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Descriptio Orbis Terrarum: Towards Transfiguration

Janusz Dubiel

A Thesis

in

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ABSTRACT

Descriptio Orbis Terrarum: Towards Transfiguration

Janusz Dubiel

The purpose of this study is to present selected, global socio-political problems in the light of advanced mathematical methods and in congruence with the idea of the unification of academic realms, as well as interdisciplinary thinking. It is argued here that the Public Choice theory has not provided sufficiently precise and advanced mathematical tools of understanding in its approach to Public Policy. Moreover, the Public Choice theory is often associated with neoconservatism. This association seems to be artificial because it imposes normative constraints on research in the subject matter.

Unification and interdisciplinary thinking are expected to permit for transfiguration of the individual, the political player, into the "whole human being" who is able to interact with the global environment empathically. It is assumed that transfiguration into the whole cannot be done without prior integration, on the administrative level, of an already severely compartmentalized encoded human experience. Specifically, mathematical and geometrical models of society are presented, based on different variables. The purpose of the models is to allow for a precise, in mathematical terms, redefinition, and, thus, better understanding of worldly phenomena with respect to political, cultural and economic problems. Fundamental concepts such as multiculturalism, freedom, justice, power and distribution are discussed in detail.

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III. THE *ORBIS TERRARUM* MANIFOLD WORLD MODEL

LIST OF FIGURES AND NEW DEFINITIONS

LIST OF SPECIAL SYMBOLS

$\equiv$ identical with

d simple derivative

$\int$ integer

Δ delta

∂ partial derivative

∇ nabla (an operator)

We must stop acting as though nature were organized into disciplines in the same way that universities are.

- Russell L. Ackoff

Je n'estime pas que l'homme soit capable de former dans son esprit un projet plus vain et plus chimerique que de pretendre, en écrivant de quelque art ou de quelque science que ce soit, échaper à toute sorte de critique et enlever les suffrages de tous ses lecteurs.

- Jean de La Bruyère

I. INTRODUCTION

A. Thesis statement and main objectives

The purpose of this work is to show the need for an integration of academic disciplines into a unified vision; one which places the transfiguration of selves into the center of vision in order to create a true global village. Transfiguration requires, in turn, a holistic perspective as regards the human being and an encoded human experience. The new civic culture and education cannot be initiated without both structural (societal) and cognitive (individual) transformations within contemporary civilizational space.

Specifically, mathematical physics is used as a supporting tool, linking natural and social sciences. This tool should be regarded as a tool of expression, and never as its end. Otherwise, dehumanization in its most technocratic sense would take place, hence, discrediting the thesis' main purpose. Models of society are presented while their mathematical and geometrical properties are interpreted using an advanced language of modern mathematical physics and geometry. First, a general framework is presented with strong supporting arguments from contemporary political scientists and physicists. Second, models of a multicultural society are presented in order to indicate a iimited possibility for the creation of a new civic culture under given

conditions. Third, a world model is heuristically developed, which should help in understanding why global inequalities severely inhibit the possibility for the creation of a true, non-ideological global village composed of transfigured individuals. The model, *Orbis Terrarum* Manifold World Model, explains why the ideologies of the twentieth century have derailed humanity from its path to transfiguration by emphasizing and producing inequalities and differences in many areas. The models are intended to underline impediments to a new civic culture within the global civilizational space; those which still exist and, even, develop. Finally, some light is shed upon one eternal problem: whether transfiguration is and will be much more difficult due to fundamental weaknesses in either a faulty genetic design of the human being or the structures created by and for him/her. The models present structures created or projected to be by the human being on the Earth. In sum, it is argued in the thesis that two elements are required for the creation of the new global civilization from a purely technical point of view: the structural transformation of both educational and cultural systems, and the individual transformation of contemporary individuals who will need to fit in to the new, still hypothetical, true global village. The conclusion will betray a pessimistic predictive nature of this work.

The thesis delineates the impediments to the creation of the true global village by a means of the mathematical and physical analyses of the global structures in which the person, the political player, is immersed. The creation of the true global village is impossible without the person's transfiguration defined around the *primum non nocere* principle, further revealing itself in the empathic type of personality.

B. Why integrate

The main premise behind this idea of the holistic future is that:

1.) Contemporary scientific development has brought about a dramatic qualitative and quantitative increase of specialized, and simultaneously difficult to grasp, branches of both "soft" (social) and "hard" (natural) sciences.

2.) there is an evergrowing demand for:

a.) consolidation,

b.) systemization and

c.) application

of all types of sciences in order to make sense out of the world in which we live. It is argued, therefore, that political science together with its decision-making and analytical branch of public policy will gradually experience acute difficulties in both theoretical and applied aspects of activity unless the interdisciplinary, integrated-holistic approach is either adopted or fully recognized for adoption. As a result, the future development will, most probably, have to adopt interdisciplinary approach to all branches of human knowledge and experience. One may even argue that such a holistic and integrating approach is already urgently needed due to an extraordinarily rapid acceleration of world events and scientific discoveries. Political science, as well as all other social sciences, constitutes a type of knowledge and human experience which is prone to the integrating and holistic approach due to the enormous progress in science at the end of twentieth century.

Indeed, political science and public policy are already on an integrating, and

by no means colliding, course with human geography. No wonder that modern, advanced graduate programs at North American universities successfully attempt to reconcile and synthesize political science, public policy and geography. Still, as of the mid-nineties of the twentieth century, there is a rift between geographers themselves with respect to the very existence of human geography. Classical physical geography has difficulties in recognizing human geography as a branch of science *per se* while regarding the latter as a branch of the Arts. An integrated approach makes such a distinction or differentiation useless, and absolutely unnecessary. A synthesis of human experience and scientific discovery, understood as *Summa Technologiae,* reveals that this particular example of the division between Arts and Sciences is academic when we look at "the big picture". Let us look at an automobile, for example. Providing that the car is a locally understood embodiment of *Summa Technologiae,* we are confronted with a problem that is locally "correct" and, globally, "incorrect". The problem is: what is more important in its tangibility, and bears more consequences to the understanding of the moving car in its environment:

1.) an engine ?

2.) a gearbox ?

3.) the human being driving this car ?

4.) a road without which the whole process of driving would have been rendered useless ? or, perhaps,

5.) local laws governing transportation ? and,

6.) finally, the direction, speed and distance from the staring point to the finish ?

This particular example shows how specialization and detachment from a contextual background kills common sense and makes it more difficult to look at "the big picture". On the other hand, however, these six points belong to different categories of scientific classification. We would, certainly, put the engine and gearbox into automotive engineering for example, while placing the human being into the social sciences, *per se*. In sum, if we insisted on synthesis, we could attempt to comprehend both the basic rules and the phenomena associated with mechanics and humanities. Moreover, we would be interested in biology, medicine, psychology, etc.. In order to find an appropriate place in our classification for political science, we would attempt to comprehend general traffic laws. To complete the picture, we would ask about a road map, to say nothing about why the driver is using his/her car in the first instance. By no means is this example perfect, it merely approximates the general problem of:

1.) interconnectivity

2.) specialization and

3.) the basic dichotomy

of natural and social sciences in general.

Political science does, and will, experience in the near future, a great revolutionary, qualitative change. Due to an unprecedented progress in natural sciences "much of the science learned by today's mature political scientist during his or her secondary education is now either obsolete or seriously in question".[1] As

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[1]Roger D. Masters, "Introduction: Human Nature, Biology, and Justice", International Political Science Review (1994), Vol.15, No.4, 323.

summarized by Roger D. Masters from Dartmouth College, there are radical changes in the following fields affecting contemporary political studies:

> - Neuroscience. The Lockean view of the brain as a *tabula rasa* has been demolished by discoveries that the central nervous system has a modular structure; human perceptual capacities and emotional responses, while shaped by experience, have innate characteristics (Gazzaniga, 1988).
> - Artificial Intelligence. As connectionists models of the brain have been found to predict cognitive function, new approaches to artificial intelligence have begun to model creative thought in art, music, and science that traditionally seemed uniquely resistant to scientific understanding (Boden, 1992).
> - Game Theory. Mathematical cost-benefit models of cooperation and competition, like the Prisoners' Dilemma, have been extended from economic or political contexts to the underlying structure of social behavior in evolutionary theory (Axelrod and Hamilton, 1981); this integration of theories in the natural and social sciences often has unexpected substantive and methodological implications (e.g., Hirshleifer, 1987; Frank, 1988; Masters,1989)
> - Physics. Newtonian or classical mechanics, long the epitome of scientific method and predictability, have been reduced to a special case of principles that challenge conventional certainties; even Einstein's theory of relativity and Heisenberg's uncertainty principle seem tame in the light of new and puzzling theories of matter and the cosmos (Penrose, 1989)
> - Mathematics. Whatever the complexities of observational science, at least mathematicians seemed capable of showing how determinist relationships could yield predictable outcomes; with the emergence of nonlinear dynamic systems and fractal geometry - popularly known as "chaos theory" - it now appears that even determined relationships can yield highly unpredictable outcomes (Gleick, 1987)[2]

The list is by no means a complete one. Nonetheless, it indicates a drastic paradigm shift in natural sciences that affects our understanding of the world. However, there still exists a general problem which a contemporary, educated individual confronts while attempting to understand surrounding reality: fragmentation and compartmentalization of knowledge. This is due to:

1.) a lengthy process of information accumulation through various means of mechanical reproduction and storage;

2.) disciplinary hyperspecialization resulting in a growing alienation of specialists from their natural and general human environment two "solitudes" exist in modern

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[2]Masters, 324.

academe, that is, Arts and Sciences.

