Anticipating Systems
An Application to the Possible Futures of Contemporary Society

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To Heinz von Foerster,
the author of *Observing Systems*.

Abstract
The purpose of this paper is to use a general systemic model to describe complex self-organizing systems, to interpret the present state of the Western society and build some scenarios for its possible futures. In the first part we present the general holistic metamodel or language to interpret complex partly autonomous systems, like social, living or cognitive systems. In the second part we present C. W. Graves' typology for systems of value or coping systems which we will use in the application of our model. In the last part we use our general metamodel to represent the life cycle of the rationalist paradigm from the Renaissance to the present time and generate some prospective scenarios with the help of Graves' typology.
Keywords: systemic metamodel, holism, anticipation, values, prospective scenarios

1 Introduction

In this paper, inspired by the ambiguous title of Heinz von Foerster's important book Observing Systems (von Foerster 1984), we would like to throw a bridge between studying systems which have some anticipating capacity, on one hand, and using the knowledge thus acquired to anticipate, or at least to prospect some scenarios for the future of our own society, on the other hand. In other words, we would like to contribute to fill the gap between the scientists who study complex systems, and those who - volens nolens - make complex systems, the decision makers of the economy and the politicians.

It is becoming evident, probably also to the most confident adepts of the progress through technology and economy - and more generally of the mainstream objectivist and reductionist scientific paradigm - that we have been witnessing in the last decade an amazing accumulation of unexpected, challenging and disturbing events. Many people are just spectators of these phenomena and do not see any correlations between them; they wait for the progress to recover as was the case in the 1960's. Others begin to question the real efficiency of our way of doing things but few question the implicit philosophical presuppositions which are at the root of the Western Weltanschauung.

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We think - or rather hope - that the systems science, the science of complex systems, by its constructive criticism of the dominant mechanist paradigm, will help to conciliate our actions and representations with the way nature works in reality.

1.1 Double Purpose of this Paper

The expression "anticipating systems" means two things. Firstly, it refers to the scientific study of anticipating systems, systems which - thanks to their stucture and organization - have the ability to make predictive models, to influence or to generate the future. Secondly, "anticipating systems" refers to the act of anticipating – predicting or preparing - the future functioning of real life systems.

The first case corresponds to the part of the scientific endeavor devoted to making theoretical models of the natural systems which are complex enough to take their future into account one way or another; this can be done by the system either by predicting its own future, by preparing to it in an adequate manner or by following some recurrent patterns. The second case is simply for a scientist to anticipate the behavior of real life systems; he/she can make predictions or scenarios by using the theoretical models developed in the first case.

In this paper we will do both. In the first part, we will present a general model to interpret the dynamics of complex self-organizing systems. Let us recall that we have previously also used our model to prospect the notion of anticipation and have shown the relationship between the complexity of systems and their anticipating capacity (Schwarz, 1997a). In the second part of the present paper, we will use our metamodel to make a model of the industrial society, or more precisely of the empirico-analytical paradigm that started at the Renaissance and is still surviving today; we will then contextualize what has been going on in the last decade and show some scenarios for possible futures. Our model is compatible with the view that this paradigm has actualized most of its potentialities and that the negative collateral effects are now surpassing its benefits.

C.W. Graves, a psychologist who extended Maslow's work on the pyramid of human needs, has proposed (C. W. Graves 1974) a scale of eight systems of values which individuals and societies use for their negotiations with their Umwelt. We use this scale, which is perfectly compatible with the levels generated by our general metamodel, to propose three families of scenarios for the future of society: 1) regression to past value systems, 2) continuation of the objectivist utilitarist value system, and 3) metamorphosis to new value systems. We will describe their main features and try to identify them in the news from the world.

We are convinced that we can increase our influence on our destiny only by understanding the logic of the forces at work in the systems around us.

1.2 Some Unexpected and Challenging Problems in the Last Decade.

In this section we briefly recall some unexpected and mostly undesired developments that occured in the last decade on this planet; they may well be the

manifestation of the inadequacy of the mechanist paradigm and of the corresponding analytical science and fragmented practice.

