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The **JOURNAL OF SOCIOCYBERNETICS** (ISSN 1607-8667) is an electronic journal published biannually--Spring/Summer and Fall/Winter--by the Research Committee on Sociocybernetics of the International Sociological Association.

MANUSCRIPT submissions should be sent electronically (in MSWord or Rich Text File format) to each of the editors: Karl-Heinz Simon (simon@usf.uni-kassel.de), Barry Gibson (B.J.Gibson@sheffield.ac.uk) and Juan Aguado (jmaguado@um.es). In general, please follow the Chicago Manuel of Style; citations and bibliography should follow the current journal style (APA). Normally, articles should be original texts of no more than 6000 words, although longer articles will be considered in exceptional circumstances. The Journal looks for submissions that are innovative and apply principles of General Systems Theory and Cybernetics to the social sciences, broadly conceived.

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SOCIOCYBERNETICS traces its intellectual roots to the rise of a panoply of new approaches to scientific inquiry beginning in the 1940's. These included General System Theory, cybernetics and information theory, game theory and automata, net, set, graph and compartment theories, and decision and queuing theory conceived as strategies in one way or another appropriate to the study of organized complexity. Although today the Research Committee casts a wide net in terms of appropriate subject matters, pertinent theoretical frameworks and applicable methodologies, the range of approaches deployed by scholars associated with RC51 reflect the maturation of these developments. Here we find, again, GST and first- and second-order cybernetics; in addition, there is widespread sensitivity to the issues raised by "complexity studies," especially in work conceptualizing systems as self-organizing, autocatalytic or autopoietic. "System theory", in the form given it by Niklas Luhmann, and world-systems analysis are also prominently represented within the ranks of RC51.

The institutionalization of sociocybernetic approaches in what was to become RC51, the Research Committee on Sociocybernetics of the International Sociological Association, began in 1980 with the founding of an ISA Ad Hoc Group and proceeded with the organization of sessions at succeeding quadrennial World Congresses of Sociology. The eventual RC51 became a Thematic Group and then a Working Group. Finally, in recognition of its extraordinary success (growing from some 30 members in early 1995 to 240 in 1998), the group was promoted to the status of Research Committee at the 1998 World Congress of Sociology in Montreal.

Over these past two decades, sociocybernetics has attracted a broad range of scholars whose departmental affiliations represent the entire spectrum of the disciplines, from the humanities and the social sciences through the sciences, mathematics and engineering. Furthermore, the many countries of origin of these RC51 members attest to the wide international appeal of sociocybernetic approaches. Within this highly diverse community, there is wide agreement on some very general issues, for instance, on developing strategies for the study of human reality that avoid reification, are cognizant of the pitfalls of reductionism and dualism, and generally eschew linear or homeostatic models. Not surprisingly, however, there are also wide divergences in subject matter, theoretical frameworks and methodological practices.

Many have argued that models developed for the study of complexity can be usefully appropriated for the study of human reality. Moreover, however, the emphasis in complexity studies on contingency, context-dependency, multiple, overlapping temporal and spatial frameworks, and deterministic but unpredictable systems displaying an arrow-of-time suggest that the dividing line between the sciences and the historical social sciences is fuzzier than many might like to think. What is more, in the humanities, the uniquely modern concepts of original object and autonomous human creator have come under serious attack. The coincidence of these two phenomena substantiate the impression that across the disciplines there may be observed a new concern for spatial-temporal wholes constituted at once of relational structures and the phenomenological time of their reproduction and change.

In this context of rich history and exciting possibilities, the Research Committee on Sociocybernetics of the International Sociological Association extends an open invitation through the **Journal of Sociocybernetics** to all engaged in the common quest to explain and understand social reality holistically and self-reflexively without forsaking a concern for human values--human values not construed simply as a matter of individual ethics, but conceived as an integral part of a social science for our time.

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NOTES FROM THE EDITORS

With some delay we now present a new issue of our Journal of Sociocybernetics. Beside two refereed articles about modeling problems – a “classical” one relying on dynamic systems theory and differential equations, and a second one based on a qualitative approach to describe certain aspects of cultural dynamics – there are two sections added to stimulate discussion about the fundamentals of sociocybernetics. In a “Classics” section influential texts are reprinted that are important but difficult to obtain (or nearly forgotten), and in a “Discussion” section controversies about basic concepts and approaches in sociocybernetics can be found. In that section a statement is usually commented by two disputants in order to reflect explicitly the Pros and Cons about certain positions. Finally, some information about the contents of related journals is added.

Next Issues of JOS

We are planning to publish the next issue (2/2008) in November/December, 2008. Contributions are expected by Ephraim Nissan, Nina Degele, Bernard Scott, and Hans Kuijper, as well as a text by Luhmann from the 1980ies in the “Classics” section.

Call for Contributions

In 2009 we want to begin a discussion about “Social Challenges – Sociocybernetic Solutions” and address issues like inclusion, social change, globalization and participatory systems approaches (also referring to former attempts like, for example, the Chile-experiment by Stafford Beer and others). The editors should be glad to receive submissions about the issue not later than January 2009.

The Editors

Papers

MATHEMATICAL MODEL OF SOCIAL DEVELOPMENT

Akmal Gafurov

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The trend model of the social development is described in the article. The model is based on the evolutionary and revolutionary change of three human's social behavior motives, which allows produce analysis, prognosis and optimization of the existing states` development process.

1 Mathematical Modelling of Social Processes

Unexpected and contradictory realities of today's socio-political processes raise a lot of new scientific questions. Among many forums devoted to such questions discussion we would like to point out the International conference "Capitalism, socialism and democracy", (Washington, USA, 3-8 April, 1992).

The conference has revealed the long-standing scientific questions that are becoming more relevant today, namely the issues related to the capitalism, democracy and socialism characteristics, as well as to their role determination in the prosperity and the history of human society's development. The invited presentations have made by most noted scientists once more showed an existence of varieties and contrary opinions on these questions. These varieties have confirmed the actuality of the social processes mathematical model creation. Without such a model it will be very difficult to find answers to the rising modern questions concerning of the societies evolution. The constructing of such a model is the aim of given work.

2 Mathematical Model of Social Development

Instead of the model of infinitely complicated object, which the social processes are, we will design the model of its one section ("The Actual Section").

Each level of the global hierarchical system "individual-state-humanity" has its own aims or interests. The person is the main actor that realizes all level's aims.

These aims are reflected in the motives of his social behavior. The generalized analysis of above-mentioned questions indicates that they are mostly directed to the correlation aims of the global systems, at that the correlation is differing in each of the enumerated above social systems.

In accordance with the aims of the global system's three levels, one can make the division of the human's creative social behavior motives into the following categories:

- motive having a stimulating character and reflecting mostly the legal interest of the individual, which we call as economical motive (E-motive).

- administrative - compulsory motive reflecting mostly the state's interests (or those of the society or an individual group), which we call the administrative motive (A-motive), and, finally,
- disinteresting incentive motive reflecting mostly the mankind's interests and those of nature's protection, and we call it the moral-ethical motive (M-motive).

The fear of punishment and aspiration to have reward are in the basis of the A-motive, the legal profit is the E-motive's basis, and kindness, conscience, morals and general human's culture are in the basis of the M-motive. These motives stipulate, support and complement each other, and, at the same time, counteract, thereby evolving toward the harmonious and optimal correlation.

These motives are perpetual, universal and pertaining to all people irrespective of their national, religion and other peculiarities. Some prominent scientists also point to the existence of three basic motives of social behavior. So, the well-known academician P.S. Simonov writes: "The basic driving forces of the human's behavior are his vital needs (E-motive in our interpretation), social (A-motive) and ideal or spiritual (M-motive). Moreover, the different needs don't origin from other ones, but exist independently from each other in the human being, just like in the case of animals. To analyze a human behavior it is necessary to take all of them into account" / 1 /. Another prominent sociologist A.A.Zinoviev indicates the same motives and names them as "Business"(E-motive in our interpretation), "Communal" (A-motive) and "Mental" (M-motive).

Names and definitions of such motives chosen by us are reflecting that aspect, which more completely corresponded to the aims of the respective global system's level and, at the same time, can more easily be formalized, measured, decomposed and aggregated.

We consider the mathematical equations of trends' changes in time of the values of the social-behavior's system 'person-society' three motives and also their speeds changes as the model of "The Actual Section" of the social development's processes. The initial equations describing the laws of the motive's values changes are based on the well-known, or not contradicting to them, historical philosophical judgments and also on the postulates formulated by us.

The motive's meanings have different scale, size, kind and fluctuation in time. The mathematical model considers the evolution of their aggregated (which were received by the compilation of many relevant figures), trend (smoothed out during a big period of time), and normalized (from 0 to ± 1) values. The detail mathematical analysis of equations and the motive's definitions can be found in the monograph that was writing by the author of this paper / 2 /.

3 The M-motive Equations

K. Jaspers argues in his monograph "The Meaning and Assignment of History" that during his development the person realizes the universal aims and moral-ethical values, and also follows them. Most of scientists believe that the moral-ethical (cultural-moral) potential of humanity grows with time, though very slowly and not droningly.

The ultimate meaning of the M-motive (or "supremum") we designate as 1, to which it can approach in the process of evolution and which it can never exceed. The value of the M-motive of the society at the moment of time t is designated as $M(t)$. Then $1 - M(t)$ is the biggest value, on which the M-motive can increase during the evolution process, the latter is the slow growth of its meaning from minimum $M_0 > 0$ and asymptotical approximation to maximum, near to 1.

From the above-mentioned monograph we can also draw that the assumption $M_0 > 0$ is based on the theory of “axis time”, in which it is proved that from his origin the man was endowed by the common-human moral sources, which are spread round all of humanity in future.

Different religions, faiths, cultures, scientific theories, knowledge and also rumors, advertisements and other information, epidemical diseases and so on spread among members of the society over different periods of time. And one part of the society is usually the carrier and another one is the potential recipient of all above-listed. Despite the big difference in periods – from several days to ages, the speed of their spread submits to the same law. It is proportionate to the multiplication of the relative number of carriers and recipients. Hence we can formulate it as follows:

Postulate I. The speed of M- motive’s growth is proportionate to the multiplication of the achieved at the given moment level (M) and value (1-M) on which it (this level) can increase potentially.

Such processes are described by the famous differential equation of the logistical function / 3 /. Here is the mathematical model of the M-motive's speed increasing in time:

$$\frac{dM}{dt} = \alpha M(1 - M), M(0) = M_0, A \quad (1).$$

At that the coefficient α is constant, A is constant and $0 < M_0 < 1$. The value α characterizes the conditions of the M-motive’s growth in the society. From the point of view of the differential equations’ theory, the task (1) is the Task of Coshi. Here is its solution:

$$M(t) = (1 + m_0 e^{-\alpha t})^{-1}, m_0 = \frac{1 - M_0}{M_0} \quad (2).$$

This is the equation of the M-motive’s trend in time.

4 The A-motive Equations

According to the theory of law origin, the right (that is what laws, edicts, resolutions require) is “the ethical minimum”, that is a whole of moral requirements, observance of which is believed to be undoubtedly necessary at the particular stage of the society’s development / 4 /. In this approach one can observe the tendency to closing in so called “the natural law” and the morality as norms, which influence on the human’s behavior, as well as the understanding that these norms have the "same order" by their destination is also recognized that these norms have the complementary mining in both actions: curbing of the destructive or socially harmful human’s activity, and also stimulating of the creative and useful human’s practice. Hence we can draw from this the following:

Postulate II. The compulsion of society members is needed to the extent in such degree to which their normative social behavior lacks the moral- ethical motive.

In evolutionary processes the compulsion degree reflected in legal norms and regulations, that is place and role of duties - A(t) lags in a certain measure behind the "compulsion" reflected in the "natural law", but in revolutionary processes it outstrips (we may say, on the time distance θ) the “compulsion” reflected in the "natural law" $A_e(t)$. So we use the constant θ with “+” sign for revolutionary process; “-” sign for evolutionary process, as it is shown below in the equations:

$$A(t) = 1 - kM(t - \theta) \quad (3).$$

At that θ and k values are constants, and $-\infty < t < +\infty$; $0 < k < 1$.

The speed of the A-motive changing is:

$$\frac{d^i A(t)}{dt^i} = -K \frac{d^i M(t-\theta)}{dt^i} \quad (4).$$

6 The E-motive Equations

What does the E-motive's speed increasing depend on?

As a rule, a society with low cultural-moral potential can't have the well-developed economy. The culture and morality development leads to the economic activity reviving and rising and also gets it on a higher level. The M-motive's speed increasing becomes more the E-motive's speed growing will be more too. On the other hand, it was noted that when the A-motive's speed increasing becomes smaller the E-motive's speed decreasing level becomes more too (we can see the same process on the Independent States' Commonwealth (ISC) economy example).

The human's aspiration to the creative activity to satisfy own interests in the society (E-motive) is influenced by the State's and the common to all mankind interests. As the M- and A-motives influence simultaneously on the E-motive, so the E-motive's speed changing depends on the summary influence of the M- and A-motives' speeds changing. From this, let's formulate the following:

Postulate III. The change in the people's interest during the creative activity for the social and personal interest's satisfaction is caused by the joint influence change of their social behavior compulsory and the stimulating motives.

On this base, we can accept that:

$$\frac{dE}{dt} = \omega \left(\frac{dM}{dt} + \frac{dA}{dt} \right); E(-\infty)=0 \quad (5)$$

E is the "economical motive", $\omega = \text{Const}$ is coefficient of proportionality.

We can illustrate the rightness of the accepted equation (5) with the help of logical-mathematical and historical and philosophical analyses of the function's graphs A(t), M(t), E(t) and their derivatives A'(t), M'(t), E'(t) for the case of the social development evolutionary process.

The equation's (5) solution gives the following law of the E-motive change:

$$E(t) = \omega e^{\omega t} \left(\frac{1}{m_0 + e^{\omega t}} - \frac{ke^{-\theta}}{m_0 + e^{\omega(t-\theta)}} \right) \quad (6)$$

The analysis of this function for evolution process shows us once again that the E-motive decreases after "saturation". Indeed, after the achievement of the high well-being level the aspiration for the economical profit decreases and asymptotically approaches to the certain minimum $\text{Lim } E(t) = \omega (1-k)$.

7 Prosperity Trend's Equation

The prosperity trend's meaning - P(t) is defined on the base of the following:

Postulate IV. The prosperity level of independent society is the summary result of the creative activity of its members during the certain time. Its equation for the evolutionary process is:

$$P(t) = \int E(t)dt = \frac{\omega}{\alpha} \ln(m_0 + e^{\alpha t}) - \frac{k\omega}{\alpha e^{\theta(1-\alpha)}} \ln(m_0 + e^{\alpha(t-\theta)}) + C \quad (7)$$

The economic index $P(t)$ can be expressed as a product of $(p \times P)$, where p is the coefficient of proportionality and P is a gross national product per head (HGNP).