As Philip R. Wallace from McGill University astutely notes:

> at the centre of the problem is the increasing specialization of intellectual endeavour. We carve out a bit of the world and assume it can be understood in isolation. It is, regretfully, a product of the scientific age, where *technique* has become our predominant concern, and technical expertise our most esteemed possession. This leads to compartmentalization, and we speak, as in the 19th century, of such things as the "conflict of Science and Religion", as though they were two powers disputing possession of a piece of territory.[3]

The demise of the Lockean paradigm connects human mind to its physical genetic composition while not eliminating the environmental influences.

C. Why not integrate

The strongest argument against holistic thinking in the sciences is a technical/biological limitation of a single individual to grasp significant knowledge from more than one department. Those who can contribute seminally to more than one department, are often considered freaks of nature by their peers. Integration is absolutely impossible without the elimination of this simple, trivial misconception. Thousands of students may wish to be taught in a new way, nonetheless, nothing will be done from purely technical reasons if those who are supposed to do it refuse to participate. Sidney Perkowitz from Emory University describes the current situation and proposes that:

> as for my colleagues, they need to forget how it was "when we were graduate students" and join and a brand-new ballgame. If we can honestly face its realities alongside our students, and challenge them to become good scientists who are also useful to society, we are fulfilling our deepest obligations as teachers...Other requisite changes need leadership from deans and provost. I believe that students are correct when they call for multidisciplinary education, even beyond the mixing of scientific disciplines, to the mixing of scientific training with work in the

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[3]Philip R. Wallace, Physics: Imagination and Reality (Singapore: World Scientific Publishing, Inc., 1991), 3.

humanities or the social sciences[4]

But are "colleagues" forced to do that? The point is that they are not when not threatened with layoffs. Integration would bring about a great uproar resulting from self-preserving behavior and may be counter-productive. Integration may prove an impossible mission, because of self-defensive mechanisms employed by the faculty. The level of self-defence seems to be directly proportional to the level of cognitive mediocrity. A threatened mediocrity would use all available methods to discredit the enterprise of integration. One must not forget that an absolute majority of today's North American faculty acquired their positions in the 1960s, when it was sufficient to have a Master's or a Doctoral degree "in something", without having achieved status in the scientific community, in order to gain an university job. This relative ease of achieving employment was coupled with an economic prosperity peak, along with the drug & free-love, mind-shaping revolution on a cognitive level.

Second, "if it ain't broke, don't fix it". Civilization did not collapse because of a compartmentalization of knowledge. Quite the opposite. Technical wonders and technological gadgets, together with an unbelievable richness of the encoded human experience in literary and artistic forms add to the greatness of intellectual diversity conducted by the specialists. Moreover, specialization secures professionalism in a given field and assures us that a given individual is a reliable source of information. Specialization eliminates individuals who know "something about everything", and who finally bring about a dissipation of knowledge.

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[4]Sydney Perkowitz, "Moving the Goalposts", American Scientist, September/October 1996, 427.

D. Mathematical physics and politics

1. Metaphors

The approach to the subject matter is that of broadly understood metaphors between literature in political studies in general, both traditional and the most advanced, and concepts being developed in and for physics. As Robert D. Behn from Duke University notes:

> many of the key concepts of physics are no more real than the invisible hand of economics or public opinion in political science. We all talk about "the force of gravity", and "a magnetic field" as if we observe these phenomena every day. Yet these concepts are abstractions. They have been "invented" by physicists to help explain what they observe.[5]

Hence, physicists build their model of reality using abstract concepts expressed in the language of advanced mathematics. Social scientists, including political scientists, use mostly verbal forms of expression which serve, collectively, as tools to explain reality in the subject matter. Actually, metaphors cover a range of possibilities as far as types of relations are concerned and not only them. According to the structure-mapping theory, which depicts a theoretical framework for analogy in general, there are several kinds of predicates mapped in different types of domain comparisons. These are literal similarity, analogy proper, abstraction and anomaly. Thus, the term "metaphor" allows for a large margin of tolerance in terms of formal terminology and taxonomy. Metaphors can be either relational comparisons (analogies) or, in some cases, attribute matches.[6] Another defintion states that metaphors are linguistic

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[5]Robert D. Behn, "Management and the Neutrino: The Search for Meaningful Metaphors" Public Administration Review September/October 1992, Vol. 52, No.5.: 409.

[6]Dedre Gentner, "Structure-Mapping: A Theoretical Framework for Analogy" in Allan Collins and Edward E. Smith (eds.) Readings in Cognitive Science. A Perspective from Psychology and Artificial Intelligence (San Mateo,

models which are used to acquire and communicate knowledge through a transfer of meaning. Metaphors can be used "to understand one element of experience in terms of another".[7]

2. *Science's two-dimensionality*

Our case study reflects the spirit of systems science in its shift from one-dimensionality to two-dimensionality. Generally speaking, one can distinguish three stages of collecting the information about the world we live in and processing this information:

> i. *prescientific period* (until about the sixteenth century) - characterized by common sense, speculation, the method of trial and error, craft skills, deductive reasoning, and the emphasis on tradition.
> ii. *one-dimensional science* (the period from the seventeenth century until about the middle of this century) - characterized by the integration of speculation, deductive reasoning, and experimentation, with a particular emphasis on the latter, which gives rise to the various experimentally based disciplines (...)
> iii. *two-dimensional science* (developing since about the middle of this century) - characterized by the emergence of systems science, which focuses on the relational rather than experimental aspects of the investigated systems, and its integration with the experimentally based (traditional) disciplines of science.[8]

When we look back at the very process of comparing different branches of academic domains, or as Thom puts it, the taxonomy of experience, we realize that such an endeavour is not a new one. Indeed, "the analogy between politics and physics, between political experience and the scientific worldview, has always been a

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California: Morgan Kaufman Publishers, Inc., 1988), 306.

[7]John P. van Gigch, "Systems Science, the Discipline of Epistemological Domains, Contributes to the Design of the Intelligent Global Web", Behavioral Science, Vol. 35, 1994, 130.

[8]George Klir, Architecture of the Problems System Solving, (New York: Plenum Press, 1985), 8.

close one in the West".[9] However, political study was dominated by a mechanicist paradigm taken directly from Newtonian physics and adapted as both, a general worldview in political science, and a political, normative theory by Hobbes. Indeed, "it is precisely the long-reigning metaphor of mechanism that has been overthrown by physics in recent years"[10] through new discoveries in physics in 1980s and 1990s. As we see, this metaphor of mechanism has been invalidated as a tool of modelling and understanding in its application for political study. Physics itself, nonetheless, makes steady progress, and does not rest on the annihilation of old ideas.

Neither is political economy immune to the influence of physics and the metaphors between them. A striking similarity between the use of modern physics to social economics, and the use of the former to political study itself, becomes more visible when:

> the holistic approach of quantum theory is investigated as a tool for social economics to analyze and interpret socioeconomic reality and paradigms. (...) in terms of quantum theory, investigations of microeconomic processes are interwoven with the macroeconomic frame of reference of the observer. The very act of observation is to be considered as an integral part of the observed system.[11]

E. The mathematical-physical approach: the fundamental hypothesis

It is assumed that there exists general mapping between concepts pertaining to physics proper and concepts in political study and vice-versa. That is, there is at least

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[9]Patrick Glynn, "Quantum Leap", The National Interest, Spring 1995, 50.