The most visible processes took place in the field of economy and technology:

1. Collapse of the planned economy systems in Eastern Europe
2. Globalization of the economy and finance
3. Increasing priority of the commercial over the political
4. Shrinking of the democratic decisional field in favor of the financial
5. Explosion of the global communication networks
6. Privatization of the commons (territorial colective infrastructures and networks)
7. Decreasing returns of capital due to environmental and social costs increase

Social and cultural transformations are also accelerating:

- Increased gap between rich and poor people
- Increased gap between rich and poor countries and associated frustration
- Increased strain betwen civil society aspirations and economical logic
- No consensual purpose for the future of society and no project for a coherent society management.
- Generalized trend toward technophilic race and consumer conditioning
- Confrontations between Western and other cultures and civilizations

The ecological problems due to the explosion of matter and energy exchanges in society are well known:

- Climatic changes
- Depletion of non renewable ressources
- Pollution of air, ground and waters

1.3 Usual Interpretative Frameworks and Systems Sciences.

We suspect that these series of events are not just temporary accidental fluctuations but are caused by the inadequacy of our world view and our methods to manage complex situations. The usual explicative frameworks like religions, political ideologies (liberalism, socialism, etc.) are not pertinent tools to understand these developments. Furthermore, mono-disciplines like economical science, sociology, psychology, anthropology, etc. are unable to apprehend alone complex hybrid systems.

What is needed is a model, or better a language, adapted to decribe and interpret complex situations, or more precisely partly autonomous complex systems like social systems, living systems or conscious systems. Several lines of research have been followed in the last 50 years to elaborate such models in the context of cybernetics, general systems theory (GST), nonlinear dynamics (chaos theory), complex adaptive systems research (CAS), cellular automata, recursive and hyperincursive systems, as well as artificial life (AL). Several new concepts have been proposed in the field of these systemic sciences.

2 The Main Features of a General Language to Interpret Partly Autonomous Complex Systems

We have recently proposed a new basic metamodel or language from which one can build models to interpret real life complex systems having some degree of autonomy or operational closure, like self-organization, self-regulation, self-production (autopoiesis) or self-reference. As the details of this language have been published elsewhere (Schwarz, 1997b, 2000), we will present here only its main characteristics before applying it to the case of society.

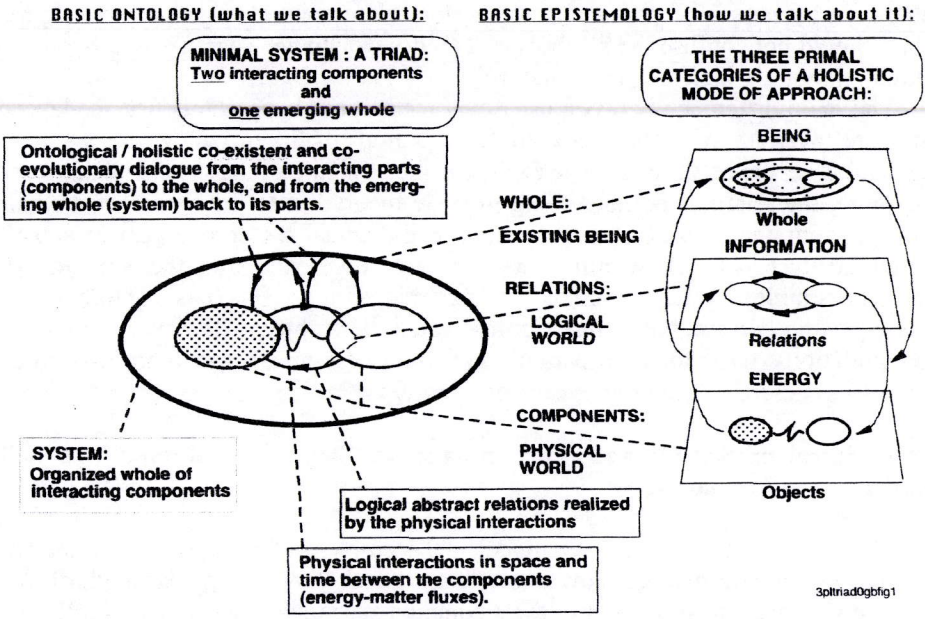


Fig.1. The basic entity which is the object of the description proposed in this paper is the minimal system: a triad (non-separable whole) of two interacting components (ontology). The corresponding epistemology has therefore three primal categories: the physical world of objects (components), the abstract world of relations (images of interactions), and the existing world of the whole which is (system).

2.1 Primordial Categories and Prototypical System

Searching for the most general configuration of things when we observe nature, we propose a most simple and general system made up of two components in relation (see left of fig.1). It can represent either any pair of interacting objects (for something to happen you need to be two!) or a subject observing an object. Drawing the epistemological and ontological conclusions from this trivial starting point, we propose that any existing situation, is given by couples of interacting components, which constitute an existential whole, a "system". This entity has two aspects: 1) its material structure, the physical aspect of the system and 2) its organization, the immanent

network of potential relations which represents the possible subsequent states of the system.