The above-mentioned, in the common view, equations (1-7) represent the mathematical “The Actual Section” model for the social processes. For purposes of correct analysis, prognosis and management of the concrete State it is necessary to construct the corresponding equation in the particular form, with their parameters numerical meanings using. The latter means 6 coefficients and constants, the physical meaning and the limits of which were given above. The numeral quantities of the equation’s parameters are determined by the approximation method, which is consisted in the collection and processing of the statistical data pertaining to the respective country. During the information collecting and data handling process we’ll add necessary supplements and corrections, especially in questions concerning definition, interpretation, measuring, decomposition and aggregation of the motives.

8 Adequacy of “The Actual Section” Model for Social Processes

We’ll check the adequacy of the model with the method of comparison of the abstract-model and real situation and the prognoses about the future development of 4 country’s groups, in which there are about 190 world countries included.

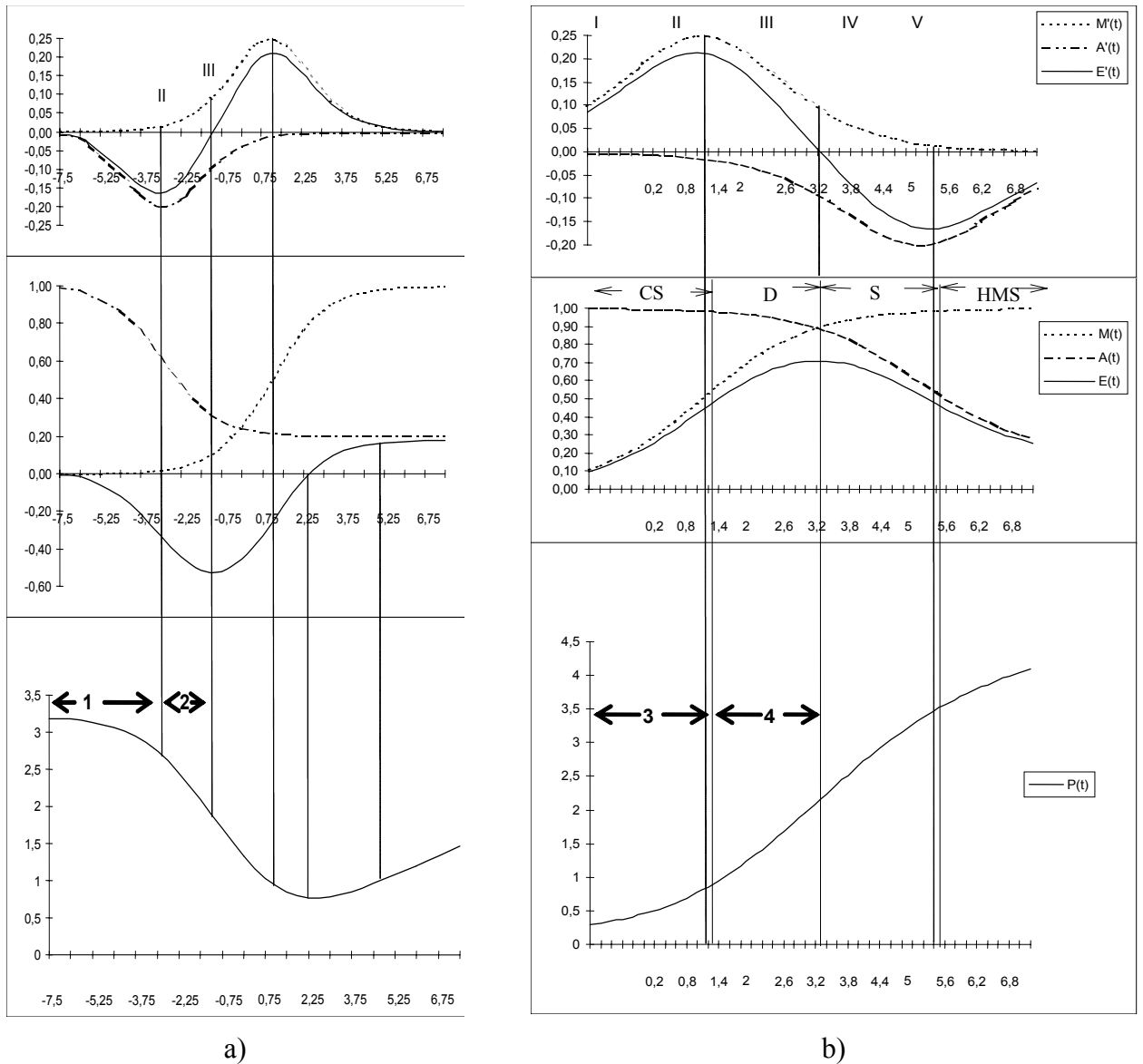
In making the model analysis it is relevant to use the graphs of the particular equations of a certain averaged “Model State”. We have identified the quantities of parameters of such state’s equation by the method of selection during the computer simulation process. The precondition for such selection is that clearness and obviousness of the characteristic graphs’ sections are ensured, and their irregularity of curves location in accordance with the mathematical laws. As a result of this selection we defined the following numerical values of 6 parameters of the “Model State” equations, namely they are: $\omega=1$; $M(0)=0.25$; $k=0.8$; $\theta=4$, $\omega=0.9$ and $c=3$.

The picture (see below) shows three groups of the graphs produced by the computer simulation, which demonstrate the cause-and-effect relation between the socio-political (SP) and the socio-economical (SE) processes in both revolutionary and evolutionary conditions of their passing.

The upper part of picture demonstrates the graphs of the motives’ values speeds change in time – $M'(t)$, $A'(t)$ and $E'(t)$, reflecting the SE processes speed.

In the middle part of the picture, we can see the graph of the motives’ values change in time – $M(t)$, $A(t)$ and $E(t)$, which characterize SP state of the society.

Finally, the third part of the picture on below demonstrates the graph of the prosperity $P(t)$ level that is the main result or outcome of SP and SE processes.



The graphs of the revolutionary (a) and evolutionary (b) socio-economical processes.

For purposes of model analysis, we divide the graphs by the vertical lines into four parts, each of them is corresponding to one of four phases of the society's condition; they are marked on the picture as 1, 2, 3 and 4. The 1 and 2 phases are reflected the revolutionary process, and others 3 and 4 phases are reflected the evolutionary one. Then, we compare the formal characteristics of these phases with the short substantial description of the real SP and SE conditions of those groups of states, which these parts display.

The given graphs with their irregularity of curves have the character and the relative location in the strict correspondence with the mathematical laws. So we can see the motive's mutual influence regularities. This shows the advantage of the mathematical modelling (especially the differential calculus), which allows to realize with confidence the abstract analyses and reveal clearly what is difficult to reveal and prove by the other description methods.

From the variety of indexes of the State's development we choose HGNP, as the most important, integral value, which characterizes their socio-economical condition.

9 The Revolutionary Processes Analysis

1. The Collapse Phase

Formal characteristics of the collapse phase are : $\frac{dA}{dt} < 0$, $A \in (1; 0.5]$; $M \approx 0$; $E < 0$ и $\frac{dP}{dt} < 0$.

We can see from the graph that in the collapse phase the compulsory motive weakens much earlier, than the moral-ethical motive rising up to the level, which is necessary for the market economy and democracy functioning. The economical motive becomes negative and correspondingly the sharp collapse of the economy takes place.

As a result of the weakness of all three motives in this period the creative potential of the society decreases, and there is not any stimulus for the socially useful activity, there are more various abuses and plunders of the other's (especially public and state's) property, than law and order and also creation.

All of the recently independent post-totalitarian and post-communist countries, in which the previous coercion state apparatus and the governmental bodies of economy and life managing were destroyed, are hitting in this phase.

It was revealed that during 1985-1995 years period in the post-communist European countries and in all post-soviet republics are hitting in this phase, the annual HGPN was decreased and the living standards became worse. The duration and deepness of the crisis are different in all these countries. Only those states of this group that owned the big raw materials export potential (Russia, Kazakhstan) were able to overcome crisis relatively quickly.

2. The Depression Phase

Formal characteristics of the depression phase are $\frac{dA}{dt} < 0$, $A \in [0.6; 0.2]$; $\frac{dM}{dt} > 0$

$M \in [0; 0.1]$, $\frac{dE}{dt} < 0$, $E \in [-0.2; -0.5]$;

As we see on the graph, the M-motive is still on the low level, the A-motive continues to decrease and the economical motive remains negative. The well-being level decreasing will continue for a long time. The government remains too weak and doesn't possess the sufficient administrative and economic resources for providing conditions for the culture and education development, as well as for business and the market economy ensuring and effectively stimulating. The middle class of owners (MCO) is too small and weak to be able to support law and order and society self-development.

There are about 100 such countries in the world. They are post-colonial and post-totalitarian states, in which about 70% of the earth's population is living. The HGPN in these countries is less than \$ 1.000 and in some of them it is even less than \$ 500.

The group of such countries includes side by side with small and young states of Asia, Africa and Latin America also such big states with the ancient culture, profitable geographical location and with rich natural resources as India (HGPN is \$ 460), Pakistan (HGPN is \$ 420) and other ones, which remain on this level for 50-60 years.

These states got free from dictatorship, but have been unable to build real democracy ensuring freedom and prosperity. The system that exists there can rather be called "pseudo-democracy", which can't provide anything but backwardness and stagnation.

As we can see from the graphs, the shortest way of these countries to democracy and prosperity is clear: this way passes through the strong state's power. Only those from these countries, which will from the beginning establish the state's power aspiring to build an independent and strong civil society, based on the strong MCO, will be able to overcome backwardness. Afterwards they will need to consolidate this power up to the level $A \approx 1$ and, based on it, develop the M- motive and the E-motive up to the level required for the transition to democracy. Only 9 countries "of new democracy" are able follow this very difficult way.

3. The Evolutional Development Analysis

The motives' evolution graphs reflect the evolution of the social development of mankind. Here we can see that with the human's development and the cultural-moral potential growth it is stimulated the improvement of the society and the growth of its well-being, asymptotically approaching to a certain limit. The society proceeds, step by step (evolutionary), the known formations, which are quantitatively characterized by the certain correlation of these three motives' values.

The Social Formations. On the base of three motives' model the social-economic formations are described quantitatively that is formally, and thus more strictly and exactly. At the same time, these descriptions don't contrary to the traditional ones.

All the period of the human's society development from a certain "axis time" to the distant future, showed in the motives' trend graphs, can be described by the vertical lines I, II, III, IV and V, which stretch through their irregularity of curves. These lines divide the whole period into four sections corresponding to the known social formations characterized with the certain correlation of three motives, as well as pace and directions of their change.

4. The Dictatorship or Reestablishment Phase

On the section located between the vertical lines I and II we can see the dictatorship or reestablishment phase with the following characteristics: $A \approx 1$, $E+M < A$, $M = (0 - 0.5)$, $E = (0 - 0.5)$.

Here, the compulsory motive plays the key role. The stimulating motives are just arising and their summary value is less than the compulsory value. The level of well-being is low and grows slowly. According to the formational classification, this society's phase corresponds to the different forms of dictatorship, such as slave-owning system, feudalism, monarchy, totalitarianism, authoritarianism and so on, which in general we can call as the compulsion society (CS).

There are about 50 non-democratic states in this phase. They are Cuba, North Korea and China, where the totalitarian system exists, Morocco and Oman (monarchies) and others. In these states the A value is $A > M+E$. The E-motive's values are not equal everywhere. For instance, $E=0$ for Cuba and North Korea, but $E > 0$ for Morocco and Oman. Respectively, the well-being level is different in these countries. The well-being level is much higher, where business and MCO are more developed.

The most part of this group of states can remain in this phase in future, but another one can go under the democracy way. In the latter case, the state power is strong enough and has the potential to provide conditions for further development of culture, education, order, protection of private property and stimulating of business activity. If good will exists the state leadership there can choose the fast transition way to the market economy and democracy, the way which was taken by the mentioned below 9 countries of new democracy (4th phase) and also China going the similar way. It can work out and realize the state complex program on stimulating and creating the strong MCO, - the real base of future democracy.

Therefore, this phase can be also regarded as the reestablishment phase, increasing the opportunity for transition to market economy and democracy.

5. The Democracy and Prosperity Phase

The democracy and prosperity phase is located on the section II-III and has the following characteristics:

$$M > 0.5 \text{ and } E > 0.5, M + E > A, M < A, E < A, \left(\frac{dE}{dt}\right) > 0, P_d \gg P_{sc}$$

We can see on the graphs that the inducement (free will) of a man plays the more important role than his compulsion. The market relationships prevail and the meaning of the E-motive grows sharply. The well-being level is much higher than it is in the compulsion society (CS).

This society corresponds to generally accepted meaning of democracy (D). There is a strong MCO constituting more than 50% of population and having the capacity for creating a strong and independent civil society, which is able to defend itself as well as to maintain order and strengthen the process of democratic self-development. The power in such country, as a matter of fact, belongs to the people.

First of all, 22 states with old democratic traditions and also 9 states of “new democracy” (with the HGNP values from \$ 5.000 to \$ 40.000) are hitting in this phase.

These states can expect the stable and dynamical development in the future. We can see on the graph of the P(t) that is located after the vertical line II, in the phase of democracy, the prosperity grows faster than before it. It can be explained in a way that in this stage the mechanism of the self-development of the civil society is switched on, which is interested in and provides for the maximum stimulation of the creative potential of all society's members.

In the section III-IV there are the values: $M > A, M > E, \left(\frac{dE}{dt}\right) < 0, \left(\frac{dP}{dt}\right)_s = \left(\frac{dP}{dt}\right)_d$.

The graph shows the aspiration of a person in such a society for taking care of social interests is higher than for that of own interests related to acquisition and accumulation of the material goods. A man seeks for more moral values. The state compulsion decreases, the capitalistic relations weaken, but the well-being rises, as the pace of its growth remains the same like in the democracy state.

Such a society corresponds to the commonly accepted meaning of socialism (S). The practical embodiment of this society is very problematic, although some of the well-being characteristics and the socio-political relations in some prosperous countries like Norway, Sweden and Switzerland approach to the characteristics of this society.

To complete the analysis of the social development model, we will also consider the section IV-V, where the society must, hypothetically, be placed, which is much farther from reality than the previous one. The motive's values approximate the mathematical limits: $M \in [0.9; 1); A \in [0.5; 0); E \in [0.5; 0); P_{sc} > P_s; P_{SM} \Rightarrow P_{limit}$

$$\left(\frac{dE}{dt}\right) < 0, \left(\left(\frac{dP}{dt}\right)_s = \left(\frac{dP}{dt}\right)_d\right).$$

The human's material needs must mainly be satisfied in this hypothetical society. The prosperity level is higher than in socialism and approaches to its limit meaning and almost doesn't grow. The single inducement motive is the aspiration to the spiritual development and the high morality.

This society can conditionally be called as the “High Moral Society” (HMS). It is well described in the works of Platoon, Aristotle, Avicenna, al Farabi, Kampanella and other great thinkers as the ideal example, which we is needed for the comparison with reality and finding the current system shortcomings

Our prognoses made on the base of the suggested mathematical model 15 years ago about the reforms results in many countries including the ISC, have come true, despite its principle contradictions with many analysts' opinions there existing at that time.

10 Conclusions

1. The given model from our point of view is likely to meet the necessary and sufficient criteria of adequacy because:

- a) it doesn't contradict the commonly accepted concepts of the social development;
- b) it allows to scientifically justify the laws of indexes of social economical and social political conditions of almost all states of the world;
- c) it provides the possibility to make the prognoses of social economical development that are confirmed in quite enough examples.