[10]Ibid., 51.

[11]Siegfried G. Karsten, "Quantum Theory and Social Economics: The Holistic Approach of Modern Physics Serves Better Than Newton's Mechanics in Approaching Reality", The American Journal of Economics and Sociology, Vol.49, No.4, (October, 1990), 385.

partial two-way mapping between spatial and temporal political concepts and physical ones. Our task is to study these relations, that is, to analyze types of metaphors between physics proper and political study. We also acknowledge that certain items pertaining to mathematics proper, a coordinate system for example, have been employed in their pure form by political scientists in a more advanced and geometric interpretation of socio-political phenomena. This fundamental hypothesis is represented graphically by a theorem of an intersection of academic realms.

F. Theorem

The theorem can be presented graphically as a set intersection under the set theory. First, we present the traditional taxonomy of academic realms as a typical "tree" with branches corresponding to traditional academic domains. Notice that ethics is set apart from sciences such as mathematics and social sciences:

ACADEMIC REALMS:

SCIENCES			HUMANITIES	ARTS
Social	Mental	Natural	Ethics (...)	(...)
Politics	*Mathematics*	*Physics*		

We need the theorem because "a theorem", said Christopher Zeeman, "is an intellectual resting point - something you can stand on to proceed further. Something you know, can encapsulate, grasp as a whole."[12] Our theorem presents how different academic realms are linked to each other by elements which have commonality.

One must recall that there is an absolute and unbreakable limit of self-understanding on behalf of the human being. *Zoon politikon* will never fully understand itself (or to put it in more human-friendly terms: him/herself). We are aware of this natural self-limitation thanks to an intellectual discovery made by Kurt Gödel, and known as Gödel's theorem. Despite the fact that:

> over the next century, as our society is forced to address such problems as genetic engineering and ethnic conflict, (...), we will need a greater understanding of the biological discoveries concerning human nature and behavior[13],

we will never be able to have complete self-understanding within our own human intellectual framework. Despite a dramatic statement that, "at no time in human history has it been more suitable to recall the ancient Delphic injunction, *gnothi seauton*"[14], we have to comprehend that the process of self-understanding will proceed *ad infinitum*, providing there exists an infinite amount of time at our disposal. Gödel's theorem is one of the pinnacles of human intellectual achievements[15], and in its formal logical version states that "for every consistent formalization of arithmetic,

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[12]Jack Cohen and Ian Stewart, The Collapse of Chaos (New York: Viking Penguin, 1994), 235.

[13]Masters, 326.

[14]Ibid., 326.

[15]John L. Casti, Reality Rules: Picturing the World in Mathematics (New York: John Wiley & Sons, Inc., 1992.), v.2, 308

there exist arithmetic truths unprovable within that formal system".[16]

G. Dequantification and the qualitative approach

By a humanistic system, we mean a non-mechanistic system in which human behavior plays a major role. Examples of humanistic systems are political systems, economic systems, social systems, religious systems, etc.. A single individual and his thought processes may also be viewed as a humanistic system.[17]

There are three basic approaches to the humanistic systems graphically presented by figure 1.1:[18]

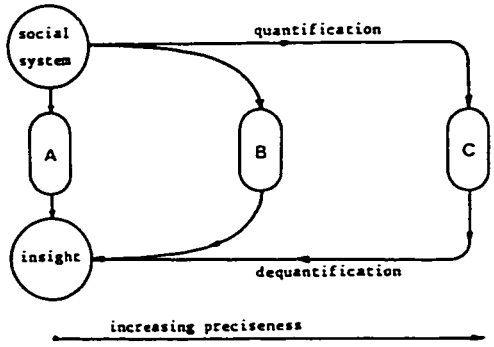

Fig. 1.1. Reprinted from Thissen, 410.

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[16]Casti, 313.

[17]Lotfi A. Zadeh, "A Fuzzy-algorithmic Approach to the Definition of Complex or Imprecise Concepts" in Hartmut Bossel, Salomon Klaczko, Norbert Muller, Systems Theory in the Social Sciences (Basel and Stuttgart: Birkhauser Verlag, 1976), 203, footnote.

[18]W. Thissen, "Simulation Models in a Social Environment: The Need for Dequantification", in Systems Theory in the Social Sciences, 410.

The main problem encountered by a holistic scientist is that, "social systems work on the basis of human norms and values, and other imprecise concepts that are difficult - or even impossible - to translate into the terms of classical system theory".[19] We can also add that social systems work on the basis of natural necessities, since human being are equipped with their physical bodies. Thus, social systems, viewed from the holistic point of view, comprise both more tangible physical elements and less tangible, abstract elements belonging to ethics. Method A represents a traditional way of acquiring insight into social phenomena. We use our intuition, subjective judgement, personal experience, etc..[20] This method is responsible for the literary body of political study in its most voluminous and verbal form and, by no means is a wrong method. It constitutes the mainstay of a codified human experience and intellectual reflection. Method B represents the "fuzzy-sets" approach and qualitative modelling. Method C represents the mathematical systems theory. Contemporary scientists try to improve their B and C methods, that is, to make the social sciences like the natural ones.

If we define variables as concepts which vary, then we can classify them into more useful and clearly defined categories. Political literature is full of concepts which are defined by adding "more", "less", etc. - these are ordinal variables.[21] There are "more powerful politicians, states, etc."; there is a "less distributive

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[19]Thissen, 409.

[20]Ibid., 410.

[21]Jeremy Wilson, Analyzing Politics (Scarborough: Prentice-Hall Canada Inc., 1988), 41.

system"; there is a "less just society". In sum, we see that political literature uses not only concepts, but frequently uses them in terms of their relative strength with respect to their core meaning. A political scientist rarely says that a given society is simply "just" or "unjust" since these are nominal variables.[22] Actually, this form of a very moral approach to political study is often attenuated or amplified by a linguistic operation of adding "more" or "less". Moreover, under a traditional paradigm of value-free science, the social scientist becomes a normative, political philosopher by declaring his/her opinion in moral terms, while loosing his/her aura of scientific objectivity. As it is succinctly argued:

> science itself - cannot settle debates on value. Science cannot determine whether capitalism is better or worse than socialism except in terms of some set of agreed-on criteria. We could only determine scientifically whether capitalism or socialism most supported human dignity and freedom if we were able to agree on some measures of dignity and freedom, and our conclusion in that case would depend totally on the measures we had agreed on.[23]

Be that as it may, we are not yet, for the sake of simplicity, dismantling the traditional division between normative political philosophy and value-free political science reflected in the "tree" of academic realms. Suffice to say, while describing qualitative political literature, the scientist would compare the society to another one. Then, our "more" or "less" takes on their sensible meaning.

We often wonder how to measure certain concepts in social science, and how to describe them more scientifically by stripping them of their metaphoric dimension. Apart from a general problem of whether or not we should do this at all, we can find

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[22]Wilson, 41.

[23]Earl Babbie, The Practice of Social Research (Belmont, California: Wadsworth Publishing Company, 1992), 28.

certain mathematical methods of expression which would simulate a greater level of a concepts's tangibility. Even if this operation is not possible in some cases, the very effort of doing this is worthy of serious consideration. We will deal with the following problem: concepts vs. their level of tangibility in scientific terms. We understand tangibility to mean the ability to grasp the concept outside an exclusively subjective sense of perception and subjectively perceived sense of hierarchy.

> It may be argued, rather persuasively, that most of the concepts encountered in various domains of human knowledge are, in reality, much to complex to admit of simple definition or precise definition. This is true, for example, of the concepts of recession and utility in economics; (...) truth and causality in philosophy; intelligence and creativity in psychology; and obscenity and insanity in law.[24]

This is because the popular concept is too complex or imprecise, but it does not mean that a scientific complex cannot be precisely defined, even if it is complex. Nonetheless, generally speaking

> most of the social sciences today operate with a mathematical arsenal that has been developed for the physical sciences and engineering: the language of precise mathematics. While this language is certainly applicable to many problems in the social sciences, it appears inappropriate for the description of many fundamental processes, especially those involving reasoning, decision-making, and behavior. These processes have strong elements of non-numerical (linguistic) concept manipulation and inexact quantitative analysis.[25]

Reasoning, decision-making and behavior are basic areas and concepts in today's political science. The first two belong to public policy and administration, the last one is fundamental to the behavioralism that dominated the post-WWII political science. The latter is a social science, and as such differs from physics proper in the following manner:

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[24]Zadeh, 202.