In other words, the usual Cartesian-Newtonian dualist view of an objective "reality" whose evolution is determined by some eternal "laws", is replaced by a holistic approach where what happens emerges from a deep ontological dialogue between two inseparable and nevertheless irreducible aspects: the physical world of the things, which we can perceive by our senses and which corresponds to the usual world of physics, and the cybernetical world of the potential relations immanent in the system, one of which will be realized in the next round of the dynamics of the system. This potential field can be symbolized in the framework of a theory by symbols or algorithms, like numbers, parameters, differential equations, logical reasoning or geometrical figures. But one should not confuse the symbols of a theory, which are human artifacts, and the potential relations, which are part of nature.

The main difference between usual physics and our approach is that the laws of physics are invariant and represented by the equations of the theory, whereas here, in the general case, the relations change each time the structure of the system changes and, furthermore, the relations do not belong to some theory but to the system as a whole. There is a continuous basic dialogue between the actual material organism and the potential abstract network within. In fig.1. are represented, on the left side the prototypical simplest system, made of two interacting components (basic ontology), and on the right the corresponding three primal categories: objects (for example energy-matter), relations (basis for information), and wholes (systems), which are used in our metamodel to describe the world (basic epistemology).

2.2 The Spiral of Self-Organization and the six Steps of Evolution from Self-Organization to Autonomy.

The next question in our metamodel is the problem of dynamics: how does the primal generic system emerge, how does change occur ? We show that the birth of a wide variety of real life systems displays a common succession of four stages following a state of instability:

- precursor tensions, source of instability (conditions far from equilibrium)
- noise or fluctuations (alea), triggering:
- a cascade of mutually provoked events (self-organization by positive feedbacks), which leads to:
- a new dynamically stable structure-organization of the system , followed by
- a phase of actualization of the potentialities or propensions of this new system (entropic drift or trend toward the more probable).

These stages correspond to the four sectors of the spiral of fig.2. It must be noticed that the fluctuations in the alea sector do not always lead to a new viable configuration (branch c) but, more often, end up with the destruction of the system (b) or eventually with its maintenance with minor adjustments (a).

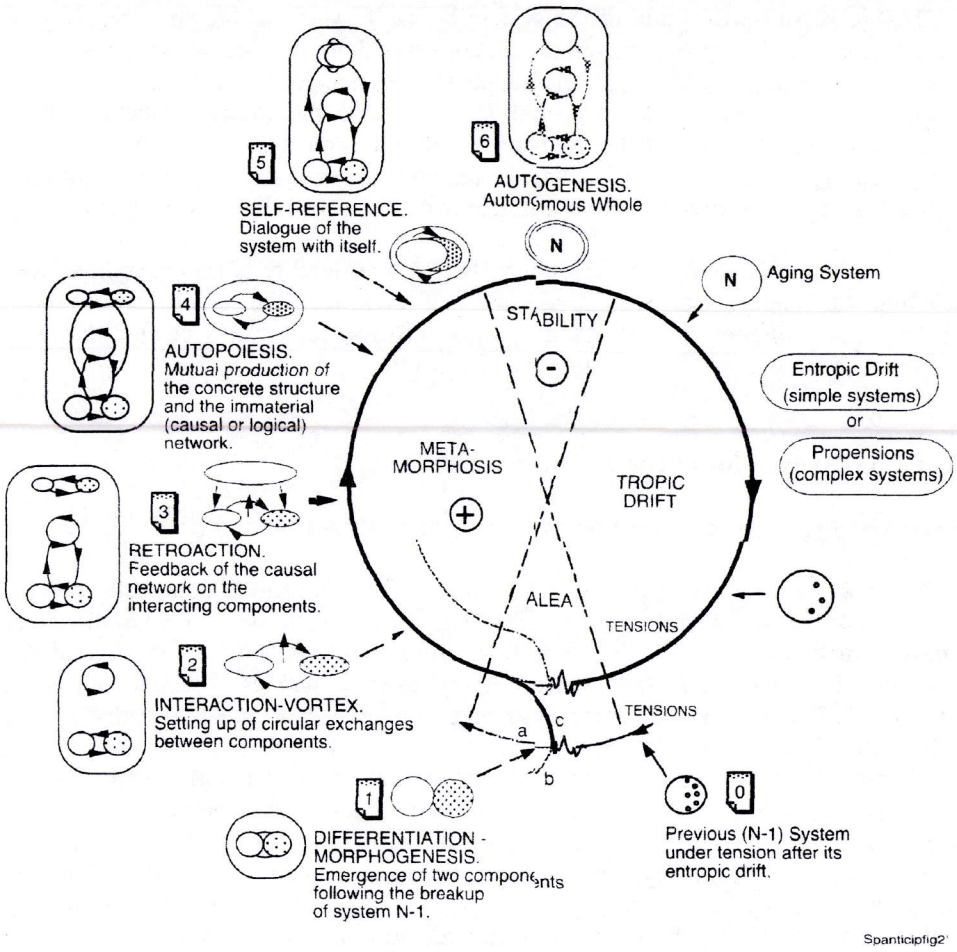


Fig.2. The seven steps in the self-organization and evolution of viable systems.