2. We can see on “The Actual Section” graphs the very simple and, at the same time, clear submission of the social processes. In our mind, it is so simple, that allows even non-specialist to make the correct analyses and prognoses of the social development.

We can find in this submission not only the clear answers to many actual questions of the social development, but also find the optimal transition way from dictatorship to democracy and prosperity.

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**MEDIEVAL (AND LATER) COMPULSORY SIGNS
OF GROUP IDENTITY DISCLOSURE.
PART I: THE GENERAL PATTERN AT THE
CORE OF THE SOCIAL DYNAMICS OF THE
JEWISH BADGE, SET IN EPISODIC FORMULAE
AND IN SYSTEMS & CONTROL BLOCK SCHEMATA**

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*In this article, an extension of a formalism I introduced previously (Nissan 2003) is applied to the core pattern of such social dynamics of prejudice, that takes the form of forcing members of a dispreferred group to wear a sign of recognition. Moreover, block schemata are given, that show feedback on the attitudes of society, based on the goals of a malevolent authority. The phenomenon has occurred several times throughout history: e.g., the Jewish badge in medieval Europe, or under Nazi rule, as well as for Hindus under Taliban rule in Afghanistan. We begin by situating such an episode in the history of the Mongol Il Khanid kingdom. The earliest precedent was under the Abbasid Caliphate. In 1831, the badge was still reimposed in Modena, by a ruler who provided the model for Stendhal's *La Chartreuse de Parme*. The episodic formulae notation applied here is a slight extension with respect to a technique that has already proven itself to be versatile for representing social relations, ownership or possession, epistemic states, perception and testimony, communication between agents, the setting and achievement of goals, and so forth (Nissan 2003, 2007, 2008a; Nissan et al. 2004). Part II will apply episodic formulae on some sample narrative, out of those introduced here.*

1. A Mongol Regional State in Turmoil

Persia and Mesopotamia, as a practically independent kingdom within the Mongol empire, was ruled by the Il Khanid dynasty. Formally the Il Khanid monarchs formally were not kings, but rather viceroys of the Great Khan in Tai tu (i.e., Beijing or Peking), whereas in practice they were totally independent. In fact, 'Il Khan' means 'viceroy', or 'subordinate of the Great Khan'. "The first four great khans resided in Mongolia. The fifth, Qubilay or Kubilay (1260–94), whose wisdom and power the Venetian merchant traveler Marco Polo described with so much enthusiasm, moved his capital to Peking, China, and embraced Buddhism" (Vernadsky 1969, p. 64).

The king from the Il Khanid dynasty that is mentioned in Marco Polo's *Il Milione* was Arghun. The circumstances of Arghun's death were related in the extant Syriac-language text

of the *Chronicon Syriacum* of the Eastern Christian writer Gregory Bar-Hebraeus, a native of Melitene (now Malatya in Turkey), who is also known as Gregorius Abul Faragius or Gregory Abū 'l Faraj of Ibn al 'Ibrī, b. 1226, d. 1286 (a dating which is problematic in view of the date Arghun's own demise, unless we allow the *Chronicon* to have been supplemented after Bar-Hebraeus' death). The circumstances of Arghun's death were also dealt with in the writings of several Moslem authors, who very much resented in particular Arghun's Jewish vizier and physician, Sa'd al Dawla, who had been in charge as what we would call now a prime minister for about two years, as well as their resenting, more in general, the Buddhist Arghun's promotion of minorities (Christians and Jews), while there was a perception that he and his top administrators were deliberately overlooking the promotion of members of the demographically hegemonic faith of the kingdom. Baghdad had been the conquered capital of the fallen Abbasid Caliphate, and Sunni rule was replaced with what was perceived to be the humiliation of heathen rule under the Mongols.

Arghun fell severely ill. The *Chronicon Syriacum* mentions paralysis, and it may be it was the outcome of a stroke. Sa'd al-Dawla was not being successful in bringing about an amelioration of the King's conditions, even though the King himself was unwavering in trusting him. Opponents of the vizier, led by some Mongol noblemen, captured the vizier as well as some persons close to him. They were murdered. The unaware Arghun, perplexed at the disappearance of his trusted physician, only died two weeks later (elsewhere I found: five days later), on 10 March 1291. This happened in the Il Khanid capital city of Tabrīz, in northern Iran, and resulted in an anti-Jewish massacre in several cities, because a rumour was spread that permission to loot had been given. My main source is Ben-Jacob (1979, pp. 60–69), but as this is a book in Hebrew, I'll also cite Sir Henry H. Howorth's (b. 1842, d. 1923) *History of the Mongols* (1888, Part 3 = Vol. 4, ca. pp. 330–360), as well as Budge's English translation of Bar-Hebraeus' Syriac-language *Chronicon Syriacum*, 1932, p. 490).

Arghun's brother and successor, Gaykhatu (or Geikhatu), upon his enthronement, opened an investigation of the killing of Sa'd al-Dawla and officials who were with him. Two Mongol noble men were convicted and given rather lenient sentences, but later on they were pardoned. Note however: “[W]hen Geikhatu succeeded his brother Arghun as Khan in 1291, he in turn killed off Arghun's prominent supporters, among whom were many Armenians”, according to Bedrosian (1979) in a dissertation about Armenia during the Turco-Mongol invasions.

Hostile historians blamed Sa'd al-Dawla for poisoning Arghun, and their point was that it served the king well for having promoted him in the first place. By another account, Arghun died for heeding the advice of heathen men of religion he imported from India or Mongol-ruled China. There is yet another account, that in the demise of Arghun sees the hand of Ta'achar (Ba'arin), a Mongol nobleman who was to become sultan in 1295 (taking the name of Baydu) after murdering Arghun's brother and successor, Gaykhatu. Baydu had rebelled, and Gaykhatu was strangled with a bowstring, but the reign of Baydu didn't last the year: Ghazan Khan, Arghun's son, executed him in 1295, and became what is improperly said to have been the first Muslim Il Khanid ruler.

More detailed knowledge of the dynastic narrative reveals that he was “the first of a line”, or “the one who inaugurated the Islamic phase of the Il Khanid dynasty”, rather than “the first”: in fact, after Arghun's father, Abagha, drank himself to death in 1282, his eldest son, Arghun, at first yielded to an uncle, Teguder, who took the Islamic name Aḥmad (he is known as Aḥmad Khān), and developed friendly relations with Mamlūk Egypt. Eventually Arghun rebelled and was defeated, but afterwards enthroned as sultan by the plotter, the emir Buqa, of a coup in which Teguder was killed. Buqa engaged in peculation and was put to death in 1289. It was then that Sa'd al-Dawla was made Arghun's financial administrator, and tried to tighten the budget — only to fall two years later. In his rather short tenure as vizier and

finance administrator, Sa‘d al-Dawla returned some money to taxpayers, while promising to double the tax-revenue. He managed to keep that promise. Possibly, at least part of how he managed this was achieved through the elimination of diversions such as had been practised by Buqa and his associates.

In 1287–1297 there was a general Eurasian financial crisis, and silver supplies dropped sharply. In the period 1291–1295, Il Khanid finances collapsed. Gaykhatu stands out as the sultan under whom the state coffers were empty: his vizier Sadr al Dīn Zanjānī introduced paper money (called *chao*, and being an imitation of the paper money issued by the Great Khan Qubilai in China, in very different financial circumstances). Within two months, the initiative of introducing paper money and making its use compulsory under the pain of death (which involved for subjects the obligation to hand over to the state all precious metals) turned out to be a failure, and this intended remedy made a difficult crisis even worse.

Already Arghun had grossly overspent, to secure support for his rule, and arguably Sa‘d al Dawla made himself unpopular with some by trying to tighten the budget. After the financial collapse that followed his death, in the years 1291–1295, the kingdom went through the convulsions of the period 1295–1297, when the conversion to Islam of Arghun’s son, Ghazan Khan, was accompanied by a campaign of persecutions against other denominations (conducted by the vizier Nawrūz who was later executed), but there were as well massive purges of political opponents: there had been a rebellion of Mongol princes.

Arghun’s favouring Buddhists, and bringing clerics of that faith into his capital, reflects both the prestige of the court of the Great Khan, and the not yet Islamized Mongol aristocracy in Persian and Iraq still sticking to a Far Eastern identity. The prestige of Islamic culture in lands that had previously belonged to the Baghdad Caliphate, instead, motivated the Arabic names of the viziers, and the pressure of the Persian environment eventually motivated kings to become Moslem, starting with Arghun’s son Ghazan (enthroned in 1295, and himself succeeded by Öljeytü in 1304).

2. The Badge Enters the Picture

Ibn al-Fūfī, a historian from the Middle Ages, related (Ben-Jacob 1979, p. 70) that as soon as Ghazan-Khan was enthroned, a campaign against non-Islamic communities was undertaken. Among the other things, distinctive attire was imposed on their members: a yellow badge in the turban for Jews, and special belts for Christians. That measure was suspended two months afterwards, as the mob set upon persons so clad. The badges had been first introduced in Caliphal times: in the year 849 under the Caliph al-Mutawákkil. His measures, that were enforced again under another Caliph, al-Muqtadī, in 1091, also ordered wooden images of demons to be placed at the entrance of the houses of minority members. Ghazan-Khan’s model for emulation clearly were those Caliphs who had time and again imposed and enforced the distinctive badge.

The badge had an obvious effect on categorizing an individual as being a member of an inferiorized group. Most recently, wearing a distinctive badge was imposed on Hindus in Afghanistan in the later period of Taliban rule, a period that saw their numbers plummet in the country. From Europe, the Jewish badge is best known because it was imposed by the Nazis on the Jews in the Third Reich (from September 1941). During the Middle Ages, the Jewish badge was enforced in various European countries. Yet, for example, “[T]he Jewish badge was never worn in Poland” (Hundert 1997, p. 342) — that is, before the Nazi occupation.

In Europe, distinctive clothing for Jews was ordered to be introduced at the Fourth Lateran Council in 1215, in its Canon 68. In November 1215, a papal bull of Innocent III (who stands out in history for having been especially ill-disposed to the Jews) gave these decisions of the

Council the force of canon law. “The bull confined itself merely to ordering the distinguishing mark. The legislators of each country were to execute this decree as they saw fit. Princes and provincial councils henceforth discussed the type, shape, and color of the identifying mark. Two of Innocent’s successors, Popes Gregory IX and Innocent IV, repeatedly reminded rulers to pay strict attention to the requirement and to allow no exceptions to the wearing of badges. Gradually, these ‘Cain’s marks’ became a common sight in all of Europe, their wearers identifiable everywhere at a distance” (Keller 1969, pp. 213–214).

“England chose a badge depicting two stone tablets inscribed with the Ten Commandments. In France, St. Louis ordered a badge to be made of red felt or saffron-yellow cloth, cut in the shape of a wheel and worn on the upper garment, one in front and one in back, ‘so that those thus branded may be recognized from all sides’.” (ibid.). “Germany instituted the rotella, a patch of yellow cloth in the shape of a wheel or an O. In some countries a simple badge was considered inadequate and the wearing of a hat of a specified color was also prescribed” (ibid.).

In Germany, the “Jew’s hat (Judenhut) [was] one of the most distinctive features of Jewish costume in the medieval period. The funnel-shaped headgear was originally worn voluntarily by Jews but by the thirteenth century it had fallen into disuse. Consequently, in Germany, beginning in 1267, laws were promulgated that obligated Jews to wear these hats, usually yellow in color, so that they would be marked off from the Christians. It was not until 1434 that the Jews of Germany were ordered to begin wearing the Jewish badge in the form of a round yellow circle. During the fifteenth and sixteenth centuries, the Jewish badge, already in use in many other countries of Europe, generally supplanted the Jewish hat as the distinguishing mark of a Jew” (JTSA, 2002–2003).

Toaff (1991) is concerned with the Jewish badge in Italy during the 15th century. In Italy, this badge was known by the name rotella. Moreover, in some Italian towns, Jewish women were ordered to wear ear-rings as being a distinctive mark (Owen Hughes 1986); the name cercigli by which these ear-rings were referred to in Ancona suggests that they were a particular kind of ear-rings, whose shape was circular.

Here is an example from the age of Restoration in Italy, with about thirty more years to go before the unification of the country by the liberals: “Going back to the moti [i.e., revolutionary uprising] of Modena in 1831, organized by Ciro Menotti, once the ‘legitimate’ sovereigns come back, the local Jews are subjected to all of the restrictions on residence and civil representation, and even the ‘segno giudaico’ [i.e., the badge] is made compulsory” (Valori 2007, p. 79, my translation). Francesco IV of Este, the ruler of Modena at the time, provided inspiration for the character of the tyrant, Ranuce-Ernest IV, in Stendhal’s acclaimed novel, *La Chartreuse de Parme*. Both monarchs would have it both ways: be a tyrant, yet seek to portray themselves as “liberal”.

Stendhal’s novel does not mention Jews or the badge, and for that matter, his portrayal of Ciro Menotti’s fictional equivalent is somewhat unflattering. The point in mentioning *La Chartreuse de Parme* in this connection, is that the portrayal of the tyrant is instructive, and was inspired from the situation in Modena.)

3. Preliminary Remarks About Formalism

In the medieval Levant, women from the minorities had to wear an iron necklace while undressed at the public bath, and from the viewpoint of trying to represent this in a logic-based formalism, one would face the challenge of the exceptional situation of having to wear something distinctive while wearing no dress at all. There is an intended effect, that of bringing upon molestation on the forcible wearer of distinctive attire, that is best known from Europe (as late as under Czarist rule in some university towns during a given period), when

something distinctive was ordered to be worn by Jewish women, that was also imposed on prostitutes.

The obvious intended effect was that the former be molested by being approached the way some would approach the latter. This is separate from another effect of distinctive attire such as the badge: a signal of the reviled Other, in individuals who wear it and who if personally unknown, may otherwise appear, and be treated, as fellow-humans.

When it comes to formal, mathematicized representations of narrative patterns, of a kind we are going to introduce further on in this article, it is an interesting challenge to distinguish between the context of a badge, in circumstances such as the ones described, as opposed to the badge of a company being worn by its employees, or to the badge an organization being worn by people associated with it, or to the badge worn by campaigner of a given cause. A pertinent example that combines more than one context is the following.