[25]Ibid., 201.

> the high standards of precision which prevail in mathematics, physics, chemistry, engineering and other "hard" sciences stand in sharp contrast to the imprecision which pervades much of sociology, psychology, political science, history, philosophy, linguistics, anthropology, literature, art and related fields. This marked difference in the standards of precision is due, of course, to the fact that the "hard" sciences are concerned in the main with the relatively simple mechanistic systems whose behavior can be described in quantitative terms, whereas the "soft" sciences deal primarily with the much more complex non-mechanistic systems in which human judgement, perception, and emotions play the dominant role. Although the conventional mathematical techniques have been and will continue to be applied to the analysis of humanistic systems, it is clear that the great complexity of such systems calls for approaches that are significantly different in spirit as well as in substance from the traditional methods - methods which are highly effective when applied to mechanistic systems, but are far too precise in relation to systems in which human behaviour plays an important role.[26]

Physics is defined, in very general terms, as the science that deals with matter and energy in terms of motion and force.

Here, we have to recall that concepts contained in sociophysics are mainly, but not exclusively, scalars, vectors or matrices of humanistic concepts. They may be called intermodal translators because of their interdisciplinary nature. "Hard" sciences are well expressed in sociophysics and are easier to grasp because:

> (...) much of the power of mathematical techniques for dealing with mechanistic systems derives from the existence of a set of units for such basic parameters as length, area, weight, force, current, heat, etc..[27]

The parameters of "hard" sciences are easy to grasp in the sense of their unquestionably established affiliation to the class of all types of tensors: zero-order, first-order, second-order and so on. They are expressed at the interval level of measurement, such as meters, kilograms, etc.. Here, we face the most difficult problem related to our study of metaphors between physics and politics:

> stepping up the ladder of measurement precision to what are known as interval variables, we come to measures that assess not only whether one case is higher or lower but also the amount of difference. Measurement of the variable percentage of vote polled by the government party

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[26]Zadeh, 203.

[27]Ibid., 205.

> might, for example, lead to the conclusion: the government party party got 36 percent of the vote in Manitoba but 48 percent in Ontario.[28]

It has been argued that dequantification and simultaneous physico-geometric interpretation of the phenomena, traditionally regarded as exclusively pertaining to the social sciences, is possible in the light of the latest achievements in scientific thought. We acknowledge that Rene Thom's Structural Stability and Morphogenesis has revolutionized the entire mode of looking at and thinking about all kinds of phenomena, even though comparing politics to physics and vice-versa is an old idea. Physics and politics, physics and human affairs and human geography, physics and economics and sociology, etc. cease to be as separate and incompatible as they might have seemed to be. The only obstacle for the acceptance and understanding of the new holistic paradigm is the traditional quantitative paradigm focusing on the arithmetical approach to natural and social phenomena. As of today, quantification has built an impenetrable wall and cleavage between natural and social sciences. The most vivid examples of this would be to ask for "five meters of social justice" or "two kilograms of will to political power". The former examples depict the interval level of measurement for variables inextricably related to human affairs in political study. We do not say "no" to the possibility of finding the interval level of measurement for these variables in the future. We should not erect barriers to that which we are not yet able to grasp and convert into the language of mathematics. As of today, justice or morality remain ordinal variables. The literature on the subject matter provides a plethora of examples and verbal expressions describing human

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[28]Wilson, 41.

affairs and politics as "more or less just", for example. A scientist capable of devising a fully quantitative level of measurement for these "soft" or social variables will probably receive a Nobel Prize, but in the future. Arithmetics is a part of mathematics, however, it is not necessarily its highest and the most sophisticated form and level of expression. Dequantification allows for a compatibility between mathematical and physical concepts on one side and social and philosophical ones on the other.

We justify our effort of studying and comparing physics and socio-political phenomena under the condition of dequantification by citing Rene Thom's justification of his epochal work:

> The first reason is that *every quantitative model first requires a qualitative isolation from reality* in setting up an experimentally reproducible stable situation. We take the main divisions of science, the taxonomy of experience, into physics, biology, chemistry, and so forth as given a priori, a decomposition bequeathed on us almost unconsciously by our perception and used by every scientist, no matter who he is, rather like monsieur Jourdain speaking prose. Should it not be of interest in this situation to reconsider this decomposition and integrate it into the framework of an abstract general theory, rather than to accept it blindly as an irreducible fact of reality ?
> The second reason is our ignorance of the limits of quantitative models. The enormous successes of nineteenth century physics, based on the use and exploitation of physical laws, created the belief that all phenomena could be justified in a similar way, that life and thought themselves might be expressed in equations. But, on reflection, very few phenomena on mathematically simply expressed ("fundamental") laws: scarcely three, namely, gravitation (Newton's law), light, and electricity (Maxwell's law). Their simplicity is only apparent, and only expresses how gravitation and electromagnetism are intimately connected with geometry of space, the result of statistical effect of a large number of isolated, independent, small phenomena. (...) even when a system is controlled by explicit laws of evolution, it often happens that its qualitative behaviour is still not computable and predictable; as soon as the number of parameters of the system increases, the possibility of a close calculation decreases - what Bellman has called the curse of dimensionality.[29]

Let us remain under this curse for the sake of this work. One will not isolate from reality any quantitative model in order to achieve proper conditions for successful

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[29]Rene Thom, Structural Stability and Morphogenesis (Reading, Massachusetts: W.A. Benjamin, Inc., 1975), 322.

measurements of quantitative data. By the same token, we will not try to reduce life and thought to mathematical equations, while keeping in mind that such attempts may succeed in the future. Certain aspects of them, however, may be expressed mathematico-physically in general terms today, like entropy. We accept the whole three-dimensional spatial reality and time, while knowing that we will not have the opportunity of calculating all trajectories of all particles in motion on earth. In sum, we prefer geometry to arithmetics while not losing the required depth and scope of intellectual insight into the subject matter.

II. TOWARDS WORLD GOVERNMENT: THE PHYSICS AND GEOMETRY OF MULTICULTURALISM

A. Introduction

This chapter is based upon Michel Pagé's set of three geometrical models of multiculturalism in its Canadian context, in the light of the computer simulations of social systems conducted by Latané, Nowak, and Liu. The models are so universal that they can be applied to any federal state, and by definition, to the global community composed of different cultural regions. Page's approach is descriptive, and does not impose a specific solution, thus giving prescriptive freedom for any researcher in the subject matter. A very high degree of universality guarantees that the models are space- and time invariant, that is, are applicable in an unchanged form to any earthly region in the past, the present and in the future.

B. The models

There are, basically, three theoretical models of integration, or a lack of it, in a society. They can be represented as geometrical-mathematical models. Notwithstanding their apparent complexity, they are quite simple and well defined. They certainly do not exhaust all theoretical possibilities, nonetheless, all major variants can be put between them as transitional ones, at best.

The first two models (conceptions) are so closely related that they can be distinguished from the third one as a single and a separate group of models (conceptions). As far as their legality is concerned, these three models are in

accordance with the Canadian and Quebecois Charters of Rights and Liberties, and with the Act 1988 for the preservation and enhancement of multiculturalism in Canada. These three models are based, therefore, on four basic principles provided by those legal documents. The principles are as follows:

- ethnic groups have a right to the conservation of their culture and of their ancestral language,
- there is an opposition to all forms of discrimination and segregation,
- there is a recognition of citizenship in full share to persons of all ethnic groups and
- there is an incitement of citizens of all origins to participate in the development of a productive and harmonious society.[30]

The models are defined around the notion of a cultural area. It consists of an ensemble of domains of life which are regulated by norms.[31] Because the language becomes more and more scientific, if not incomprehensible, it would be nice to present a coherent explanation of the term domain:

> For example, the domain of nutrition is a domain of life which is strongly invested by ethnic cultures. According to the conception of multiple cultural areas, each culture invests the nutrition of its particular norms independently of the others: that which makes something the domain of nutrition contributes to the differences among the multiple cultural areas. The conception of a common cultural area signifies that the cultures altogether invest nutrition in the society in such a way that each culture allows itself to be invested by the others and in turn invests the others. As such, a common cultural space is constituted in which all particular cultures are constantly meeting without seeking to delimit a proper and impassable zone[32]

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[30]Michel Pagé, "Three Conceptions of Integration in a Canadian PluriEthnic Society", Canadian Ethnic Studies, XXIV, no.3, 1992, 37.