A closer study of these processes shows that the iteration of such spiral cycles of self-organization and entropic drift generates a long term evolution toward ever more complex and autonomous systems, characterized by the successive appearance of six fundamental loops of increasing abstraction following the entropic drift of the parent system (0) (see Schwarz 1997b and 2000):

1. morphogenesis: positive feedback loops which produce self-organization, i.e. the structuration of the medium,
2. vortices: recycling of matter, like ecological cycles or matter-energy circulation in living or social organisms
3. homeostasis: cybernetical networks of mostly negative feedback regulating loops,

4. autopoiesis: self-production of the system by itself, which means that the physical exchanges in the system generate, or correspond to, an immanent network of causality whose product is precisely the physical exchanges that generated it,
5. self-reference: between the physical structure and the logical organization; a (perfectly) autopoietic system is self-referential: it has no outside reference,
6. autogenesis, or self-creation, leading to autonomy; an autonomous system not only produces itself (by autopoiesis) but is able to create its own laws of production.

Let us mention that three cycles contribute to the stability of the system: vortices (recycling of matter), self-regulation and self-reference; the other three cycles, morphogenesis, autopoiesis and autogenesis, insure the capacity to change that also contributes to the perennity of the system as an identity.

3 C.W. Graves' Model for Value Systems

3.1 Graves' Typology for the Levels of Existence in Human History

During the troubled years 1965-1970 in the USA (Vietnam War, students revolts, etc.), the American psychologist Clare W. Graves felt that the United States were witnessing a change of value system; this intuition pushed him to go beyond the anecdote and to try to elaborate a general theory for the dynamics of human values (C. W. Graves 1974)), which can be seen as an extension of A. Maslow's pyramid of human needs (A. Maslow, 1954)

Contrary to most scientists studying human values, who assume that the nature of man is fixed and there is a single set of human values, Graves proposed that man's nature is a constantly evolving open system. His research data showed that this human system proceeds by quantum jumps from one steady state to another. He then proposed that the psychology of the mature human being is "an unfolding, emergent, oscillating, spiralling process marked by progressive subordination of older, lower-order behavior systems to newer, higher-order systems as man's existential problems change".

Thus man tends, normally, to change his psychology as the conditions of his existence change. Each successive stage, or level of existence, is a state through which people pass on the way to other states of dynamic equilibrium. When a person is centred on one state of existence, he/she has a total psychology which is particular to that state. His/her feelings, motivations, ethics and values, neurological activity, learning systems, belief systems, conceptions of management, economical and political theory, vision of the world, all are appropriate to that state. A person can change in the direction of more complex levels of existence as his conditions of existence change; another person may stabilize at a given level and live out his life at one or a combination of levels. In a given problematic situation, he/she will resort to one or another of the available coping systems. Thus an adult lives in a potentially open system of needs, values and aspirations, but often settles into what appears to be a closed system.

In history, human existence as a whole also went through a number of levels of existence: paleolithic, nomadic, neolithic settlements, royal and imperial organizations, merchant nation-states, each characterized by: a) a configuration of outside conditions imposed by the environment and the necessity of survival and b) a configuration of internal behaviors, mental representations and strategies to cope with the problems. Each of this coping systems, constituted by a set of external challenges and a set of behavioral answers, is thus symbolized by a couple of letters, A-N, B-O, C-P, etc. Graves proposed that human society, or rather the human system, has until now, with its present techno-economical form, traveled through six subsistence levels – organic, tribalistic, egocentric, absolutist, materialist and humanistic - which started with the emergence of the species *Homo sapiens*. Going now beyond mere subsistence, the future of mankind, Graves suspects, is characterized by a qualitative jump: the satisfaction of the material needs of organic survival will be supplemented by the pursuit of deeper existential dimensions, through more integrative and holistic levels.

TABLE 1

In column 2, the six subsistence levels and the double existential levels identified by Graves are listed, with some concrete examples in column 3. For this description, we use not only C. W. Graves' work but also documents published by two of his followers (D. E. Beck et al. 1996). In column 1, the corresponding metamodel steps are indicated (see more comments in section 3.2 below). More details on the correspondence between Graves' typology and our systemic holistic metamodel can be found in (Schwarz 1998).