4. The Teheran Narrative from 1897–1898

Amnon Netzer (1996, p. 247) writes: “In July 1898, Joseph Cazès arrived in Teheran as the emissary of the AIU”, i.e., the Alliance Israélite Universelle, in order to establish a modern Jewish school. The AIU, a philanthropic organization whose aim was to establish in the Levant and North Africa schools that would foster among local Jews modern Western culture, and more specifically French culture. Cazès was faced with the following situation in Tehran: “Since 1897, the Jews had worn a red patch on their clothes, as ordered by the Shi‘ite mullah, Reihanollah. They were loath to leave the Jewish quarter for fear of being attacked or murdered by their oppressors” (ibid.). Ben-Jacob (1979, pp. 326–327) mentions how in 19th-century premodern times, a red badge was imposed on the Jews of Hilla, Iraq, along with other disabilities in their attire and in walking around; this makes Hilla very different from Baghdad, and both cities were in the same province of the Ottoman empire, conditions for Jews in Iraq having been at the time all in all better than in the Kingdom of Persia. In Tehran, “Cazès’s great efforts and the intervention of foreign representatives enabled him to reach a compromise with the Persians: the Jews would replace the red patch with the symbol of the AIU” (Netzer 1996, p. 248) — still making them recognizable. Yet, the reigning King (who made a donation to the AIU school) was keen on introducing reforms, and, e.g., issued a decree abolishing the reward, for converts, of becoming the sole heir of deceased family members, to the exclusion of relatives remaining Jewish. The decree was ignored (ibid., p. 246). The conceptual operation of replacing the red patch with the AIU symbol is interesting on more than one level. It implied the acceptance, on the part of the wearers, of the Frenchifying, secularizing aims of the AIU. It also, as intended, implied that wearers weren’t being humiliated by wearing a patch imposed on them as being a stigma, but rather were “willingly” displaying the logo of a communal organization.

In the rest of this article, we are going to represent in formulae and in block schemata not these specific episodes, but rather the core pattern underlying them. The representation, set in formulae, of some specific narrative out of the ones we have presented thus far, will be given in Part II, a sequel of this article. Having discussed formally the general pattern in this article, we could then consider in Part II how specific narratives could be represented. In particular, we are going to formalize in Part II the narrative from Teheran.

5. A Device for Social Exclusion: Expressing the Underlying Rationale by Means of Formulae

Let us formalize the phenomenon described. Let us conventionally symbolize prejudice by means of a square box (which by itself, in my notation stands for both knowledge and belief) inside a four-pointed star, and let the four notations

$$\begin{array}{cc}
 \begin{array}{c} \text{+} \\ \square \\ \star \\ \mathcal{A} \end{array} \xi^t, & \begin{array}{c} \text{+} \\ \blacksquare \\ \star \\ \mathcal{A} \end{array} \xi^t, \\
 \begin{array}{c} \text{-} \\ \square \\ \star \\ \mathcal{A} \end{array} \xi^t, & \begin{array}{c} \text{-} \\ \blacksquare \\ \star \\ \mathcal{A} \end{array} \xi^t,
 \end{array}$$

respectively mean that agent A (at a given time, if indicated by a superscript) is positively, very positively, negatively, or very negatively prejudiced concerning ξ (which may be an abstract issue, or a human group and so forth). In my notation, communication from a to b is symbolized by

$$\begin{array}{c} \text{b} \\ \mu \\ \text{a} \end{array}$$

followed by a parenthesis enclosing the communicated message; if this is an order being given, then an exclamation mark follows the parenthesis. Agent A setting a goal for itself is notated by means of a hollow g inside a concave box; a hollow g on its own stands for an active goal; whereas a concave box by itself stands for conceiving of an idea. A hollow arrow closed on its left side and containing an m stands for “and this motivated” what follows the arrow. The symbol \neg stands for logical negation. A four-leaf clover stands for perception; a double-edged four-leaf clover stands for testimony; these are ocular (i.e., visual perception and eye-witness testimony) if there is an eye inside the symbol. Ability, i.e., ontological possibility, for agent A, is symbolized by can with ont as a superscript and A as a subscript. If instead of ont the superscript is deont, then it is permissibility, i.e., deontological possibility, that is meant. Transgressions on it are symbolized by a lightning-like arrow directed from the transgressing agent towards a Γ symbol, as indeed the set of duties of agent B to agent A is symbolized by

$$\Gamma_{A/B}$$

Let us notate an authority as J and a society as S. We notate the master relation, here, as follows:

$$J \triangleright S$$

Sometimes in history an authority, J over society S, is very negatively prejudiced against a human group H. It may happen, then, that J is keen on having members of society within J's jurisdiction (S) other than members of social group H, hold the same prejudice against H and mistreat its members. It has historically happened that such an authority J has ordered that members of the disliked group wear visibly a mark of their belonging to that group, so that they may be recognized as belonging to it. We represent that pattern as follows:

$$\exists t, \exists S, \exists \mathcal{H}, \exists J, \text{At } t :$$

$$\left[\begin{array}{l} (\mathcal{J} \triangleright S) \wedge \left(\boxed{-}_{\mathcal{J}} \mathcal{H} \right) \xrightarrow{\text{m}} \left(\boxed{\mathcal{G}}_{\mathcal{J}} \left(\pi' \right) \right) \xrightarrow{\text{m}} \\ \xrightarrow{\text{m}} \mu_{\mathcal{J}}^S \left(\begin{array}{l} \forall j, j \in \mathcal{H} \quad j \in S : \\ \pi'' \in \Gamma_{j/S} \end{array} \right) ! \end{array} \right]$$

That is to say: there exist a time t, a society S, a social group H, and an authority or jurisdiction J, such that at time t, J has authority over the society S, and J is very negatively prejudiced against social group H, and this motivated (at time t) the setting of a goal on the part of J, this goal being as expressed by proposition π' . This in turn motivated an order, given (at time t) by authority J to society S, to the effect that for every j who is an individual member in both set H and set S, proposition π'' is a duty within the duties that j owes to society S. The propositions are nested inside a formula such as this one as a macro (i.e., you can just replace the formula for the proposition in place of the name of the given proposition), rather than as a logic truth value.

$$\pi' \equiv \left[\begin{array}{l} \text{if} \left[\begin{array}{l} (j \text{ is-a person}) \wedge (m \text{ is-a person}) \wedge \\ \wedge (j \in \mathcal{H}) \wedge (m \in S) \wedge (m \notin \mathcal{H}) \end{array} \right] \\ \text{then} \left[\begin{array}{l} \left(\boxed{-}_m \mathcal{H} \right) \wedge \left[\begin{array}{l} \text{if} \left(\boxed{\square}_m (j \in \mathcal{H}) \right) \\ \text{then} (m \text{ mistreats } j) \end{array} \right] \wedge \\ \wedge \left[\begin{array}{l} \text{if} \left(\boxed{\text{eye}}_m j \right) \\ \text{then} \left(\boxed{\square}_m (j \in \mathcal{H}) \right) \end{array} \right] \end{array} \right] \end{array} \right]$$

Proposition π' (i.e., the state of affairs that authority J has set for itself as a goal to be achieved) states that: if j and m are persons, and j is a member of social group H, whereas m is a member of society S, but not of H, then m is very strongly prejudiced against social group H, and if m believes that j is a member of H, then m mistreats j, and if m sees j, then m believes that j is a member of social group H. That is to say, the

authority has the goal that not only members of society other than the disliked group, will dislike members of that group, but that moreover, when seeing these, these could be recognized as such.

$$\pi'' \equiv \left[\begin{array}{l} \forall j, \forall m, \left(\beta_j \text{ is-a } \beta \right) \wedge \\ \wedge \left[\neg \text{can}_j^{\text{deont}} \neg \left(j \text{ wears } \beta_j \right) \right] \wedge \\ \wedge \left[\neg \text{can}_m^{\text{deont}} \left[\left(m \text{ wears } \beta_m \right) \wedge \right. \right. \\ \left. \left. \wedge \left(\beta_m \text{ is-a } \beta \right) \right] \wedge \pi''' \right] \end{array} \right]$$

Proposition π'' (i.e., the duty that authority J imposes on members of society other than those who are also members in the group the authority dislikes) states that: for every j and for every m, β_j (which is something associated with j) is an individual instance of kind β , and j must (as an obligation, i.e., j cannot deontically not to) wear β_j . And moreover, m must not wear β_m , where β_m is an individual instance of kind β . And moreover, also proposition π''' applies.

$$\pi''' \equiv \left[\begin{array}{l} \forall j, \forall m : \\ \text{if } \left(\text{can}_m^{\text{ont}} \left(\text{see}_m(j) \right) \right) \\ \text{then } \text{can}_m^{\text{ont}} \left[\left(\text{see}_m(j) \left(j \text{ wears } \beta_j \right) \right) \wedge \right. \\ \left. \wedge \left(\square_m \left(\beta_j \text{ is-a } \beta \right) \right) \right] \end{array} \right]$$

Proposition π''' (i.e., part of duty π'' that authority J imposes on members of society other than those who are also members in the group the authority dislikes) states that: for every j and for every m, if m is able to (i.e., if m ontologically can) see j, then m is able to see that j is wearing β_j , and m believes (is aware) that β_j is an instance of kind β . That is to say, such members of society who are not members of the persecuted group will both be able to see the badge, and to know what it is. The formulation of the condition part of proposition π''' ensures that the action part would not apply, say, to some m who is blind, or somewhere else out of sight where it could not see j anyway.

Bear in mind that in our notation as used here, we do not distinguish between belief, knowledge, and awareness. That is a distinction that is important, instead, in Adamatzky's (2005) pioneering model of how a coalesced mind and irrationality emerge in a crowd, that in such circumstances may become a mob.

6. Branded by the Badge

On the back of the cover of his best-selling autobiographic novel *Un sac de billes*, relating his childhood in Paris under the occupation, novelist Joseph Joffo is introduced thus: “44

ans, exerce le métier de coiffeur” — a hairdresser or a barber, the latter having been the profession of his father.

Chapter II ends by relating his father’s delusion, at the beginning of the occupation, that what had been enacted by the Nazis in other countries will not be carried out in France: “non, pas ici, pas en France. Jamais.” The following scene is related at the very beginning of Chapter III:

— A ton tour, Jo.

Je m’approche mon veston à la main. Il est huit heures et c’est encore la nuit complète dehors. Maman est assise sur la chaise derrière la table. Elle a un dé, du fil noir et ses mains tremblent. Elles sourit avec les lèvres seulement.

Je me retourne. Sous l’abat-jour de la lampe, Maurice est immobile. Du plat de la paume il loisse sur son revers gauche l’étoile jaune cousue à gros points:

JUIF

Maurice me regarde.

— Pleure pas, tu vas l’avoir tu aussi ta médaille.

Bien sûr que je vais l’avoir, tout le quartier va l’avoir. Ce matin lorsque les gens sortiront ce sera le printemps en plein hiver, une floraison spontanée: chacun son gros coucou etalé à la boutonnière.

Quand on a ça, il n’y a plus grand-chose que l’on peut faire: on n’entre plus dans les cinémas, ni dans les trains, peut-être qu’on n’aura plus le droit de jouer aux billes non plus, peut-être aussi qu’on n’aura plus le droit d’aller à l’école. Ça serait pas mal comme loi raciale, ça.

The book has been translated in many languages, yet the following translation is my own:

— It’s your turn, Joe.

I approach, holding my jacket in my hands. It’s eight o’clock in the morning, and it’s still quite dark outside. Mum is sitting on the chair behind the table. She has a thimble, a black thread, and her hands are shaking. It’s only with her lips she is smiling.

I turn back. Under the lampshade, Maurice is still. With the flat palm of his hand, he pats, on his left lapel, the yellow star sewn in large stitches:

JEW

Maurice stares at me.

— Don’t weep, you, too, will get your medal.

Of course I’ll get it, everybody in the neighbourhood will get it. This morning, when people will be walking out, it will be spring in the depths of winter, a spontaneous bloom: everybody with his large badge displayed at his buttonhole.

Once you’ve got that, there isn’t much you can do any more: you don’t get into the cinema, any more than on the train, quite possibly you’ll no longer have the right to play marbles, and perhaps not even the right to go to school. Not bad, as a racial law.

Whether, in addressing Joseph (the author when he was a child), telling him “Don’t weep, you, too, will get your medal”, his brother is being ironic or otherwise — that is to say, whether or not either child or both have initially misunderstood the social role of the compulsory Jewish badge — referring to it as a badge of which one is to be proud is somewhat similar to gilding the pill as attempted by Cazès in Tehran in the summer of 1898: “Cazès’s great efforts and the intervention of foreign representatives enabled him to reach a compromise with the Persians: the Jews would replace the red patch with the symbol of the AIU” (Netzer 1996, p. 248) — still making them recognizable. As pointed out earlier, in the words of the end of Chapter 2 in this article, the compromise reached by Cazès “implied that wearers weren’t being humiliated by wearing a patch impose on them as being a stigma, but rather were ‘willingly’ displaying the logo of a communal organization”.

Jacques Petit (1972, p. 35) has remarked that Léon Bloy, in his ambiguous *Salut par les Juifs*, published in 1892, in which he took his distances from the “élucubrations antijuives de M. [Édouard] Drumont” (p. 21) — the anti-Jewish rantings by the leading ideological hatemonger in the France of the 1890s — yet early on in that book, Bloy “rappelle une page violente du Désespéré, à laquelle il ne voit «pas le moyen de changer un quart de ligne»” (“recalls a violent page from [his own] *In Despair*, of which he sees ‘no way of changing [even] one quarter of ligne”), and quoted at length from that text anti-Jewish invectives, as well as the following statement (on p. 25 of the *Salut par les Juifs*):

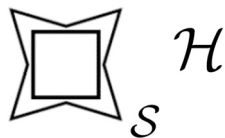
Le Moyen Age, disait-je en parlant des Juifs, avait le bon sens de les cantonner dans des chenils réservés et de leur imposer une défroque spéciale qui permît à chacun de les éviter [...]

The Middle Ages, I was saying while talking about the Jews, had the good sense of segregating them in reserved chennels, and of imposing on them a special dress that enabled anybody to avoid them [...]

A means for discerning, indeed for discriminating, that was not available in his own days in his own surroundings. Yet, rather self-contradictorily, he was also claiming that ugliness sets the Jews apart. If so, one does not see the need he was claiming, for some distinctive feature in the dress, so they could be told apart.

7. A Complementary Representation, by Means of Block Schemata

Let us introduce the following symbology:



is the prevailing affective attitude of society S to group H.

Liking is positive, disliking is negative.

$$\Phi \equiv (\mathcal{J} \triangleright \mathcal{S}) \wedge \left(\square_{\mathcal{J}} \mathcal{H} \right)$$

This is a proposition stating that J is the authority in society S and that J is heavily prejudiced against H.



is the degree of self-determination of society S.

σ_S is a function strengthening any input from S.

σ_J is a function strengthening input from authority J.

$\delta_S \sigma_S$ is a multiplication that affects a signal, by strengthening input from S, yet this is made dependent on how self-determining the society S is.

W_S^a is the strength of constitutional guarantees (if any) checking **access** to power in S.

W_S^x is the strength of constitutional guarantees (if any) checking the **exercise** of power in S.

$\square_S W_S^x$ means that society S is aware of the (non-null) strength of the constitutional guarantees checking the **exercise** of power in S.

K_S^J is the compliance of society S with J (for the contextual purposes).