[31]Ibid., 38

[32]Ibid., 38

Since the term integration is central to our analysis, it is necessary to present some definitions and explanations concerning this term. According to Berry, integration is a form of acculturation which seeks an equilibrium between:

a) conservation of cultural identity and characteristics;

b) positive relationships with other groups.[33]

A different classification defines acculturation as a situation when ethnic/national identity is retained, while assimilation is a situation when a merger with a larger culture occurs. The first model of integration is called the conception of multiple cultural areas, and is interpreted geometrically by figure 2.1:

FIGURE 1

REPRESENTATION OF A MULTI-ETHNIC SOCIETY
IN A "MULTIPLE CULTURAL AREAS" CONCEPTION

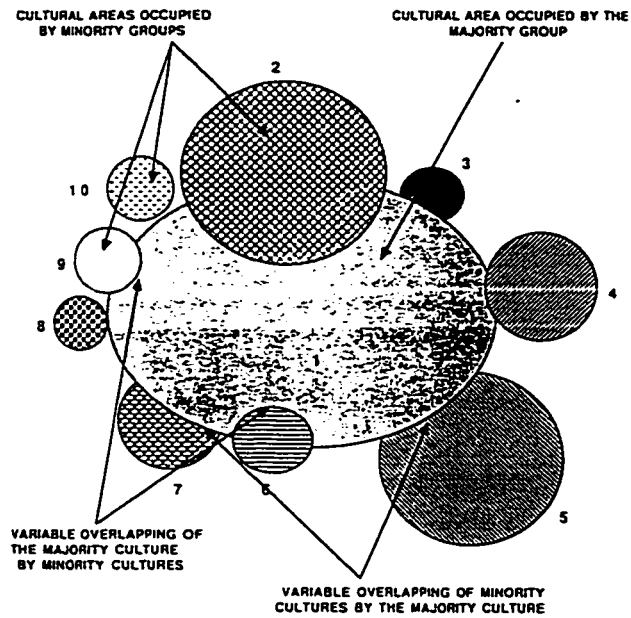

Fig. 2.1. Reprinted from Pagé, 42.

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[33]Pagé, 36

Commentary:

> 1. The culture of the majority group occupies a predominant space especially because a large variety of public domains of life is regulated almost exclusively by the ethnic culture of this group - entertainment, mass communication, professional sport, business, politics, etc.
> 2. Each minority ethnic culture occupies a delimited space in this social universe. This space is constituted by the ensemble of the domains of life in which the ethnic group applies its cultural norm in a way which is suitable and exclusive to that culture. This is a more or less large area depending on the quantity of the domains in which the norms of the ethnic culture apply.
> 3. Some of these ethnic groups keep a distance from the majority group (8 and 10), while others stay near by. Certain groups which are in a position of contact with the majority groups(3, 5, and 7) yield to the culture of this majority group a certain part of the space in which they could apply their norms. In other words, the majority culture variably invades these domains. Other minority groups, in their relationships to the majority culture, practise a certain cultural domination over it, which can be important enough in certain cases (2 and 6) and very prudent in other (4 and 9).
> 4. The minority ethnic groups generally keep a fair distance from one another; they are primarily preoccupied with the conservation of their cultural integrity in their relationships with the majority group.[34]

The last description is certainly the most suitable for native groups in Canadian reserves, but not necessarily typical of them. As far the first model is concerned in general, the retention of ethnic identity takes on the character of an obligation.[35] It means that any member of his/her group is obliged to belong to this group and is obliged to behave according to socio-cultural norms that characterize the group. From a liberal, or simply a more humanistic and pro-individual point of view, this model is hostile *ex definitione* to an individual human being understood as a set of unexploited potentials. Ghettoization not only inhibits individual development due to the lack of a broader perspective, but also eliminates individuals from a broadly defined participation in the society. If a minority feels threatened due to its small population or its high intellectual density or its peculiar customs and official dress-

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[34]Page, 43

[35]Ibid., 35

code, then the pro-individual approach is often regarded as a betrayal of communitarian values. On the other hand, however, the same individual had profited from this minority which supplied him/her with a favourable, friendly environment. Therefore, there is no absolute answer to this problem. Often, individuals move back to the community having encountered hostile environmental conditions outside.

The second model of integration is called the conception of a common cultural area, and is interpreted geometrically by figure 2.2.

> According to the second conception, retention is also an obligation related to membership in the ethnic group; however, there are no domains where the ethnic culture of the majority group is dominant, so that ethnic groups are free to invade all the domains of life where their ethnic culture can provide the appropriate norms. They are incited to appropriate the norms of the other groups depending on the appeal that they exert.[36]

FIGURE 2

REPRESENTATION OF A MULTI-ETHNIC SOCIETY
IN A "COMMON CULTURAL AREA" CONCEPTION

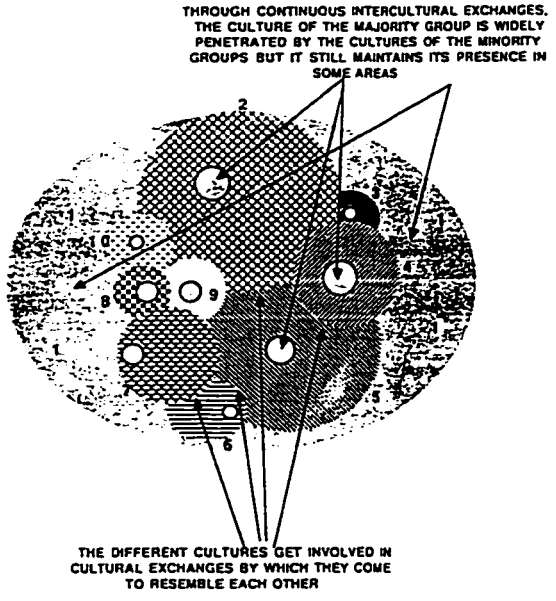

Fig. 2.2 Reprinted from Pagé, 43.

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[36]Pagé, 35

There are four characteristics pertaining to this model:

1. The social distance between the minority groups which characterizes the multiple cultural areas conception is eliminated. This signifies that the ethnic groups do not reserve domains in which they exclusively apply their proper cultural norms. In the conception of the common space, the ethnic groups are in a position of close contact in such a way that all the cultures in contact apply their norms in all the domains of life. This results in a lot of cultural interbreeding in all of the domains. This is what the dissolution of the frontiers encircling each of the groups and the partial overlapping of the circles seek to illustrate. The ethnic groups do not reserve a few domains of their cultural autonomy, they equally affirm their norms in all of the domains.
2. A group is not in close contact with all the other groups. It establishes preferences in these positions. As such, groups 7,8,9 and 10, for example, have multiple exchanges amongst themselves while they do not have direct exchanges with groups 3 and 4.
3. The minority groups are not in periphery of the space occupied by the majority group (1). The culture of the majority group does not exclusively occupy a dominant portion of the cultural space. All the cultural groups occupy, with the latter, all the domains. The majority group shares this space with the others. Its ethnic culture may be present more than the others in some of the domains because it has been present for a longer period of time in the public institutions and also because the demographic domination of the bearers of this culture is such that they are omnipresent.
4. The particular ethnic cultures exchange a part of their respective characteristics in such a way that the traits of a groups can be recognized in numerous other groups. Since it is often the majority group which is in close contact with all the others, all the minority ethnic groups incorporate the traits of the dominant group to varying degrees. This is indicated by the small circles representing the majority group which we perceive inside each of the minority groups.[37]

The third model of integration is called the private-public conception:

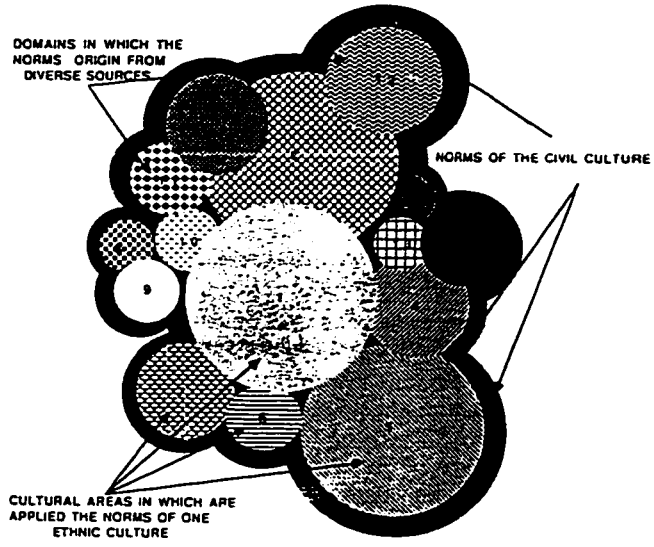

Fig. 2.3. Reprinted from Pagé, 45.

