I would also like only to mention Jackson's view of post-modernism, taking as a departure point Benton and Craib (2001, p 161). where they write: "The proper object of any social science is not, it is argued, people and their meanings but the underlying structures which generate those meanings and in some sense generate the people themselves". It is often argued that a series of major thinkers in fact 'decentred' human beings. If this is the case, then a lot of the systems thinking which the other four systems thinkers have declared to be significant must be seen as an ongoing conversation and exchange of ideas between people which is not particularly important. According to what Benton and Craib (2001, p169) write, under the heading "Post-modernism: Losing Philosophy": "Nothing is certain, nothing stands still long enough to be identified, there is no such thing as knowledge in any scientific sense, philosophy in any totalizing sense; there may be rational thought but it has no priority over the irrational and eventually merges

into the irrational." They point out, too, that there is a critical post-modernism which can be connected with the Frankfurter School, particularly the later works of Adorno, and which also, to a certain extent, is in line with Jackson's view.

This may be one of the reasons why Jackson's assessment highlights certain positive sides, at the same time as he sees drawbacks. However, I do not think it is convincing to pick out certain aspects from post-modernism which are presented in Jackson (2000, p 345, Table 9) "Constitutive rules of a generic framework for the application of the post-modern systems approach". The thirteen points enumerated are presented in such a fashion that according to my point of view they have a dissuasive effect. The first point is described as a mode of thought which accords with "post-modern rationale, that is focused on disrupting real-world problem situations by critically questioning all received opinion and accepted ways of doing things."

THE TIME FACTOR

On studying the content of the writings of Jackson, Flood, Ulrich and Midgley I have been struck by how little significance they have accorded to the time factor. For example Ulrich's "Table 6/4" (1983, pp 341-342) has no time axis. The time difference ought to be incorporated between the different levels in the table, since a long period of time can to the various stages such as "Taxonomy of problem-solving dimensions", and from there to the "Actual mapping" and "Ideal mapping", until, via the "Process of unfolding", one reaches the stage of "Rational planning". In a similar fashion, Flood and Jackson's matrices lack a time axis, in spite of the fact that in their metaphor of an organization, the parts constituting the organization will scarcely remain unchanged over time.

Midgley does not really have the same problem, but even so, to my mind his "boundary critique" should also include a discussion of the time dimension. In every alternative, the time aspect is important if one is to be able to assess the effectiveness of a measure. This has to do with the feedback process, which, whatever one's standpoint, has to be included. There are all too many examples of planning which has not taken account of the time aspect, and which has not from the outset dealt with the question of how the follow-up process is to be constructed.

CONCLUSION

The writers discussed in this paper show some differences in systems thinking. I do not deny that there is use for general overviews such as those given by for example Jackson (2000) but one has to find out what alternative one may find convenient and encourages him/her to study and apply systems thinking.

REFERENCES

- Benton, T., Craib, I. (2001) *Philosophy of Social Science – The Philosophical Foundations of Social Thought*. New York, Palgrave.
- Churchman, C. W. (1982) *Thought and Wisdom*. Seaside California, Intersystems Publications.
- Flood, R. L. and Jackson M. C. (1991) *Creative Problem Solving – Total Systems Intervention*, New York, John Wiley and Sons.
- Frandsberg, T., Web site <www.living-systems.nu>
- Jackson, M. C. (2000) *Systems Approaches to Management*. New York, Kluwer Academic/Plenum Publishers.
- Kellner, D. (1989) *Critical Theory, Marxism and Modernity*. Baltimore, The Johns Hopkins University Press.
- Lönnroth, Lars. (2003, Nov 23) *Upplysande omprövning av upplysningen (Informative reconsideration of the Enlightenment)*. Svenska Dagbladet, Stockholm.

- Midgley, G. (2000) *Systemic Intervention: Philosophy, Methodology, and Practice* New York, Kluwer Academic/Plenum Publishers.
- Miller J. (1978) *Living Systems* New York, McGraw-Hill Inc.
- Morgan, G. (1986) *Images of Organization*. Sage Publications, Inc., London.
- Nagel, T. (1986) *The View from Nowhere*. New York, Oxford University Press.
- Nordberg, M. (184 1985) *Den dynamiska medeltiden (The Dynamic Middle Ages)* Bokförlaget Rabén Prisma. Stockholm
- Ulrich, W. (1983) *Critical Heuristics of Social Planning- A New Approach to Practical Philosophy*. Switzerland, Paul Haupt Bern und Stuttgart.
- Wilby, J. (1995) Book review. *Leading the Living Organization: Growth Strategies for Management*. New York, Systems Practice, 8:124, Plenum Press.
- Whitehead, A. N. (1925) *Science and the Modern World Lowell Lectures, 1925*. The Macmillan Company New York. Reprinted (1967) *The Free Press Paperback Edition*. New York
- Whitehead, A. N. (1929 repr 1978) *Process and Reality*. The Free Press, New York

Received: 11 August 2003

Accepted in final form: 30 March 2004 after two revisions

About the author

Tage Fändberg, address Höstvägen 1, 16931, Solna, Sweden has worked for a number of years in the area of Living Systems Theory. You can find more details at his web site: <http://www.living-systems.nu> or by sending him an email at: tage.frandberg@living-systems.nu