K_S^J is the readiness of society S to comply with J (for the purposes relevant in the given context).

$$\Psi_1 \equiv \text{intends}_J (\text{harm}_J \mathcal{H})$$

$$\Psi_2 \equiv \text{intends}_J (\text{harm}_S \mathcal{H})$$

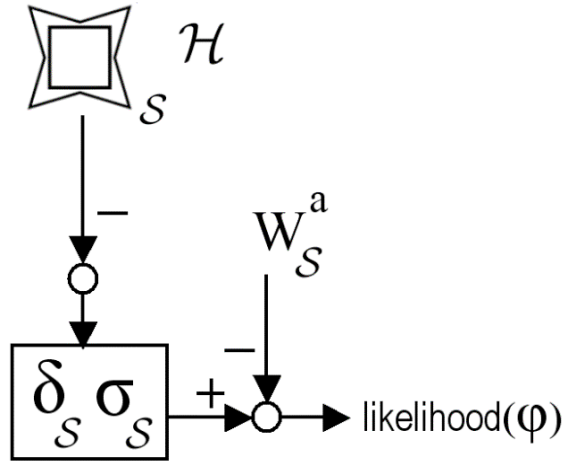
The previous two formulae respectively mean that

“The authority J intends to do harm to H”,

and that

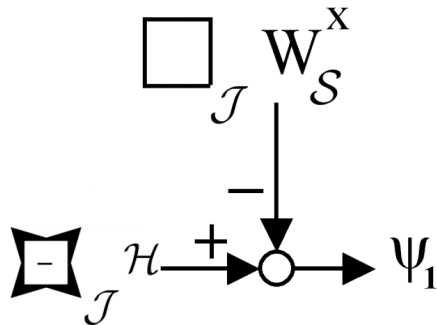
“The authority J intends that society S will do harm to H”.

Next, let us turn to the following four block schemata. The first schema states that to the extent that society harbours a positive attitude towards the given minority group, and to the extent that this society is self-determining, as well as to the extent that there are constitutional guarantees checking the access to power, then the likelihood that a malevolent ruler would come to power diminishes.



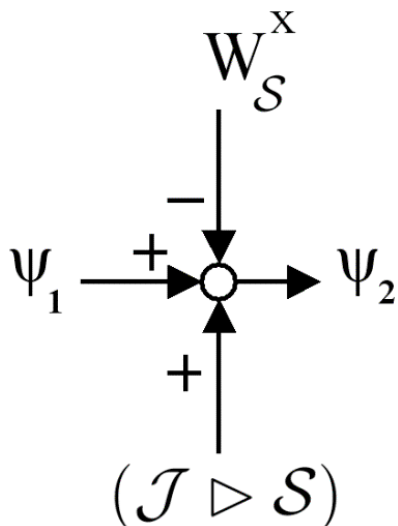
Scheme 1

The second block schema states that the ruler being heavily prejudiced against the given minority militates towards, but the ruler's awareness of there being effective constitutional guarantees checking the exercise of power militate against, the ruler intending to harm that given minority:



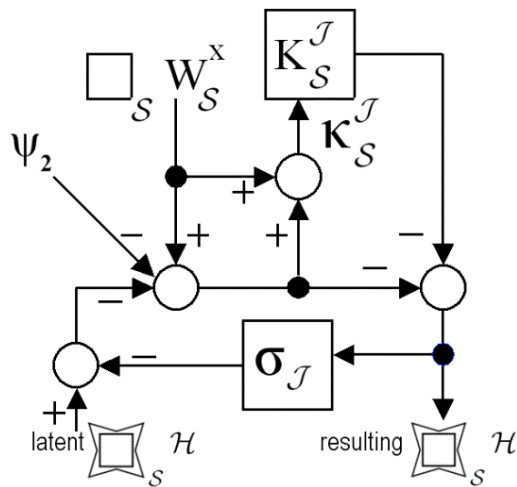
Scheme 2

The third block schema states that the ruler's domination of society, as well as the ruler's intention to harm the given minority, militate towards the ruler seeking to have society itself harm that minority, but this is somewhat reined in by the strength (if any) of constitutional guarantees on the exercise of power in that society:



Scheme 3

And finally, we find feedback in the fourth block schema:



Scheme 4

The fourth block schema takes into account society's readiness to comply with the malevolent intent of the ruler towards the given minority. This is affected by the initial latent attitudes in society towards that minority, as well as by society's awareness of the (non-null) strength of constitutional guarantees checking the exercise of power. If society itself is negatively prejudiced, this will help the malevolent ruler to make this social attitude towards the minority even worse.

8. Conclusions

In this article, I have adopted two kinds of representation:

- The traditional approach in terms of *block schemata*.
- *Episodic formulae*. I have extended here, with the introduction of prejudice, a notation for representing episodic knowledge of social narratives, as well as situational patterns, that I have applied extensively in recent years, e.g. in Nissan et al. (2004) and Nissan (2003, 2007, 2008a, cf. 2001a, 2002). The notation is based on logic predicates, with some elements from set theory as well as from semantic nets (e.g., Schubert et al. 1979) from artificial intelligence (AI), also drawing part of the inspiration from the so-called conceptual dependency school in AI treatments of narratives (e.g., Schank and Riesbeck 1981; Dyer 1983a).

Elsewhere (Nissan 2007, Part I, 'Concluding Remarks') I felt able to claim:

In the several papers applying the formalisms [i.e., applications of episodic formulae], different episodic situations were handled. Sometimes quite complex relations about identity were prominent; some other times, [it was] the structure of goals and beliefs. The formalism has proven itself to be flexible. All in all, it is general enough. Moreover, we can justifiably expect that the process of creating the formalism will converge. Basically subsets of the same sets of operators or relations have been used for a diverse array of situations to be represented.

Here in particular, we have been able to represent in episodic formulae the a core pattern within the social dynamics of social prejudice, whereas feedback has been shown in a non-equivalent, but rather complementary representation in block schemata as usual in systems & control. They make the social dynamics explicit, in terms of circular causality, feedback, and, in a sense, self-fulfilling prophecies. Incidentally, my article 'Anticipatory Narrative

Construal' discusses an array of contexts in which apparently anticipation is invoked in how sense is made of narratives (Nissan 2001b).

The episodic formulae symbolism I used in this and other papers is compact and I found it handy, enabling as it does one who has learned the notation to grasp a formula at a glance. It would be possible, of course, to replace the graphic symbolism with verbal identifiers, i.e., with names for predicates. The prefixed operators can be considered in terms of modal logic, or, then, they can be just considered to be ordinary predicates.

As an anonymous referee pointed out:

As it is only a 'notation' (as the author says, one could also formulate different ones), it cannot be expected to see a calculation or comparison on this basis, but still a notation is a first step and it could be indicated how future development could go that direction.

In the Concluding Remarks to Nissan (2007, Part I), I stated the following:

A referee asked how the work presented relates to the development of ontologies and the semantic web. Could ontologies help in constructing the representation of the text? The answer to this question is in the affirmative. Actually, it could be said that in part — in particular, such aspects that are related to frames from AI, or case grammars from linguistics — the representation drew on the experience of the present author, developing deeply nested relations for the purposes of databases of terminology and semantic concepts [(Nissan 1986, 1987a, 1987b, 1999),] as well as of knowledge-representation as applied otherwise. The same referee also asked: Could this formalism help the development of ontologies? The reply is that it could, especially if considered jointly with the previous experience with semantic representations that has just been mentioned.

How general is the method of formal representation adopted in the AURANGZEB model? There is a core of operators — the majority of them — that occur (possibly just a subset) in each and every representation in formulae which I developed for the various narratives. On occasion, the opportunity of introducing a new operator has emerged. Nevertheless, the operators converge on a given set. This should be enough to assuage the concern lest operators be introduced in ad hoc fashion, to suit particular narratives. [...] I am currently [envisaging] trying to devise translation schemata whose input is our formalization method, and whose output is code in an object language, being respectively an extension of the event calculus, and an extension of the situation calculus.

The kinds in which the formalism could be potentially used in the long term are fairly diverse. It has been envisaged that an interactive tool could be developed, that would construct an internal narrative representation while acquiring knowledge from a human interlocutor, or with the assistance of a human interlocutor. Also, it has been envisaged that narrative intelligence would be integrated into various kinds of interactive processes. Moreover, in the ongoing GALLURA project, an attempt is being done to set a distinction between a bona fide, realistic engagement with making sense of a narrative of by

means of a narrative, and different universes of interpretation, in which, for example, narratives could be developed by combining patterns, according to non-realistic criteria which could be of mock-explanation, or mythopoietic (generating narratives within the framework of a mythology being developed with a given set of poetic conventions).

Meanwhile, in Nissan (2008c, 2008d) I have discussed the different kinds of explanation in a narrative context. In Nissan (2007, Part II, 'Conclusions'), I remarked:

One of the directions for future research, is the development of an interactive tool for acquiring an internal representation along the lines of what we have seen, for a narrative input discursively, yet interactively by a human user. Note that the formalism presented here mainly consists of a goal-and-plan account of action. The events include causing harm, which was done as part of plans for achieving goals of overpowering. Yet, there is as well "causing harm" which, for its own sake, deserves a logical analysis. Åqvist and Mullock's *Causing Harm: A Logico-Legal Study* [(1989)] goes some way towards such formalization. We didn't delve into that, nor did we consider the intricacies of duty as represented by means of deontic logic [(Åqvist 1984)]. [...]

Developing a capability supplementing other kinds of computer processing with narrative intelligence, yields the promise of augmenting the sensibility of the way the processing is carried out on inputs which have a narrative structure. Yet, even though research into the computer processing of narratives has been going on since the 1970s, its aims have proven to be rather elusive, because of the massive amount of common sense which need be represented. There has been a period when efforts invested in this field conspicuously diminished, but in recent years there has been a comeback. Refraining from tackling the issues will not help to make them more tractable. This article [(Nissan 2007)] is a small step towards the latter goal.

In agreement with the remark of a referee, about how important it is "to underline the generality of the different model elements", we would like to emphasize that it has been paramount for us, in recent years, to apply and roughhew the general formalism again and again, to different narrative situations, which we have presented in several articles. There is a core of operators — the majority of them — that occur (possibly just a subset) in each and every representation in formulae which we developed for the various narratives. On occasion, the opportunity of introducing a new operator has emerged. Nevertheless, the operators converge on a given set. This should be enough to assuage the concern of that referee, lest "many operators were introduced just following the particular story chosen for this paper, and that another story would lead to as many other operators, thus severely limiting the scalability, and ultimately the usefulness, of the approach". As it turned out from this author's experience with the many narratives analyzed, the narratives per se do not require specific sets of operators, and this because the general set of operators is rich and adequate.

When we do need further operators, this is when we decide to tackle a further topic in how the human mind works. In particular, if we need handle emotions explicitly, then arguably there is no escape from adopting at least a subset of the ontology that results from research into emotions in psychology, and from its application within AI since at least as early as the 1980s. Already Michael Dyer [(1983a, 1983b, 1987)] has referred to a set of about fifty emotions listed in the literature, and Liming Chen {see below} has done so recently, in his own research about embodied agents. Yet, these emotions can be described in a discrete space of a few parameters. Another factor which can augment the set of operators would be the wish to formalize not just the narrative, but the narration as well: how the narrative is related and delivered to an audience. Again, there is nothing new about this, and there exists a literature which among the other things, has endeavoured to formalize, e.g., rhetorical gestures. At any rate, it is important to stick to a modular architecture, so that tools can be made available and applied again by different teams to different projects. The wheel need not be invented over and over again. [... T]he present author is currently trying to devise translation schemata whose input is this writer's formalization method, and whose output is code in an object language, being respectively an extension of the event calculus, and an extension of the situation calculus. We also envisage an interface for acquiring narratives, so that its output would be our formalism.

I would welcome expressions of interest from academic readers, concerning collaboration in this project: thus far, it has been collaboartion that has been in scarce supply. In Nissan (2007, Part I), in the context of a survey, I remarked as follows:

An important direction for research, that has been pursued in the last several years, is the development of suitable formal representations for feeding a narrative into a computer animation environment, and instructing embodied agents it contains. Some models of animated agents adopt a merely reactive approach to modelling agent behavior, whereas other models endow the agents with some cognitive abilities, while also being endowed with a reactive system which responds with actions to perceptions. Agents with cognitive abilities display reactive, as well as deliberative and social behavior. Such cognitive models of agents that are logic-based have also been referred to as cognitive robotics. One of the logic-based cognitive models of agents is the project described by Chen et al. [(2000, 2001a, 2001b, 2001c)]. It introduced an embodied agent design approach which within the same agent architecture, reconciles the autonomy of the agent with agent instructability on the part of the user. Given a narrative, agents have to perform tasks or take initiatives. A high-level behavior specification language is used in order to build the cognitive model. This includes specifying agents' knowledge about their domains and what are the preconditions and effects of actions that can be taken there. It also includes a certain amount of common sense about the given domain. Such common sense is useful, so that feeding the system an input narrative does not need be in painstaking detail. The formalism is based on an extension of the Event Calculus (this being preferred to

the Situation Calculus). Actions with durations can be represented, and the formalism is suitable because of “its ability to assimilate a narrative, i.e. the description of a course of action such as plot or story, adjust the effects of actions and the time-line of the narrative as it becomes more and more precise” incrementally [(Chen et al. 2001a: p. 20)]. That architecture also includes an emotion synthesizer. This in turn influences planning as well as the performance of actions. As to planning, it is a process which works on a collection of event calculus formulae, and which consists of a resolution-based abductive theorem-proving process. Agent control is both declarative and procedural. The role of narratives and how they are processed in animated environments with embodied agents is especially interesting, as it shows how narrative processing within computer science is not merely or necessarily about analyzing or generating natural-language text, which is how computer linguists have been approaching narratives.

Nissan (2008a) applied episodic formulae to agents reasoning about their own or each other’s body. The example chosen was an anecdote about Tamerlane ordering three painters, each in turn, to paint his portrait. Social positioning, and the importance of not offending the ruler, are paramount in that narrative. In the ‘Introduction’ of Nissan (2008b), an overview companion paper of Nissan (2008a), I began indeed by pointing out:

An important aspect of embodied agents, whether within robotics, or with animated avatars in virtual environments, is whether they are able to reason on their own body, and about the body of other embodied agents, as well as about the physical properties of props (objects) in the environment. It is especially in robotics that the idea of robots able to reconfigure themselves has some currency. Some other computer tools were developed with the aim of, e.g., providing a virtual model of the human body.

This is important for having a computational agent reason, e.g., about physical harm in a narrative. Among the other things, Nissan (2008a) — to say it with its conclusions section —

argues for the importance of providing an explicit treatment for the narrative dimension of social interaction, even when this takes place in a society of embodied agents: not only among animated avatars in a virtual environments, but even in a society of robots.

Part II, i.e., the sequel of the present article, will apply episodic formulae on some sample narrative, out of those introduced in the present Part I. This kind of research is ultimately germane to the concerns of Adamatzky (2005), even though the models were developed independently of each other, and initially with no knowledge of each other.

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Classics

A Quotation from Chapter 6, Walter Buckley "Sociology and Modern Systems Theory", Prentice-Hall Sociology Series, Englewood Cliffs, 1967 (Permission granted by Pearson Education, Inc., Upper Saddle River, New Jersey)

"... The general theme of this chapter has been the problem of "social control". In discussing various facets of this notion we have argued that a model of society as a complex adaptive system is required if the notion is to be sharpened in meaning. Social control, or social order, is not simply a function of men conforming to the demands of others, to divine precepts or natural law, or to fixed norms of an equilibrial or homeostatic system. Whatever control, order, or disorder there is at any time in society is a function of the interrelations and interactions of the components of an ongoing system process. Groupings of individuals seeking material and social goals in a physical and sociocultural environment generate meanings, interaction patterns, and ecological arrangements that are more or less temporary adjustments always open to redefinition and rearrangement. These social and cultural patterns involve, in varying degrees, an internal component of voluntary, informed self control and an external component of direct or indirect constraint. That is, legitimate authority and coercive power are both normally present in society, but one or the other may predominate at times.