[37]Pagé, 44.

It is different from the previous two models because it is not based upon mutual relations between majoritarian or minoritarian ethnic groups. This model is focused rather on what unites all these groups, even though such a bond may be of a highly abstract value in some cases. In more physical terms, the third model is based upon adhesion, and it is not based upon dissipation. This model differs from others in that there are several domains only where the ethnic cultures are autonomous.[38] There are also three main characteristics of this model:

> 1. The circles which represent the domains in which the norms of the ethnic cultures apply (1 to 10) are surrounded by a dark circle which represents the public norms which are present in almost all the domains of life in conjunction with the norms of the ethnic cultures. All the circles representing the ethnic norms are surrounded by a similar circle, which indicates that the norms of the civil culture are the same for all. They constitute the common civil culture.
> 2. In this conception as in the second one, some of the groups are in close contact and they exercise some influence on each other. There are preferences in these exchanges. As such, groups 7,8,9 and 10, for example, have multiple exchanges amongst themselves while they do not have direct exchanges with groups 3 and 4; but in the third conception, contact between ethnic groups is not restricted to mutual attraction. The most important feature of the third conception on this particular matter is that all ethnic cultures are in contact through their adhesion to the norms of the civil culture. This is represented in figure 3 by the dark circles which are connected all together.
> 3. Figure 3 illustrates cultural areas which are not present in the preceding figures(11, 12, 13, 14). They are domains of life in which private norms are applied which do not stem from identifiable ethnic cultures. These spaces are invested by private norms coming from diverse sources among which can be some norms from codes serving specific interests - for example, norms of a political party or of a labour union.[39]

The third conception is treated in this chapter as an ideal one for any single country, providing multiculturalism has to exist and will exist. Moreover, if it is possible to find the lowest common denominator for all global cultures, then this model is an ideal one for the global community under World Government. This hypothetical lowest common denominator is represented by the civil culture to which everybody

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[38]Pagé, 44.

[39]Ibid., 45.

adheres. The model reconciles all opposing factors in order to maintain a relatively undisturbed development of different national cultures around the globe, while not denying a person's ethnic heritage:

> The functions exercised in the institutions of society are a domain of life which private norms must be reconciled with norms of the civil culture. The essential function of civil institutions in a plural society is to be the places where people are incited to leave behind their ethno-cultural particularisms in order to coordinate their actions with others on values of general import, which go beyond the particular values distinguishing the ethnic groups. For example, civil institutions must ceaselessly seek to adopt such values as secularity, which protect religious particularisms against all forms of discrimination. If the presence of culturally distinctive marks does not modify this essential function of civil institutions, it should not raise any objections. But if it compromises the cohesion of civil institutions, one must renounce it. One reason why the cohesion could be compromised is the negative impact of people's spontaneous psychological reactions towards culturally distinctive marks. If such reactions modify in any way the place which the bearers of distinctive marks are supposed to occupy in the institutions, it seems preferable not to wear distinctive ethnic marks.[40]

In other words, *primum non nocere*.

> The individuals always have a substantial margin of freedom with respect to the norms of the culture of their ethnic group. The continuity of the individual's personal life experience is the primary basis of identity. The only important condition of identity is that the individual recognizes him/herself in the succession of his/her choices of the rules of life. In these choices the individual is free to maintain, to a greater or lesser extent, his/her identification to his/her ethnic culture. He/she has the freedom to develop for him/herself a cultural formula through his/her contacts with bearers of other cultures. Identity is only partly given by the ancestral ethnic group. Identity is also a personal project which is realized by looking forward.[41]

The fundamental characteristic of this model is that it requires, of every and each person, a high degree of empathic morality resulting from the most logical directive: to do unto others as they would like done to themselves.

A voluntary cultural "shyness" resulting from natural empathy and resulting in a low-key ethnic profile and a self-suppression of natural idiosyncracies is an ideal *modus operandi* for a person living in and, more important, willing to live in a

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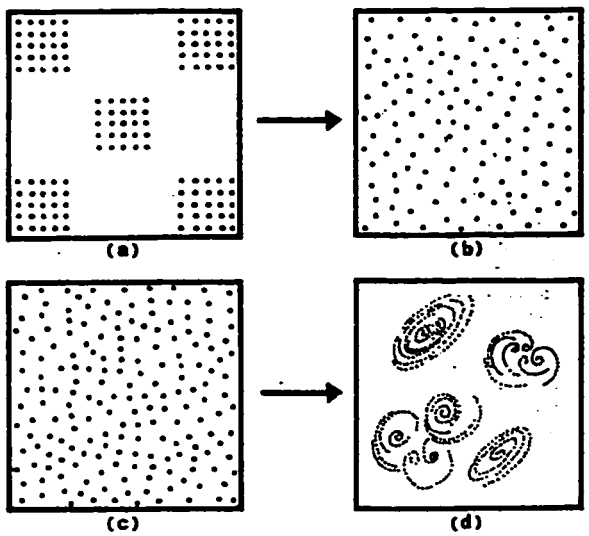
[40]Pagé, 40.

[41]Ibid., 47.

multicultural society. An inner will to avoid provocative behavior that results in a potential unnecessary and harmful for both sides' conflict is the ultimate wisdom and strength of a given person, not his or her stupidity or weakness. Modern cultural, religious, linguistic and gender-based vociferous *chutzpa* revealing itself as a set of hate-ideologies prevents true global *cohabitation.* On the other hand, the empathic behavioral model must not be mistaken for a lack of any ethnic and/or cultural identity resulting in an absolute conformism with the prevailing/dominant culture. These are two different phenomena. The latter leads to an absolute homogeneity and maximum thermodynamical entropy having little in common with the private-public model of multiculturalism. Maximum thermodynamical entropy excludes multiculturalism *ex definitione* and renders the whole discussion void of meaning. Maximum entropy in physics of gases and liquids corresponds to the situation when all particles have the lowest and equal energy. They do not differ among themselves at all from the macroscopic point of view. Maximum entropy denies not only multiculturalism but culture itself.

C. Entropy, negentropy, and clustering

Entropy in physics is one of those nice concepts which can be presented graphically without much mathematics. Actually, the concept is one of the simplest possible because it can be drawn or painted on a paper sheet:



7 The concept of order depends crucially on whether gravity can be ignored. Box (a) contains a gas for which gravity is negligible. Its highly ordered molecular arrangement soon gives way to featureless disorder (maximum entropy) as a result of molecular agitation and collisions. The final state is shown in (b). By contrast, a gravitating 'gas', for example a system of stars, will do just the opposite. The initial uniform configuration (c) will tend to fragment and become clumpy as the stars fall together and organize themselves into clusters (c.f. galaxies). The ultimate result of this clumping would be a number of black holes.

Fig. 2.4. Reprinted from Paul Davies, God and the New Physics, (New York: Penguin Books, 1990), 53.

> In systems such as boxes of gas, where gravity is so small it can be ignored, low entropy (ordered) states are complicated, while high entropy (disordered) states are simple. For example, a box in which all the gas molecules are crowded into the corners clearly involves a more complicated arrangement than the equilibrium (maximum entropy) state in which the gas is distributed uniformly throughout the box.[42]

Physical gravity can be compared with social gravity which is understood as a will on behalf of individuals to create a clustered society of with a high degree of mutual understanding, communication and solidarity.

The first model of multiculturalism is that of minimum entropy. The third one

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[42]Davies, 53.

approximates, and approximates only, the state of maximum entropy. It differs from the state of maximum entropy in that it does not eliminate heterogeneity. Nonetheless, there is the lowest common denominator, called civil, culture which enables all persons living within that society to live in peace, understood as the minimum level of ethno-cultural conflict. The lowest common denominator for the global population living under World Government is no longer an issue. The issue is the quality of the lowest common denominator. Maximum entropy is not required, nor, practically, attainable. The sequence of models corresponds to growing entropy (decreasing negentropy) providing that separate communities correspond to collections of gas particles of different energies and molecular qualities.