1 **Corresponding Metamodel Steps and Processes**	**2** **Caracterisation of the Systems of Value and their Fields of Consciousness (FC)**	**3** **Examples of Behavior Illustrative Activities**
0. TROPIC DRIFT **Dissipation** **KeyWords:** **one, substance**	0. AN - ORGANIC Organism. Body. Organic survival: security, food, reproduction FC: my body	eating, drinking, talking about food; hunting; dresses, home; sex, erotism, seduction, look, games;
1. MORPHOGENESIS **Self-organizing system** **KW: two, space**	1. BO - TRIBALISTIC- "KinSpirits" - Tribal Order Life in group, clan. FC: my family, my clan, my group, nature	stories about family, groups, working colleagues; associative life; music and sport gatherings; tales, sagas, epic

2. **VORTEX** **Self-organized system** **KW: time, communication**	2. CP - EGOCENTRIC "PowerGods" – Ego: I in a hostile world FC: close neighbourhood, my property	search for more power or more property; interpretation of events in terms of power play in politics, business, personal or intellectual relationships
3. **FEEDBACK** **Self-regulated system** **KW: stability, compatibility**	3. DQ - ABSOLUTIST "TruthForce" – Absolute Order. service / obedience to the Organization FC: world on which I depend	submission or power in the name of a (mythified) Organization: kingdom, empire, nation, army, church, party, or its symbol: king, president, chief, pope, leader, Führer, etc.
4. **AUTOPOIESIS** **Self-producing system** **KW: survival, dialogue**	4. ER - MATERIALISTIC "StriveDrive"- Thinking I. Satisfaction of ambitions in a world full of oportunities FC: Useful world	competition for material, economical, intellectual progress; care for factual or rational data: scientific, technical or economical.
5. SELFREFERENCE **Self-knowing system** **KW: knowledge, awareness**	5. FS - HUMANISTIC "HumanBond" Social order Life in solidarity with others. FC: Fellow humans	drive toward solidarity, to make life more harmonious; collective actions; associations.
6. **AUTOGENESIS** **Toward autonomy** **KW: creation, self-creation**	6a. GT - INTEGRATIVE - "FlexFlow" – Self. Lucid fullness integrated in nature. Flexibility to change. FC: Gaïa 6b. HU - HOLISTIC "GlobalView" - Identity Identification to whole. Non-duality FC: to be	6a Activities integrating not only humans but also nature, life, the whole planet; ecology. 6b Global vision; extended consciousness; non-separation.

3.2 Correspondance between Graves' Levels and the Steps in the General Evolution of Complex Self-Organizing Systems

Graves' typology for the different coping systems for managing problems seems quite convincing. But it is, after all, only a description to which the reader can adhere or not, depending on its own views, experiences and prejudices.

On the other hand, after having elaborated the general model for the dynamics of self-organizing systems presented in the first part of the present paper, (from completely different observations and reflexions), it occurred to us that some correlations existed between the seven steps in the general evolution of natural self-organizing systems and the seven levels of existence of the human system identified by Graves. We propose that the levels recognized by Graves are the signature of the birth, growth and evolution of a particular natural self-organizing system: the human system (human beings and human society), as a sub-system of planet Earth. The human system is a very complex and holistic system, being not only a living but also a cognitive system with distributed consciousness (in human individuals). As such it cannot be interpreted with pertinence by mechanist and cybernetical conceptual tools only; systemic holistic concepts and frameworks are also needed, where not only material-structural aspects and cybernetical-causal aspects are handled separately, but also their dialectics and the existential features emerging from them like in autopoietic and autonomous systems.

In table 1 we interpret Graves' levels as concrete historical manifestations of the seven general steps in the evolution of complex systems toward autonomy. The steps in the constitution of any viable system correspond to the successive apparition of each of the six cycles mentioned in section 2.2. and following the entropic drift of the parent system (seven steps all together): morphogenesis, vortices, feedbacks, autopoiesis, self-reference, and autogenesis,

In the case of the human system, the entropic drift corresponds to the history of life which precedes the apparition of *Homo sapiens*. Morphogenesis is associated with the dyad formed by the human individual and his/her parents; vortices are circular exchanges between sedentarized man and his threatening and useful external environment; feedbacks, which imply the connection between the physical-material world and the relational-immaterial world - therefore the appearence of the whole - are marked by the development of collective myths as generators of behaviors. With autopoiesis, the ontological correlation between the production process and the produced whole is tighter, which implies more coherence between what is and the cognitive processes: logical coherence takes over mythical beliefs. Self-reference increases self-knowledge therefore consciousness, first individual, later collective. The evolution is achieved with autogenesis which leads to autonomy. We associate it with Graves' two existential levels, integrative and holistic, which point to overall coherence: identification of individuals, collective and unified whole, pointing to pure being.