A simple, cybernetic feedback model of explicit group goal-seeking does not fit most societies of the past and present because of a lack in those societies of informed, centralized direction and widespread, promotively interdependent goal behaviors of individuals and subgroups. In some cases in history, large scale, planned social development or change fitting this model has occurred, based on a strong centralized leadership and an efficient administrative apparatus; but the goals attained were not salient for large segments of the population, and problems of internal consensus and cohesion have usually arisen sooner or later to halt the process. Extensive, conscious attempts to direct a complex society in a viable, adaptive manner have only just begun in modern history, and much remains to be learned to avoid the mistakes of the past. An intimate understanding of the workings of the sociocultural level of complex adaptive system is essential.

Modern systems analysis suggests that a sociocultural system with high adaptive potential, or integration as we might call it, requires some optimum level of both stability and flexibility: a relative stability of the social-psychological foundations of interpersonal relations and of the cultural meanings and value hierarchies that hold group members together in the same universe of discourse and, at the same time, a flexibility of structural relations characterized by the lack of strong barriers to change, along with a certain propensity for reorganizing the current institutional structure should environmental challenges or emerging internal conditions suggest the need. A central feature of the complex adaptive system is its capacity to persist or develop by changing its own structure, sometimes in fundamental ways.

Underlying the criteria of stability and flexibility are the basic elements of the adaptive process: 1) a source for the continuous introduction of "variety" into the system, which may refine or revitalize the pool of commonly usable information and the set of common meanings and symbols that, by and large, represent adequate „mappings" of the physical and social milieu; but variety means deviance, and although some may be adaptive, some will be pathogenic; 2) maintenance of an optimum level of tension in the system, but also, a relatively high level of satisfaction of members' needs-both basic needs and those generated by the

system itself; society is not a tension-reducing system-tension is produced by the normal impulses to action, the „role-strain" of everyday social relations, cognitive dissonance, incongruence of interpersonal matrices, and the like; 3) a full, two-way communication network extending throughout all parts of the system to provide adequate linkage of components and to make possible the various feedback loops essential to effective goal attainment; 4) a selective, or decision-making, system that is sensitive not only to changes in the external environment but also to those in its internal state (that is, it must be self-conscious), and which is capable of „learning" or allowing for changes in its goals and values; and 5) effective mechanisms for preserving and propagating those meanings, symbol systems, and information sets that have, for the moment, passed the tests of truth, goodness and beauty; and this newly structured variety becomes the basis of the sociocultural framework within which the next round of adaptive process occurs.

This kind of model is complex, and it is not as comforting as an equilibrium or functionalistic model. But the several recent theories of social interaction and institutional dynamics that we outlined in earlier chapters are intended to show that the challenge has already been accepted and a significant overhaul of sociological theory is well under way. And it is going in a direction, we reiterate, that is quite closely in line with modern systems analysis, which provides an integrating theoretical framework that may contribute to the advance-if we but choose to exploit it.“

Discussion

IS IT POSSIBLE TO USE SECOND-ORDER CYBERNETICS AS A TECHNOLOGICAL DEVICE IN SOCIOLOGICAL RESEARCH?

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In this paper Sociocybernetics is re-defined as the science which deals with the control of the efficiency of social systems, which mean the necessity of controlling any negative difference produced between the achieved outputs and the expected outputs. In this sense, most of published works with the label of "sociocybernetics" would not be real sociocybernetics approaches or applications. In the same way "Second-order Cybernetics" which could be understood as a more sophisticated and technological view of Sociocybernetics, seems to emphasize above all the relationship Observer/Observed Object mainly with the aim of analyzing the fact of observation itself. I will suggest that the relationship observer/observed object will be limited only to certain cases where "communication" (not observation) is realized under strong conditions of power from the part of the communicator, and that an excessive emphasis on this relationship has negative consequences for society and may rise ethical problems for social scientists. In general, presenting knowledge as only a subjective perception of the communicator would lead to inaction. But a different and more practical outcome could be expected if the communicator presents women's problems as objective verifiable knowledge (through the known inter-subjective agreements among experts), since then the responsibility has to be sought in the political determinants of the sociopolitical structure and other systemic factors.

1. Introduction

From time to time new concepts appear in science trying to overcome old concepts and to inject fresh knowledge into the tree of science. But some of these concepts seem sometimes rather artificial or inadequate for a specific science. That is the case, in my opinion, what happens specifically in Sociology with the concept of "Second-order Cybernetics" which pretends to add a new dimension (the inclusion of the subject) into the epistemology of social sciences through the emphasis made on the relationship "Observer/Observed Object", or like Luhmann put it: on "the observations of observing systems...."

Before starting with the concept of Second-order Cybernetics, let me remember what in general is understood by "Cybernetics" as a science, since there is an unavoidable bridge between them. It seems clear that from Ampere (1834), going through Wiener, McCulloch/Pitts, Asbby, Couffignal, Rosnay and many others, Cybernetics deals with a very

few but fundamental concepts like control, government, regulation and deviation, or in other words, the control of the general EFFICIENCY of the system. The basic goal of Cybernetics is, in principle, very simple and at the same time it looks like one of the most essential tasks of any system: to control its behaviour, or more precisely, to control the “EFFICACY” of the system which is one of the six dimensions of the concept of “Systemic Efficiency” (Parra-Luna, 2006). The implicit universal worry about this central concept of efficiency in all kind of systems, it what makes of Cybernetics a science with such a wide field of applications. But around this basic idea of Cybernetics I want to make some observations:

1) As the reader can easily check, the majority of scientific works entitled as sociocybernetics do not mention any of these four fundamental concepts. On the contrary, it is sufficient to entitle a paper as cybernetics to be considered like that. It is really common to see titles of papers like “... a cybernetics point of view”; or “A Sociocybernetics approach to ...”, and after, you hardly see in text the basic concepts of real Cybernetics. It seems that Cybernetics is more a “fashion concept”. It is necessary to put an end to this swindle.

One has to start by conceiving the Theory of Social Systems as the theory of “transforming” entities which convert inputs into outputs, and try to control the EFFICACY (the relation “achieved outputs/expected outputs”) of this transformation in order to understand the very nature of Cybernetics. In my view, Cybernetics is both at the top of Systems Theory and it is only a specialized part of it. Cybernetics, according to its founding fathers, is the “part of the system which deals with the control of its efficiency”.

Ludwig von Bertalanffy, the father of General Systems Theory, would certify this idea of Cybernetics when he integrates into his theory the concept of Homeostasis from Cannon; the negative entropy from Communication Theory; and the concepts of control, deviations and corrections from Cybernetics.

From a simple lay point of view any social system, big or small, any personal activity, from the president of a government to the milkman or the taxi-driver, are implied in cybernetic goals since they try to achieve what they planned, or in other words, they try to control deviations between planning and achievement. But from a scientific perspective we have to differentiate the general functions of systems looking for their normal performances, from the SET OF SPECIALIZED AUTOMATIC MECHANISMS INSTALLED IN SYSTEMS WITH THE PURPOSE OF CONTROLLING THEIR PERFORMANCES. It would then be unavoidable some kind of ordering or prevalence in the study of the basic systemic concepts. For instance: 1) Theoretical dimensions of the system; 2) Operational definition of dimensions; 3) General structure and interrelations among the components of the system; 4) Delimitation of successive environments 5) Planned efficacy (the relationship between planned outputs and planned inputs); 6) Achieved efficacy (achieved outputs/achieved inputs); 7) the set of deviations produced; 8) Causes which originated the deviations; 9) the series of corrections undertaken to eliminate or reduce negative deviations; and 10) Reformulation of planned efficiency in an anticipatory feed-before way. Without forgetting that the outputs are both objective (facts) and subjective (opinions about the facts) and that the latter are of capital importance in the steering of social systems. But it is important to emphasize that only steps 7) and 9) are essentially cybernetic, and sometimes step 10) when there is an explicit anticipatory way of controlling deviations. The rest are general systemic concepts.

From another complementary perspective we can order the dimensions of the social system as follows:

INPUTS

1. Structural Factors (land, extension, orographic characteristics, etc.)
2. Needs (Referential Pattern of Universal values)
3. Memory (the history of the system)
4. Environment

TRANSFORMATION

5. Conflict (Hierarchization of elites)
6. Inspirator Organ (Parliaments, Boards of Directors, etc.)
7. Ideal System of Values (the program of the Inspirator Organ)
8. Projected System of Values (the program of government) (PSV)
9. Transformation Process (by all the publics and private institutions)
10. First Outputs (the system of values produced before control) (FSV)
11. Cybernetic process (the comparison between PSV and FSV) and possible modification of FSV.
12. Second Outputs (the system of values produced after control) (SV)

Only dimension number 11 could be considered cybernetic.

2) But there are more. Forgetting these central concepts (mainly the OUTPUTS), we may forget the complex problem of NEEDS of people and the COMPLEX SYSTEM OF VALUES which tries to satisfy these needs, and therefore we can ignore the number of physical individuals who are living in the system and waiting precisely for the production of these values and nothing but these values. Van Gigh (1976), Brian Hall (1994), B. Buchanan (1998) and Martin Hall (1998) among others, could say something about the axiological dimension of social systems.

And when we ignore the real women and men (specifically their needs, interests, values and expectations) which motivate the origin and the functioning of social systems and focus our theoretical attention only on concepts like communications, observations, autopoiesis and so on, we of course avoid either to face the most important and “real” problems of people, or contribute to hide them. From this position to a rather manipulative way of steering the system can be little distance.

In my opinion, then, the discipline of Sociocybernetics must specially register and emphasize, first of all, the OUTPUTS (the system of values both wanted and produced by the system for the benefit of its population, after having separated objective and subjective outputs); and second to reduce the deviations produced, either by feed-back or by a feed-forward anticipatory strategy. And carrying out this cybernetics operation, not only in a permanent search for a humanistic approach (that is to say, to contemplate the system from the position of the man in the street) but also using, if possible, a quantitative treatment of data in the line of scientific operational definitions of concepts (Lazarsfeld, Simon, Boudon) in order to approximate as much as possible to the scientific verification of hypothesis. Sociocybernetics, strictly speaking, obliges us to see the system in terms of the automatic or systematic control of the difference between DESIRED and ACHIEVED outputs. The new information technologies facilitate the automatic control of deviations. (this is still repeating an earlier point with minimal advance over two pages now).

But, since it is not clear what Sociocybernetics as a concept is supposed to achieve, when you hear the word “sociocybernetics” it would be wise to be careful and pay attention. It might happen that what you are reading is general social system theory. I do not mean at all to invalidate the sociocybernetic approach; on the contrary, in my view we should encourage and develop it. But after checking that the NEEDS (objective and subjective) of populations

are among the operational variables of the system. Together of course, with the SYSTEMS OF VALUES produced as an overall indicator of the degree of satisfaction of needs. Or, in other words, the main raw materials of Cybernetics are the outputs of the social system.

It is difficult to deny that Sociocybernetics SHOULD then deal with the most comprehensive problems of any social system, and thus the implicit danger of critical confront with the operative powers of the system (up to the comma this makes sense but I am not sure what is meant by the second part) Try this? It is difficult to deny that Sociocybernetics SHOULD then deal with the most comprehensive problems of any social system, including the implicit danger of critical confrontations with the operative powers of the system.

ABOUT SECOND-ORDER CYBERNETICS (SOC)

In this field we should be even more careful. One of its main concerns (the perception of reality) is a quite old problem as we know mainly after Berkeley (about 1710) and Kant (about 1780) not to going back to the Greek philosophers (Jenofanes, Protagoras, Platon...). The general worry is: "We as humans are unable to perceive reality" or "the object we see maybe is not real and it might be only in our perceptions".

Therefore, if Cybernetics is "the control of the efficiency of action" (Couffignal), what then would the "cybernetics of cybernetics" be? In principle "the control of the efficiency of the control of the efficiency". For example, the control made by Beria of the soviet politicians would be a negative example; and the voluntary and automatic modification of the teacher's qualifications made by the students themselves would be a positive one.

And although SOC deals also with the concepts of "autopoiesis", "self-reference", "self-observation" and others, its main concern, after von Foerster (1979) is that the fact of observation changes the observed object (the objects are constructed by the observers) and that the latter may change also the observer, and then the next observation. In SOC we are confronting a reflexive-recursive cybernetics process of knowledge where each outcome conditions the next outcomes, transforming it in a second-order cybernetics (the cybernetics of cybernetics) in opposition to the first-order cybernetics where the outcomes do not change the structure of production of the next outcomes.

This interaction observer-observed object would be more significant if we do not lose the perspective of the object's goals. Unfortunately, the immediate consequence of adopting the SOC perspective seems to change our focus of interest towards the moment and conditions of observation itself, instead of focusing on the observed object. Or, if in any case, we centre our analysis on the object, it would only be as an "observing" or "self-observing" object. The new task seems to be "the theory of observations of observations", or "observers communicating with observers about observing" (Scott, 1966, p.1). What seems to happen subsequently, mainly because of the difficulties for the practical application of these "theories" in sociological research, is that we emphasize continuously the principle that we never can grasp the social reality through our observations. We therefore contribute in some way to the development of all kinds of constructivisms and relativisms (naïf or sophisticated) where nothing is true nor false.

In opposition to this new emphasis on the role of the observer, it is my opinion that we have always assumed the unavoidable evidence of the subjective perception of things and that the "real" world might be impossible to grasp. But at the same time we also assumed that the scientific knowledge we have accumulated is valid (even if it is provisional), once the experts in the field have "certified" it (Popper). From this provisional knowledge we build bridges, airplanes or computers and they usually work. According to Boudon the problem of perception of reality in science is solved through what he calls "intersubjective agreement

between experts”. If most physicians agree that the classical gravity law (Newton) and the Relativity law (Einstein) are compatible, both macro and micro approaches are valid, at least provisionally. As sociologists, then, we never should be too impressed by the relativistic position of Heisenberg, Goedel and others, since social systems with their problems and needs (if scientifically verified) can and must be taken as operational realities. In fact, we have two options: a) to continue speaking about the unavoidable subjective perception of reality which in fact is only a universally accepted truism; or b) to recognize that many times we can perceive correctly the real world (e.g. that there are “n” students in the classroom).

Heinz von Foerster, based on relativistic mechanics (the observations are relative to the observer); and Quantum Mechanics (the observation affects the object), said that the knowledge we get is coming from the interactive relationship between the observer and the observed object. It was clear that we are applying, as I said before, some kind of cybernetic procedure through observations and the feedback we get from the observed object, which modifies the next observation in an unfinished process. From this evidence and with the help of concepts taken from Biology, Cybernetics, Communication Theory and other sciences, we can find a “seam” (a gold mine) to repeat again and again sentences like “We can never know the real world”, “The objects and phenomena do not have an objective existence, they exist only as representations of the attention upon the act of thinking the problem, not on the problem itself”. The result is that we can spend our entire life developing constructivistic, relativistic or similar theories of knowledge from which, I gather, we can never be sure are valid communicable knowledge.