Let us take a spatial area inhabited by persons of two different point of views on a subject stemming, for example, from different ethno-cultural or religious backgrounds. In other words, one asserts a rather obvious fact that attitudes are to some, cautiously speaking, if not to a very large extent, a function of ethno-cultural characteristics. Then, for our purposes, one can define a simple mapping:

$$f: f(\textit{Ethno-cultural identities}) \rightarrow \textit{Attitudes} \qquad (2.1)$$

Because "a large part of research in social science is concerned with describing distributions of attitudes in groups and societies"[43], new research methods involving

[43]Bibb Latané, Andrzej Nowak, and James H. Liu, "Measuring Emerging Social Phenomena: Dynamism, Polarization, and Clustering as Order Parameters of Social Systems", Behavioral Science, vol. 38, 1994, 1.

spatial distribution and characterized by concepts like dynamism, polarization and clustering are of critical importance as far as a qualitative change of modern science is concerned, political science in particular. The first stage of the spatial and temporal analysis involves a computer simulation of two groups composed of a minority that holds a specific point of view different from the majority:

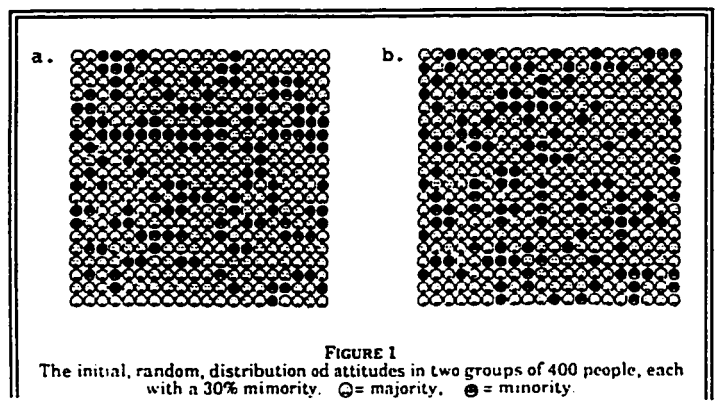

FIGURE 1
The initial, random, distribution od attitudes in two groups of 400 people, each with a 30% mimority. ○= majority, ● = minority.

Fig. 2.5. Reprinted from Latané et al., 2.

The researchers used two different algorithms during the computer simulation. Interestingly, " both groups have achieved stable equilibria without unification, contrary to Abelson's (1964) proof that 'universal ultimate agreement is an ubiquitous outcome of a very broad class of mathematical models' of social influence in fully connected networks".[44] Second, "the groups have shifted toward the majority position, with the initial 30% minority now reduced to only 16-24%"[45] ; third, "the

[44]Latané et al., 6.

[45]Ibid., 6.

groups have 'clustered', with minority members located near each other in coherent subgroups."[46]

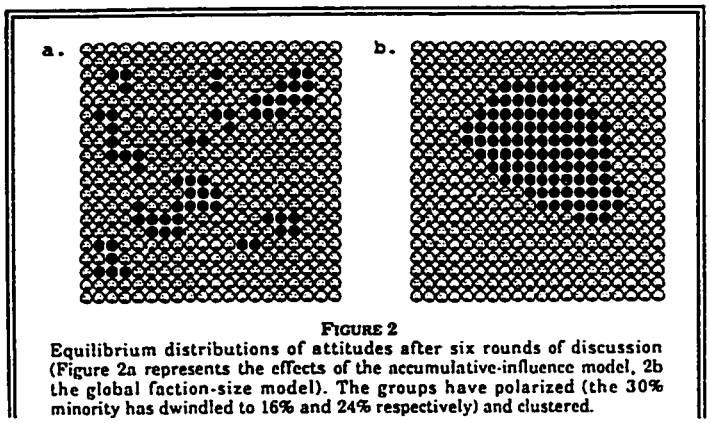

FIGURE 2
Equilibrium distributions of attitudes after six rounds of discussion (Figure 2a represents the effects of the accumulative-influence model, 2b the global faction-size model). The groups have polarized (the 30% minority has dwindled to 16% and 24% respectively) and clustered.

Fig. 2.6. Reprinted from Latané, 6.

An emerging social order is not as optimistic as it might have been expected for the purposes of the paradigm of a World Government. Certain "wishful thinking" assumptions in the classical verbal theory must be verified in order to avoid disappointments. It would be the most futile enterprise to search for the lowest common denominator and not to seek conclusions from experiences, positive and negative, of multicultural nation-states like Canada and the US. Both political entities are the best laboratories of multiculturalism in democracy. A lot may be learned in order to avoid exercises in relativistic tolerance as depicted below:

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[46]Latané et al., 6.

Fig. 2.7. Reprinted from Susan Welch et al., Understanding American Government, (Saint Paul: West Publishing Company, 1991), 371.

Clustering is the most important concept, in this case, for territorial aspects of multiculturalism resulting in different attitudes. It defines the degree to which neighbors in a physical or functional space share common attributes. Scientists discovering clustering through computer simulation explicitly adopt the following premises:

> The specificity of our approach lies in the fact that we assume that social processes, like physical processes, occur in time and in a space characterized by properties like geometry, and that group level processes are emergent properties resulting from the social interactions of individuals.[47]

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[47]Latané et al., 21.

As we know, the world is multicultural by definition. A World Government is faced, therefore, with x nation-states (more than two hundred today) and (x - y) homogenous nation-states. Each and every one of x heterogenous nation-states comprises at least two different cultures. What is important to understand is that one must tell the difference between descriptive multiculturalism, defined as a recognition of the above statements, and prescriptive multiculturalism, defined as a request to create further social divisions. Clustering is a dynamic process. The lowest common denominator may be dynamic for example, that is, it may change with time in order to fit the dynamic process of clustering. On the other hand, however, civil culture (the lowest common denominator) may be static providing it is sufficiently all-encompassing and flexible so as to fit any ever-changing multicultural mosaic under a World Government. None of these variants may work since a single nation-state cannot hold together by providing all imaginable privileges and freedoms:

> 18. The emergence of potentially divisive multiculturalism - which on the one hand represents an unavoidable recognition of the reality of the American mosaic but on the other threatens to balkanize multiethnic America by the deliberate deemphasis of the nationally unifying and socially equalizing effects of a common language and of shared historical traditions and political values.[48]

Prescriptive multiculturalism on behalf of the individuals can be explained as the will to be replaced and not necessarily as the highest form of altruism. It results in infinite tolerance and strategical self-termination.

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[48]Zbigniew Brzezinski, Out of Control, (Don Mills: Maxwell MacMillan Canada, 1993), 107.

III. THE *ORBIS TERRARUM* MANIFOLD WORLD MODEL

A. Introduction: mapping in the social sciences

The purpose of this chapter is to present how mathematical methods of modern physics and differential geometry can be applied to the social sciences. This chapter is absolutely exceptional because it comprises new and revised definitions useful in modern Political Science.

The chapter is also a contribution to qualitative revolution in scientific thinking initiated by Thom, Zeeman and others. By no means is it an attempt to revive reductionism in its crude mechanicist interpretation of worldly phenomena. Rather, it is a continuation of geometric thinking in physics as applied to other disciplines. In this particular sense, it is also a contribution to Systems Science as far its cross-disciplinary premises are concerned.

A new (since 1990) three-level model of measurement supplies the social sciences with a very useful and basic tool of understanding, including the Conceptual Level, the Empirical Level and the Indicator Level. The Conceptual Level "refers solely to a mental image in the mind of the investigator and not a word or definition of concept transferred to paper or other medium".[49] The Empirical Level "represents an actual occurrence of the phenomenon that can be studied with the senses".[50] Finally, the Indicator Level "is simply a name for an object or some form of matter

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[49]Kenneth D. Bailey, Social Entropy Theory (Albany: State University of New York Press, 1990), 26.

[50]Ibid., 26.

that has as its function the storage and transmission of information".[51]

Public Policy analysis is one of the main disciplinary branches of already multidisciplinary modern Political Science. Public Policy may be defined as a course of action or inaction on chosen by the government to address a given problem.[52] Also, it may be defined as a set of interrelated decisions taken by the government concerning the selection of goals and the means of achieving them.[53] Social Policy is, as a subdivision of Public Policy in general, a blueprint for the management of society towards social ends. It is, according to Townsend, the institutionalized control of services and institutions to maintain or even change social structures and values, depending on governmental strategic goals. Under the three-level model of measurement, Social Policy can be interpreted in its more advanced mathematical version as a mapping from the Conceptual Level into the Empirical Level as done by the government. In other words, Public Policy as social engineering is a linear operator that maps elements of the Conceptual Level into elements of the Empirical Level. How efficiently it is done can be measured by its Efficiency Ratio, defined as a fraction: elements of the Conceptual Level/elements of the Empirical Level. Perfect efficiency occurs when all elements of the Conceptual Level belonging to Public Policy makers are mapped into the Empirical Level. In other words, a

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[51]Bailey, 260.