4 Application of our General Metamodel to Contemporary Society

Graves proposed (Graves 1974) that Western civilization, specially the North American society, began to operate a transition from the ER materialistic system of value, to the last subsistence level, the FS humanistic value system in the mid-1960's. Almost thirty years after his publication, the list of problems mentioned in section 1.2. seems to confirm the decline of the ER values and behavior, based on the satisfaction of concrete individualistic ambitions and the exploitation of the opportunities – mainly material - of the world. These values gave rise to the merchant nation-states which appeared with the industrial revolution, and favored behaviors based on rational and pragmatic analysis, solid data, objectivity instead of metaphysics questioning, entrepreneurship, competition, progress, achievement and reward. These values and behaviors brought the material comfort many enjoy today in the West Merchant states seem now to be replaced more and more by deterritorialized transnational companies.

In our view, the ER materialistic system of value is the product of the reductionist approach, the empirico-analytical science and the rationalist paradigm, that emerged at the Renaissance following the decadent scolastic medieval paradigm. We have applied the spiral representation to the history of the rationalistic paradigm between its birth in the sixteenth century to the present time which we see as the end of its life cycle. We then use Graves' systems of value to generate scenarios for what will follow the bifurcation - or rather trifurcation - in which we think we are sitting now.

Some details of this interpretation can be seen on fig. 3.

The main purpose of this paper is to study the possible scenarios that will follow the chaotic phase at the end of the rationalist reductionist paradigm. To do this we use Graves' typology and correlate the three branches of the trifurcation with three groups of value systems: a) the central branch corresponds to the continuation of the ER system, b) the recessive branch corresponds to the value systems, DQ (absolutist social organizations), CP (sedentary communities of egocentric owners) and BO (tribalistic), that have been dominant in history before the advent of the ER rationalist system, c) the third branch leading to the metamorphosis, corresponds to the last subsistence level, the humanistic FS, and to the GT integrative existential level, which may be followed (much) later by the HU holistic asymptotic arrow.

More details about the characterization of these three groups of coping systems competing near the trifurcation can be found in fig. 4.

We end this paper with fig.5. by using the trifurcation pattern to interpret some concrete developments and recent historical events, which can be seen as manifestations of the three groups of behaviors and the corresponding value systems and the often incompatible worldviews.