If this relationship observer/observed object should be taken into account, what is necessary, then, is to elaborate at least a typology of objects according to their complexity in order to avoid repeating “urbi et orbi” what seems to be the basic proposition of SOC: that “the observer changes the observed object and the latter changes the observer”.

Always from the position of the people in the street (a genuine sociological position) we could ask f.i.: is it real that women do not participate in politics proportionally to their number in any country in the world? Is it real (in approximate terms) that about the 75% of the world population get only the 25 % of the global GNP? Is it real that hundred of young African migrants have die trying to cross the Gibraltar strait because their perception of relative poverty? Is it real that some rich countries have institutionalized bank secrecy where big amounts of black money belong to the mafias or dictators coming from underdeveloped countries? If these problems are real problems which affect to real people, the least we could say, -if we do not elaborate a typology of object according to their complexity or the difficulties for their falsification-, is that SOC could be opening a certain gap between real social problems and modern social science. G. Soros (1999) a self-made man, very aware of the important role of reflexivity in the world of business and in the definition of truth, puts it in this way: “The intellectual fashion rotated in opposite direction: the deconstruction of reality in the ideas and subjective prejudice of actors is today the last tendency. The truth is being questioned. I think this is also a mistake. The reflexivity process may deal to a new evaluation, never to deny our concept of truth”. (literal translation from Spanish).

RISKING HYPOTHESES

To face the problem, let me advance two hypotheses in a provocative way for the purpose of discussion

A) FIRST HYPOTHESIS

Second Order Cybernetics seems to have reinvented a very old problem (the unavoidable subjectivity of any perception of reality) and solved by Popper, Russell and others through the falsification process of the scientific method. Relativisms (Heisenberg, Goedel, Einstein, ...)

should not affect the scientific definition of social problems and they should not be relevant (at least for the moment) for sociologists. This first hypothesis can be a little more developed:

A1) WHEN THE OBSERVER IS OUTSIDE THE OBSERVED SOCIAL SYSTEM

A11) The observer never modifies the observed object. The modification is only possible when the three following circumstances appears simultaneously:

- A111) If the observer communicates her/his observation
- A112) If the communicator has a certain degree of social influence
- A113) If the observed object (the social system) perceives the meaning of the communication

A2) WHEN THE OBSERVER IS INSIDE THE OBSERVED SOCIAL SYSTEM

A21) The observer can modify the observed object since she/he is a part of it but only in the proportion of $1/n$ where “n” is the system population.

In general, it would be necessary to set up a typology of observed objects according to their complexity in order to see the degree of change caused by the communication of the observer. For example, if the observation I want to communicate to a meeting of colleagues is to inform them about a very simple fact: how many people are in the room, the communication could not change the number of people in the room.

Table 1 tries to generalize the presentation of the problem taking into account the different positions of the “observer”, the “method of observation” and the “act of communication”. In order to grasp the relationship between the observer and the observed object better, it would be necessary to classify objects in function of their complexity. In this table the degree of complexity will be only three: 1=simple (e.g. how many people are there in the classroom?); 2=complex (e.g., which is the opinion of the people in the classroom about the usefulness of the subject-matter they try to learn?); and 3=very complex (e.g., which is the system of values supported by the people in the classroom?).

Table 1

Physical position of the observer	Inside			Outside		
	1	2	3	1	2	3
Complexity of the object observed: (degrees)	1	2	3	1	2	3
1.The observer changes the observed object	0	$1/n$	$1/n$	0	0	0
2.The research technique used changes the observed object						
2.1 Historical Analysis	0	$1/n$	$1/n$	0	0	0
2.2 Secondary Analysis	0	$1/n$	$1/n$	0	0	0
2.3 Content Analysis	0	$1/n$	$1/n$	0	0	0
2.4 Anonymous Observation	0	$1/n$	$1/n$	0	0	0
2.5 Explicit Observation	0	$n+1$	$n+1$	0	0	0
2.6 Questionnaire	0	$(m+1)/n$	$(m+1)/n$	0	m/n	m/n
2.8 Deep Interview	0	$(1+1)/n$	$(1+1)/n$	0	0	0
2.9 Group Discussion	0	$(m+1)/n$	$(m+1)/n$	0	0	0
2.10 Experiment	0	?	?	0	?	?
2.11 Modelling, simulation,...	0	$1/n$	$1/n$	0	0	0
3.The observed object changes the observer	0	F2	F2	0	F2	F2
4. Changes in the observed object because the observer has communicated his observations	0	F4	F4	0	F4	F4

The symbols mean:

0=No influence at all from the observer on the observed object.

m=possible change affects only to the “m” number of participants in the survey or in the group discussion

n= population in the observed object (social system)

F2=possible changes depend, among other things, on: 1) the degree of change of the observed object; and 2) the capacity of perception of the observer.

F4=possible changes in the observed object depend, among other things, on: 1) the power (physical, political, etc.) of the communicator; 2) number of people who attained the message; 3) the degree on which they understood the message; and 4) the personal interest of the population attained.

Summarizing the four points of this table we can still emphasize:

1. The observer never modifies the observed object when he is OUTSIDE the object.

The observer modifies the observed object only when: a) he is INSIDE the object (the social system); and b) the observation implies some degree of complexity. But even under this double circumstance, the object can be modified ONLY IN RELATION TO THE SAME OBSERVER. For example, in a social system with 40 millions people, the system would be modified in the proportion 1/40.000.000.

The influence of the research techniques used in the process of observation shows a variety of possibilities. This part of the table (non exhaustive) shows 60 cases, in which in 36 cases the research technique used would not have any influence at all on the observed object (0); in 10 cases only could change the observer in relation to the population (1/n); in 2 cases would change the population “n” involved by the explicit anthropological observation, plus the observer (n+1); in 4 cases the change would affect only to the group involved in the questionnaire or in group discussion, plus the observer (m+1)/n; in 2 cases only the “m” people involved in the questionnaire when the observer is outside the social system (m/n); in 2 cases only two persons would change (1+1)/n as in the case of the deep interview; and finally, in 4 cases changes could not happen as in the case of the experiment..

The observed object changes the observer in function of the capacity of perception of the latter.

2. The communication of the scientific results to the observed object (social system), may have little or big influence in the case of complex problems, but always in function of:

- a. the power of the communicator
- b. the number of people attained by the message
- c. the degree of complexity of the message or the understanding of people, and
- d. the personal interests of the population attained.

Umpleby (2004) is right when he says that A. Smith, Marx, Keynes and Friedman, among others, had a big influence on society. I would say that, as communicators, they arrived to maximize these four prerequisites, but not as mere observers.

Summarizing, it can be said that we cannot speak about the effects of the relationship observer/observed object through sentences like: “The observer changes the observed object and vice versa”, because this is not at all true. What we should say is that the communicator changes the social system and that the latter changes the communicator, but both changes in variable degrees depending on several factors.

Or more specifically:

a) The mere observation never or almost never changes the observed object since only communication could do it

b) Even when communication exists, the changes in the observed object depends on several factors, and

c) The possible change of the communicator by the changes of the object observed also depends on some factors.

B) SECOND HYPOTHESIS

Second-order Cybernetics (von Foerster); Constructivism (Glaserfeld); Subjective Oriented Approach (Kjellman), and other theories along the same line, would tend to hide grave social problems when they deny, too often, the possibility of defining “objectively” (inter-subjectively) the social reality. The proliferation of sentences like those which follow below would mean both an historical “déjà vu”, and a brake on progress.

Let us remember some of the current sentences:

“If faut s’opposer ici au postulat classique de la recherche scientifique par laquelle un monde « objectif » est posé independant de la description (comme si une telle chose existait) ; le monde qu’il nous faut prendre en compte est un « monde subjectif », dependent de la description et qui inclut l’observateur » (von Foerster 1978).

“Objective perception is impossible...All there is to be see is –the private unique universe aroused by messages from “out there” which are rich coloured by our own imagination and knowledge –our own priververses” (Kjellman, 1996, p. 11)

All trials to connect truth and anthology must fail. Reflective constructivism reveals conceptual aspects we are not aware of in our everyday life or scientific views. It shows the deficiency of the concept of truth as a descriptive one and as a systemic one” (Wallner, 1966, p.2)

In the ontological studies there is an effort to dominate the object. But in the new approach, there is a more modest task: the fidelity to the observation where the social analysis is a process of permanent observation about the observation” (Luhmann, 1955, p. 19)

The observer plays an active part in the process of observation and that anything he observes bears his mark” (Glaserfeld,2003)

“The structure and the activity derived from this structure, appears as dependent of the activity of the subject who defines it” (Glanville, 1980)

“The idea of second-order cybernetics is that science has to incorporate the role of the subject, e.g. the observer itself” (Cor van Dijkum, 1996, p2)

“Thus we cannot escape the fact that the world we know is constructed on order (and thus in such a way to be able) to see itself” (Brier, S. 1996)

“A measurement is a manipulation made by the observer of the object she/he is trying to measure. The rest of the measurement process is to introduce an error in the measure” (Stern, Encyclopedia Britannica)

“The consequence of the measurement process is to make the activity (ontique) of the system dependent from the objectivistic (manipulative) activity of the observer” (Navarro, 1991) (Navarro is a Marxist isn’t he? Surely he would be realist and so in what sense is this quotation a good example of constructivism?? Someone needs to check that last quotation)

And so on...

I would assume all these sentences, but my very first question would be: Is anybody denying, from the Greek philosophers, that everything we perceive is perceived by our subjectivity? (previous sentence makes no sense) But at the same time, is anybody denying that this subjectivity is converted in some kind of objectivity (intersubjective agreement)

through the process of validation of knowledge? If that is so, how such a set of truisms can still be repeated today?

Of course everything we define is coming from our personal subjective perception. Of course we can never reach the absolute truth. Of course the knowledge we get depends of our activity as observers. Of course in every measure we do, we may introduce a certain degree of error. But sincerely speaking: I never consider myself any need to go back to such truisms. First, because I always assumed the unavoidable subjectivity of everything we perceive, define or measure.

If I try to describe, measure or explain what is happening in a social system, as an observer situated outside then observed system, is because I assume at least three certainties: 1) that my description is going to be validated (or falsified) by my colleagues in the field; 2) because the final description we get among all the observers (this kind of provisional “average”) is going to be considered as valid (although provisionally); and 3) this validity is going to make possible the introduction of changes, developments or improvements into the observed system for the benefit of its population. Technological and social progress are a real consequence of these certainties, or in other words, a consequence of the elimination of the role of the observer through the intersubjective agreement among experts. When we apply the standard scientific procedures of validation, the observer disappears, and therefore, instead of talking about the “return” of the subject we should speak of the “death” of the subject. This is the grandiose consequence of scientific knowledge: the gravity law is real on earth and is independent from Newton, equally real are the political division of powers (legislative, executive, judicial) with the independence of Montesquieu, or the operational definition of concepts with independence of Paul Lazarsfeld. Newton, Montesquieu and Lazarsfeld deserve historical acknowledge for their contributions but they have vanished as epistemological subjects. Some colleagues would say that this is a nineteenth-century conception of science, and I would not say the contrary. But I would continue to defend this position as a valid operational one nowadays.

Therefore, if we do not believe in the possibility of describing the real world for changing or improving it, then our elegant and privileged dilettantism is not only conservative by nature, but it could be in some cases labelled as deeply amoral. In order to avoid any possible critical point of view toward these kinds of excessive constructivisms, we would need then a definition of Second-order Cybernetics. This definition would need to have eliminated most of the unnecessary or superficial references to the relationship between observer/observed system talking only about communication and adopt the goal of defining (operationally) and knowing (heuristically) reality and the possibility of improving it according to the desires and needs of the population. Here again I would agree with Umpleby (2004): “If we assume that social science theories are not merely descriptions of society but also imply recommendations for action, then one way to evaluate a theory is to examine whether indeed society improves as a result of acting on the recommendations implicit in the theory”.

From an ethical point of view there is also a transfer of responsibility from the origin of the problem (society) to the communicator of the problem. In von Foerster’s words: “From this it appears to be clear that social cybernetics must be a second order cybernetics- a cybernetics of cybernetics- in order that the observer who enters the system shall be allowed to stipulate his own purpose: he is autonomous. If we fail to do so somebody else will determine a purpose for us. Moreover, if we fail to do so, we shall provide the excuses for those who want to transfer the responsibility for their own actions to somebody else: “I am not responsible for my actions; I just obey orders (Pilatos)”. Finally, if we fail to recognize autonomy for each, we turn into a society that attempts to honor commitments and forgets about its responsibilities” (Foerster, 1979).

Therefore, if you assert, scientifically, that “only 15% of women are represented in Parliaments”, then you are, as the communicator responsible for this situation, not the social structure, not the elites that determine this structure; not the politicians who run the functioning of the system; and not the senior politicians who represent the highest socio-political authorities. You are responsible for this political problem and maybe for all women’s problems in the world (lapidations, genital mutilations, and so on). This conclusion could have two consequences: first, you feel so impotent that you discard all knowledge about the social situation of women and contribute to concealing the real social sources of the problem; and second, you feel the need to become a hero in the same way as Don Quixote or even as Jesus Christ. Or maybe the third way out is to commit suicide. As any of these options are useless for several reasons, mainly because you rely only on subjective observation (for example, “obscenity is not a property residing within things but on the communicator), the problem will persist. Of course, a different and more practical outcome could be expected if the communicator presents the women’s problems as an objective verifiable knowledge (through the known inter-subjective agreements among experts), since then the responsibility has to be sought in the political determinants of the sociopolitical structure and other systemic factors.

CONCLUSION

It seems that the contribution of SOC is more to emphasize old concepts with some biological labels than to bring new ones into sociological theory. This emphasis would hardly lead to solve practical or methodological problems in social research and thus would probably be of little use to tackle social problems. Geyer (1994), one of the fathers of Sociocybernetics and a defender of SOC, acknowledges in a paper entitled “Second-order cybernetics: a bridge too far? The following: “There is indeed quite a methodological problem here. It is already very difficult to apply the principles and methods (e.g. feedback and non-linearities) of first-order cybernetics to empirical research, much more so than to sociological theory, and nearly impossible to incorporate a second-order cybernetics approach in one’s research design. Indeed, as far as empirical research is concerned, second-order cybernetics may be a bridge too far, given the research methodology and mathematics presently available”. What is the use then of SOC? I am also afraid that the emphasis on the metaphysics of the observer instead of the metaphysics of the object“ (Luhmann), leads scientific research towards an unavoidable narcissistic perspective instead of towards the definition of the object. SOC implicitly would say to us, not only that the means used (the observation of the observer) is more important than the end we want to achieve (the definition of the object), but that the unique objective of the research process is the “observer itself”. In other words, the “real” world can wait (and so the “real” problems) since the only reality for us would be the never ending process of “observation of the observer”. To put it in observational terms: the dangerous water did not exist for Narcissus, since only Narcissus existed.

To summarize, I see five main problems in SOC: First of all, the observer never changes the observed object, since only communication or action could do it; and when the observer is inside the social system, the change would affect only to the observer himself. Second, when the observer communicates his observation, then the changes in the observed object is a function of several factors, among them the complexity of the object. Third, to say that everything we see is a subjective perception of the real world, is a “déjà vu” historical truism and would be of little use for the scientific improvement of social systems. Fourth, to refuse the objective perception of reality leads to a refusal of objective perception of a pragmatic operational world, and that may have negative consequences for society. And fifth, as this kind of rejection implies the impossibility of defining acute social problems, SOC leads to ethics for the rich; that is to say, ethics where unjust situations cannot be tackled since they would not be real objective situations. Therefore, the ethical point of view of SOC presented

by von Foerster (the advantages of Kant's increasing the number of options) would be cancelled because of the unavoidable non-action derived from an illusory subjective perception of problems.

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COMMENTARY ON Francisco Parra-Luna's paper

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It is rare to come across an academic paper that seems to be so clearly based on prejudice and singularly lacking in scholarly merit. On numerous occasions at conferences I have heard Parra-Luna pronounce against second order cybernetics and pay little or no attention to those who disagree with him. Now I have had the opportunity of seeing his 'arguments' set out in print. If you think my comments are severe, I must first assure you that I consider Parra-Luna to be a most personable individual. Problems only arise when he dons his academic hat, mounts his hobby horse and in Don Quixote like manner tries to put the world to rights by attacking a multitude of opponents. Unfortunately, the windmills he attacks are pretty well all and sundry who make up the systems and cybernetics communities, including most if not all of the founders of those disciplines.

To attempt such an endeavour is not a bad thing in itself. However, if that endeavour is to have any merit other than being irritating 'noise' in the social system that is the systems and cybernetics community, it needs to be supported by a thorough and clearly presented review of the relevant literature, together with arguments and justifications that stand up to rigorous examination. In presenting his critique, Parra-Luna invites counter-critique. I do not believe Parra-Luna's thesis stands up to rigorous, close scrutiny. In the following I set out some reasons why I believe this to be so.

I find two signal weaknesses in Parra-Luna's thesis:

His description of what is second order cybernetics is a 'straw man', inaccurate caricature.

He fails to appreciate that by engaging in discussion of 'what is cybernetics' and 'what are first and second order cybernetics', he in fact is doing second order cybernetics. The 'cybernetics of cybernetics'.

His paper begins with definitions of cybernetics and sociocybernetics so narrow that the only social science research activities that fit their confines are those of the kind pursued by Parra-Luna himself - attempts to measure the performance of social organisations. Parra-Luna's view is that cybernetics is a subset of systems theory concerned with control processes. There are others in the systems community who share that view. However, this view is not shared by the broader cybernetics community where it is more usual to consider 'systems' and 'cybernetics' as essentially synonymous, as proposed by Ashby (1956) in his classic work *Introduction to Cybernetics*.

Parra-Luna goes on to disparage a veritable army of well-respected thinkers for daring to be other than like himself, an avowed realist. He then, bewilderingly and contrary-wise, accepts a number of propositions about the observer's role in constructing his/her reality, for example, "...the problem of reality is solve through .. ' intersubjective agreement among experts'" but declares these ideas, are in fact long accepted truisms! He does not appreciate at all the role that SOC has played in making these ideas precise and well-justified. For Parra-Luna, people who espouse SOC related idea are merely followers of fashion.

My own reading is that from before the coining of the term 'cybernetics' by Norbert Wiener in 1948, first and second order concerns were already evident in the Macy conferences which gave birth to cybernetics, as can be seen in the subtitle "feedback and

circular causality in biological and social systems.” From its inception cybernetics emphasised the role the observer plays in distinguishing universes of discourses and the systems to be observed therein. The presence of ethologists, anthropologists, sociologists and psychologists at the Macy conferences ensured that conceptual and methodological issues concerning the observation of systems that themselves can be considered as ‘observing systems’, problems of self-reference and reflexivity, were central to the thinking of the early cyberneticians. The reader may consult the conference proceedings for evidence of this. He/she may also consult the publications of, for example, Warren McCulloch, Ross Ashby, Margaret Mead, Gregory Bateson and Gordon Pask for evidence of this, as well as the work of Heinz von Foerster.

It was von Foerster who, later, in 1974, was responsible for articulating the distinction that first order cybernetics (FOC) is the study of observed systems and second order cybernetics (SOC) is the study of observing system., For more on my views on the significance of this distinction, I refer the reader to Scott (2002, 2003, 2004, 2007). For a detailed view of how the distinction came about, see von Foerster (2003).

The key idea von Foerster develops is that an observing system is a dynamic, self-organising system that constructs models of its environment in response to perturbations. In Ashby’s words, such a system is ‘information tight’. ‘Information’, ‘meaning’ and ‘knowledge’ are constructed within the system itself. Von Foerster puts it thus, “The environment contains no information. It is as it is.” In similar spirit, Pask refers to the ‘organisational closure of potentially conscious systems’ and Maturana refers to systems that are ‘autopoietic’. Von Foerster goes on to say, “The goal of SOC is to explain the observer to him/herself” and that (paraphrase), “It behoves the observer to enter the domain of his/her own descriptions.” In other words, we, as observing systems should acknowledge that we are the kind of systems we are trying to understand. We are ‘constructors of realities’, with ethical responsibilities about the forms of reality that we construct.

Parra-Luna fails to give clear definitions of FOC and SOC and in doing so fails to acknowledge that FOC and SOC are complementary in the nexus of action and reflection that is ‘observation’.

He claims that SOC states that, “The observation changes the observed object (the objects are constructed by observers) and the latter may change also the observer and then the next observation”. He cites von Foerster here, although no specific reference for this statement is given. It is Parra-Luna’s paraphrase. He uses this statement, which at most is a partial truth about what SOC has to say, as the basis for his critique of SOC

For Parra-Luna objects are just there, to be observed. He passes over any reference to the careful work of Piaget and other developmental psychologists that show how humans, as organisationally closed, autopoietic systems, come to construct their worlds of objects and social relations.

In a sustained diatribe, Parra-Luna lectures the reader about what is ‘real’. He gives examples of certain facts and situations he asserts which we all should accept /agree as ‘real’. He does this in order to deny the relevance of the constructivism epistemology of SOC.

As an example, he asserts that the proposition that, there are n people in a classroom is ‘a very simple fact’. His assertion fails to appreciate that statements of fact can always be put into question; Facts are made (L. *facere*, to make); they are built out of any number of prior assumptions about how the world works. This is the SOC constructivist position. Pask in his conversation theory (Pask, 1975) sets out formally in great detail just what are the circumstances under which it is possible for the observer of a conversation to rightly claim that the participants in a conversation do indeed agree the verisimilitude of a proposition such

as “There are 24 students in the classroom.” The participants’ in extenso models of the relation ‘students in a classroom’ must correspond. It must also be the case that the participants’ ways of defining concepts in intenso in terms of other concepts must also correspond in some way. For example, one participant’s concept of a ‘person in a classroom’ may include the criterion that he/she is a full time member of an educational institution. Another participant’s concept may be broader, encompassing part-timers or any learner engaged in study activities. The concept of what is a ‘classroom’ may also differ significantly. One participant may have in mind a particular physical location and temporal interval. Another might have in mind a virtual classroom that exists in ‘cyberspace’ and might also have in mind a different temporal interval. It is only through conversation and negotiation that the participants may indeed conclude that they are in agreement about a simple ‘real fact’. Parra-Luna seems not to have come across the 20th century mantra from the philosophy of science that, “All observations are theory laden.”

My own work on communication in social systems (e.g., Scott, 1997), which Parra-Luna cites out of context, is precisely about how the human operators in social systems frequently misperceive and miscommunicate.

By failing to define the FOC and SOC distinction, Parra-Luna also fails to appreciate that one may choose to take a first order stance (to observe a system as an ‘it’, external to oneself) or one may choose to be an observer of observing systems, where, minimally, one imputes to those systems the properties one imputes to oneself (for example, being an autonomous setter of goals and a user of language for reflection, communication and a guide for action). In mixed methodologies one may combine first order and second order data collection methods.

Perhaps the most clearest instance of Parra-Luna’s muddled thinking is his suggestion that all scientific questions can be decided by appeal to Popperian ‘falsifiability’ criteria,¹ thus failing utterly to see that the adoption of a particular epistemological position calls for making choices about propositions that are formally undecidable by standard rational, scientific methods. As von Foerster points out (von Foerster, 1992), it is our freedom to choose with respect to undecidables that makes clear the extent to which we are responsible for the realities we construct. Second order cybernetics educates us (L. educare, to lead out) about what it is to be human. It leads us out of the darkness of ignorance and prejudice into the light of freedom and responsibility.

The first and second order distinction helps make clear methodological and conceptual distinctions already to be found in the biological and social sciences. In doing so, cybernetics fulfils its role as a unifying transdiscipline. In biology we have a distinction between reductionist and holistic approaches to the study of organisms where the latter is concerned, amongst other things, with an understanding of the ‘life world’ experiential domains of living organisms. In psychology, there is a distinction between behavioural approaches, which look only for relations between stimuli and responses, treating an organism as a black box to be analysed as being governed by a set of ‘laws of behaviour’ or ‘transition rules’, and approaches which engage human subjects in various kinds of empirical investigation. For these latter studies, there is always a second order aspect, if only in the form of the ‘experimental contracts’ that are negotiated with subjects prior to the carrying out of experiments. In sociology and anthropology, there is a distinction between first order data collection and systems modelling and second order research where there is a concern with the

¹ In fact, Parra-Luna manages to misrepresent Popper. He states, “.. the scientific knowledge .. is valid, once the experts in the field have ‘certified’ it (Popper).” Whereas Popper argues that scientific knowledge is that which can be falsified.

communication of meaning and where the 'verstehen' of Weber plays a central role in informing an observer's hypotheses about the observing systems that are under observation.

In a bizarre twist, towards the end of the paper, Parra-Luna manages to distort von Foerster's teachings about ethics, that it behoves observers to take responsibility for the realities they construct. Parra-Luna somehow manages to interpret this as a doctrine of non-action in the face of the evils in the world, whereas von Foerster's position is quite to the contrary, namely that one should, "Act towards the future one desires."

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Commentary to the paper: „Is it possible to use second-order cybernetics as a technological device in sociological research?“ of Francisco Parra-Luna

Eva Buchinger

First of all, the question presented in the title of Francisco Parra-Luna's (FPL) paper is a relevant one. Although one has to ask what exactly is meant with the term "technological device", the discussion of the usability of the concept of second-order as an analytical tool is challenging within the sociocybernetic community, and beyond that of interest for the wider social sciences.

Second, my impression is that FPL misinterprets some of the basic rationales of the concept second order cybernetics (SOC). Whereas he criticises the observer-focus of SOC and diagnoses a tendency "towards an unavoidable narcissistic perspective instead towards the definition of the object" (p. 12), SOC representatives (e.g. Mead, Bateson, Foerster, Luhmann among others) have been emphasizing dependency and embeddedness.

Third, the object-focus of FPL's argumentation seems to be somewhat outdated. Contemporary discussions concentrate on questions such as "which neural- and/or societal processes are involved in individual object representation" and consequently on the question, how these research strands can be linked with issues such as "adequate measuring", "adequate indicator building" and "adequate use/interpretation of indicators". Reflexivity is one of the central keywords here.

In the following my commentary will concentrate on the "five main problems of second order cybernetics (SOC)" identified by FPL in the conclusion of his paper (p. 11-12). It must be noticed that hereby the term problem is not used to identify a research question or research issue, but to express, that SOC is characterised by "unavoidable non-action derived from the illusionary subjective perception of problems" (p. 12).

(1) Generally I agree with the first statement of FPL's conclusion that an observer does not change an object only by observing it. But I miss the inevitable second step of SOC, namely, that the observer will use the information deduced of observation for communicative and non-communicative actions – and this is exactly the point where SOC becomes fruitful. Information about an object is always something produced by an observer as a social being and it depends on the observers' categories, schemas, expectations, situational assessments etc. (which are a result of ongoing socialization) what kind of information is produced for, and used in, actions . (Of course, observation can happen without any direct relation to action, but this does not question the social nature of human beings.) The following citations illustrate these conceptual features of SOC.

G. Bateson and M. Mead (1976: 40) describe the embedded character as follows: "(...) essentially your ecosystem, your organism-plus-environment, is to be considered as a single circuit. (...) but (...) you are part of the bigger circuit (...) the engineer is outside the box, and Wiener is inside the box; I'm inside the box."

The societal dimension is addressed by H. v. Foerster (1979: 1) by the Maturana-induced statement "anything said is said to an observer" and thereupon on basis of "three concepts that are in a triadic fashion connected to each other. They are: first, the observers; second, the

language they use; and third, the society they form by the use of their language. (...) I have no doubt that you share with me the conviction that the central problems of today are societal.”

N. Luhmann ([1986] 1989:24f) introduces the concept resonance to explain observation basically: “An observer who recognizes that an object is a self-referential system notices at the same time that it is constituted tautologously and paradoxically, i.e., is arbitrary and inoperable, unobservable. (...) With the assumption of let us say, a supermodal, observationally dictated distinction of necessary and contingent the observer can eliminate the paradox while providing the observation with an operational object. (...) Our concept of resonance assumes this second-order cybernetics.”

The reformulation of these positions by K. Krippendorff (1996: 311) reads as follows: “To me, the shift from a first-order to a second-order cybernetics signalled a shift in scientific attitude toward reality, from privileging the perspectives of detached observers, spectators or engineers of a world outside of themselves to acknowledging our own participation in the world we observe and construct as its constituents.”

(2) I agree with the second statement “when the observer communicates his observation, then the changes in the observed object is a function of several factors, among them the complexity of the object” (p. 12). But I do not see, why this is a problem in the sense that SOC is useless to its explanation. On the contrary: it is of special interest how individual perceptions and descriptions – resulting in communicative signals addressing other psychic/social systems – change the self-steering mode of the latter.

(3) I disagree with the third statement “to say that everything we see is a subjective perception of the real world is a ‘dèjà vu’ historical truism and would be of little use for the scientific improvement of social systems” (p. 12) because of the same argumentation as in (2).

(4) I disagree with the fourth statement “to refuse the objective perception of reality leads to the refuse of the objective perception of a pragmatic operational world, and that may have negative consequences for society” (p. 12), because perception is per se a subjective activity and “objectivity” is the property of measurement which can be tested independent from the proposing individual and is an additional and necessarily societal (at least interpersonal) process based on various/many subjective perceptions following certain institutionalized rules (i.e. to be properly considered objective, the results of measurement must be communicated from person-to-person, and then demonstrated for third parties, as an advance in understanding of the “objective” world).

(5) Consequently I disagree with FPL’s final statement that “this kind of rejection implies the impossibility of defining acute social problems, SOC leads to ethics for the rich”.

Summing up I would say that although a critical discussion of the explanatory power of the concept of SOC is absolutely justified, the argumentation presented by FPL in this paper unfortunately miss the point.

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SYSTEMS RESEARCH and BEHAVIORAL SCIENCE

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Zehn Jahre danach

Niklas Luhmanns »Die Gesellschaft der Gesellschaft«

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