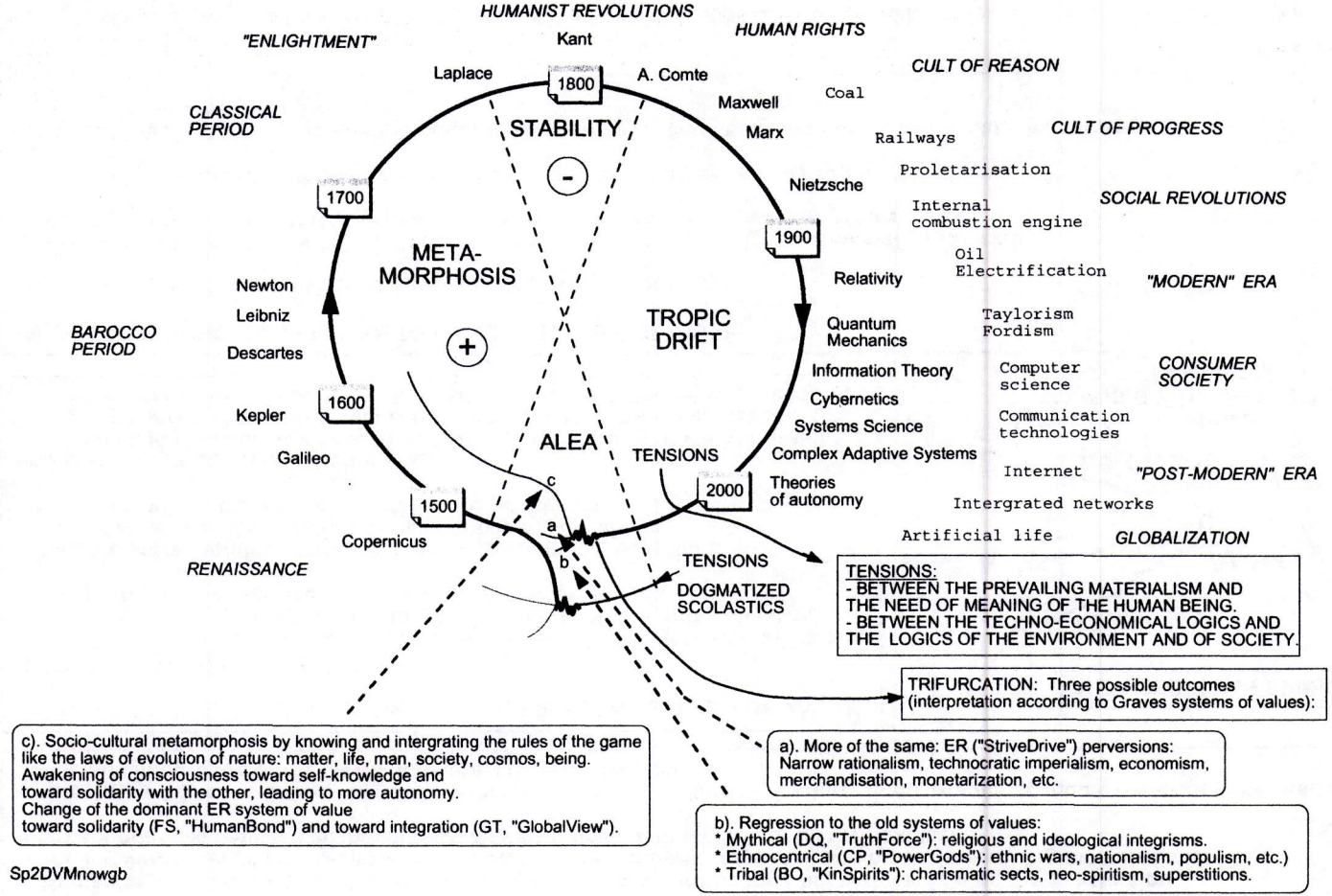


fig.3. The emergence, maturity and tropic drift of the empirico-analytical paradigm.
(based on mechanist science, reductionist epistemology, anthropocentric ideology

C. METAMORPHOSIS - TRANSITION TO OTHER SYSTEMS OF VALUE

5. Humanistic FS: behavior aiming at optimizing the social networks together with facilitating the satisfaction of the individual needs and aspirations; cooperation with others; respect of equity; understanding the numerous interdependances between all individuals. May be followed (much?) later by the next level:

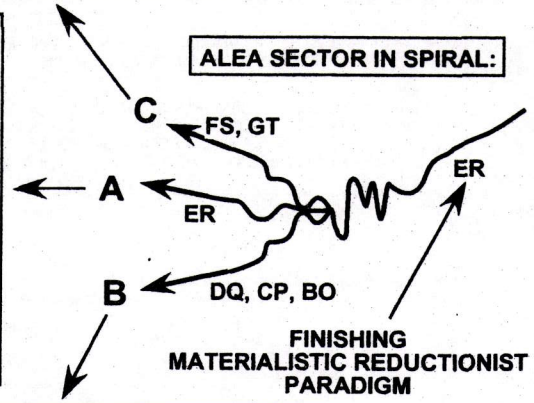
6. Integrative GT: conscious of big picture integrating self, mankind and nature; spontaneous adequate behavior generated by conscious integration of the "laws of nature"; non-dualist view;

A. "MORE OF THE SAME" - CONTINUATION OF PRESENT SYSTEM OF VALUE:

4. ER value system:
Continuation of pragmatic search for opportunities, objectivity, utilitarism, entrepreneurism, opportunism, ambition, competition, individualism, profit seeking, reward for winners, achievements

within the corresponding mechanist empirico-analytical paradigm:
materialist realism, rationalism, positivism, objectivism, mechanistic dualism, determinism, reductionism

and corresponding social functioning:
capitalist economy (whose logic is the reproduction/growth of capital), importance of techno-science as source of goods, merchandisation, monetarisation of society, submission of society to the logic of economy



B. DESTRUCTURATION - RETURN TO LOWER SYSTEMS OF VALUE:

regression toward previous (but always present) systems of value:

3. Absolutist DQ: belief in collective myths, obedience or service to abolutist Organizations: Nation, Church, Party -> nationalism, religious and ideological integrisms

2. Egocentric CP: ethnocentrism, racism, exploitation of, or hostility toward the others

1. Tribalistic BQ: animist superstitions, spiritism, occultist sects and gurus, charismatic movements life in small groups

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fig.4 Interpreting the three Possible Branches of the Present Change of Paradigm with Graves' Typology for Systems of Value

C. METAMORPHOSIS:
TRANSITION TO HUMANISTIC AND INTEGRATIVE SYSTEMS OF VALUE

Resistance to Vietnam war in the USA (1965 ->)
Paris student revolt (1968)
Ecologist movement (1973 ->)
Popular revolt movements in URSS satellites countries
Global civil resistance to the overwhelming power of economy and market globalization (Seattle, Davos, Prague, Genua...)
Emergence of cybernetic and holistic features of the global interaction Net (regulations, coherence, autonomy)

END OF TROPIC DRIFT
(= ACTUALIZATION OF PROPENSIONS)
OF THE MATERIALISTIC-REDUCTIONIST PARADIGM AND "ER" SYSTEM OF VALUE:

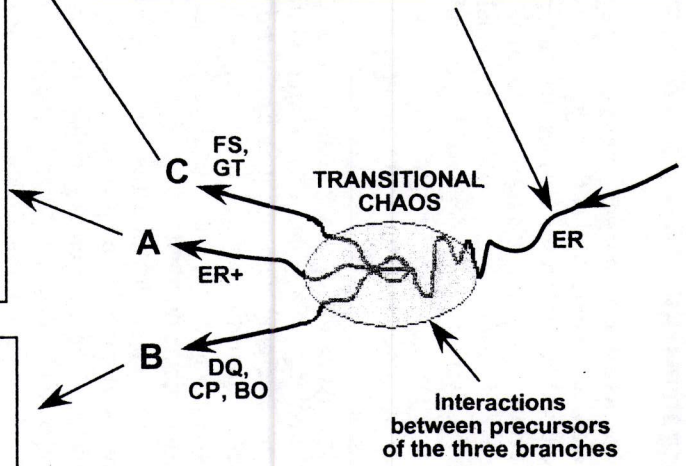
Collapse of planned economy systems
Decrease of profitability of capitalist market system due to:
***price increase of inputs (ressources, pollution)**
***wage increase (democracy, equity)**
***taxes increase (due to internalization of charges).**
Multiplication of computers
Densification of global networks
Densification of inter-communication (peer to peer)

A. "MORE OF THE SAME"
CONTINUATION OF PRESENT MATERIALISTIC-DUALIST PARADIGM AND "ER" SYSTEM OF VALUE:

Continuation of the development of the techno-econosphere mainly through building the global communication network;
Politico - economical processes to save profitability (WTO):
***suppression of obstacles to trans-national exchanges:**
***deregulation, privatization, abolition of national limitations to transnational business.**
Industry delocalization (to lower wages areas);
Extension of market field in developing countries (IMF, WB).
Rejection of environmental regulations (Kyoto).

B. DESTRUCTURATION
RETURN TO NARROWER SYSTEMS OF VALUE
ABSOLUTIST (DQ), EGOCENTRIC (CP) AND TRIBALISTIC (BO)

Nationalistic and religious integrisms; ideological and ethnic wars;
Propagation of sects; clanic gangs of young people;
Communautarism



*Inspired also by Immanuel Wallerstein's work.

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fig. 5. Some Examples of Recent Events Interpreted with Graves' Typology for Value Systems* and the Change of Paradigm Hypothesis*

5 Concluding Remarks

History has accelerated in a very impressive way in the last decade since the fall of the Berlin Wall. Some thought that this signaled the end of history. Since then, on the contrary, unexpected events, drastic business restructurations, rise and fall of promising economical sectors, surprising changes of political alliances, have occurred at an increasing pace. Professional commentators, financial gurus, intelligence experts and other mediatic analysts, mostly adepts of linear extrapolation, additive thinking and reductionist expertise loose their insight. Things look as if the system becomes more autonomous. New conceptual tools are needed to understand such complex self-organizing systems.

We are convinced that the new complexity of the world around us will require new ways of thinking, taking more into account the interdependences and, most importanty, the emerging new qualities associated with increased autonomy. The search for deep transdisciplinary invariants will not be reserved to lonely epistemologists any more, but will complement the specialists' know-how even for solving the most concrete problems.

As a modest step in this direction, we have used a transdisciplinary systemic holistic framework to interpret and give some meaning to the apparently random events which accumulate at an accelerating rythm. In our interpretation, three groups of Weltanschauungen and values are competing and interfering in a chaotic phase space. Extended discussions should be initiated to try to reach to some agreement about the future we want. We are convinced that our ability to intervene positively in the future events can only succeed if we have pertinent models of the effective dynamics at work in the complex systems of nature.

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