[52]Leslie A. Pal, Public Policy Analysis (Scarborough: Nelson, 1992), 2.

[53]William I. Jenkins, Policy Analysis (London: Martin Robertson, 1978), 15.

complete success as far as a realization of desired ends is concerned equals a 100% Efficiency Ratio in this particular kind of mapping. If a given Public Policy is absolutely ineffective, and there are no tangible changes/results whatsoever, then the Efficiency Ratio is 0%. No element of the Conceptual level is mapped into the Empirical Level. Assuming the goals and content of a given Public Policy were encoded in a tangible manner, they remain on the Indicator Level only, without further consequences. As far as the Indicator Level is concerned, this paper is a mapping from X to X'', just for example. The same applies to all tangible objects containing encoded information. Hard disks and optical storage devices are modern versions of elements of the Indicator Level.

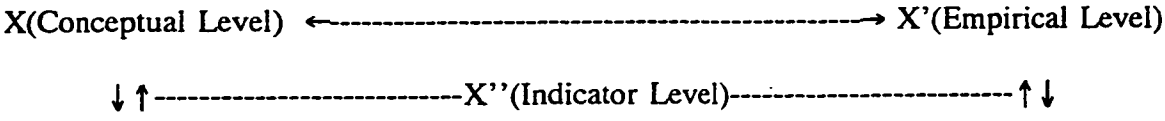

Fig. 3.1. The three-level measurement model, after Bailey, 26.

B. Population and its laws

1. Boundary delimiters

Any world model attempting to include individuals must take into consideration an absolutely crucial problem referred to here as the boundary problem for our society. This problem is so basic that it is often omitted in every-day thinking, while its importance becomes significantly more visible during political campaigns and legal disputes. Harsanyi delineates a subtle problem: who is a person in the society ? This

translates into a following question: who is and/or going to be an actual or potential political player within a given nation-state or any political entity ? The person is considered during redistribution or maldistribution of matter and energy in the system. The person is also given specific political/civilizational space in which he or she may choose to act or not to act, according to allocated degrees of spatial and political freedom. When defining persons - we must think about:

> higher animals, human idiots (sic), unborn babies in their mothers' wombs, more distant future generations - or even to decide under which conditions the inhabitants of other celestial bodies, or man-made robots, would qualify or would fail to qualify.[54]

A society is composed of persons,

> whose members ought to feel direct moral concern for one another's well-being and ought to feel moral solidarity with one another.[55]

As previously stated, political players must be defined as persons *a priori* in order to act within a given political/civilizational space. Let us look now at how a process of defining the person and freedom allocation can be interpreted in physico-mathematical terms.

Let the OTM be a civilizational configuration space (manifold), and N be a total number of all living units in that space. Let n be a number of living units defined as persons from the pool of living units as discussed by Harsanyi in his classification. Then, n/N is a ratio of "human beings" accepted as such to the total number of living entities in the space. Let bd be the boundary delimiter for a given

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[54]John C. Harsanyi, Rational Behavior and Bargaining Equilibrium in Games and Social Situations (New York: Cambridge University Press, 1977), 60.

[55]Ibid., 60.

society. Then, the boundary macro-delimiter (bmd) is any legislative act, a common perception or an informal agreement in any state/society which precisely defines who is the person in a given nation-state and/or on the Earth, if we take all nation-states. The boundary macro-delimiter acts like an axe by splitting all living units into "eligible" and "non-eligible" ones. The results of the boundary delimiter are always expressed on the interval of measurement, because we can always count living units defined as "persons". The counting is done periodically by national census, while excluding livestock and wild animals. On the other hand, however, the boundary macro-delimiter is actually a fraction expressed verbatim like "anybody older than nine months since conception" and "of the homo sapiens' genetic composition", for example. One can term this delimiter the boundary macro-delimiter, since it concerns human beings in general. Moreover, one can define a boundary sub-delimiter which would define who is an eligible political, economic, social and even a religious player. In most nation-states, living units already selected by the boundary macro-delimiter are narrowly defined by the boundary sub-delimiter encoded on the Indicator Level, such as a piece of legislation stating who is eligible to participate in national elections. who can be drafted, to whom alcoholic beverages may be sold, etc.. In the case of the boundary sub-delimiter, n denotes a number of people over the age of eighteen but below the age of twenty-six, for example, as in the case of the military draft. Moreover, the boundary macro-delimiter decides which living units may be terminated without punishment and whose termination is punishable. Hence, one can devise two fundamental definitions which are useful for further consideration. The

boundary macro-delimiter is the most important one, while there is a plethora of boundary sub-delimiters of lesser importance, like library users' manuals.

DEF. 3.1.:

The boundary macro-delimiter: an encoded information on the X level (conceptual) and/or on the X" (indicator) level defining which living units (who are recognized as such) are persons and, subsequently, political players to be dealt with during the matter/energy and space allocation process.

Usually, there is only one boundary macro-delimiter for any single nation-state. Had all political entities had the same boundary macro-delimiter at the same time, then one would have had one global boundary macro-delimiter.

DEF. 3.2.:

The boundary sub-delimiter: a law or a custom encoded on the X level (conceptual) and/or on the X" (indicator) level defining a person's eligibility for an increased freedom (privileges or rights) and/or for a decreased freedom (duty) in a given society once a living unit has been declared a person.

The boundary sub-delimiter may also be encoded as a taboo, the importance of which cannot be overestimated because "the origins of war, sacrifice and orgy are identical; they spring from the existence of taboos set up to encounter liberty in murder or sexual violence."[56]

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[56]Georges Bataille, Erotism: Death and Sensuality (San Francisco: City Light Books, 1986), 116.

A law may be replaced by informal arrangements in a given society resulting from customs and traditions. At any rate, the result is that the population of persons is always smaller in quantitative terms with respect to the original pool of living units, and that this selection is based on qualitative standards reflecting morphological and genetic characteristics of living units. Therefore, the boundary macro-delimiter is a function which maps living units into the pool of persons:

$$\boxed{f: f(N) = n} \tag{3.1}$$

where

f: the function mapping living units into persons

living units N: the domain of the function

persons n: the range of the function

Since the final outcome of the boundary macro-delimiter can be expressed on the interval level of measurement as a finite integral number defining a quantity of all persons on the local manifold, then we can develop the previous definition into a more mathematical form being linked to the global manifold (civilizational configuration space) or simply the *orbis terrarum* manifold (OTM):

$$\boxed{\frac{operationalized\ bmd}{orbis\ terrarum\ manifold} = population\ density} \tag{3.2}$$

or, in more precise terms, on the interval level of measurement:

$$\frac{(\frac{n}{N})}{S} = population\ density \tag{3.3}$$

where

n: persons (potential and actual political players).

N: all living units before classification in the Harsanyi's sense and

S: an abstract two-dimensional surface of the OTM defined by negative and positive freedoms

In graphic terms, the boundary macro-delimiter defines a total number of dots (points) on a two-dimensional curved surface, providing one defines the civilizational configuration space as a function of two variables only. The dots (points) represent living units defined as persons. Thus, defined persons are dispersed throughout the manifold according to the values of the variables defining the manifold and characteristic for each and every person. This simplified mapping is, therefore, R-mapping.

2. National census

In the spring of 1996, the Canadian government conducted a national census in order to collect data about the population. The actual data gathering was done, not by

computers, but by living units classified as persons and additionally classified as adults by the boundary sub-delimiter. The enumerators were granted the power to visit households and homeless persons because the latter were still classified as persons. They were trained how to reach the homeless and potentially dangerous persons and how not to provoke any conflict. Therefore, the government was interested in data gathering concerning all persons, regardless of how excluded from the society they might be. The enumerators were handing out short or long form questionnaires to living units perceived as persons. Under the threat of imprisonment, the persons questioned had to mail their questionnaires back to the government. This example reveals how important such a census is for the government. First, it automatically defines the population density on the Canadian manifold. Second, using more specific data, it allows for a spatial positioning of the persons on that manifold, according to required characteristics (R-mapping).

Let us devise the following, highly hypothetical, situation for the sake of an intellectual exercise: the government procures a study project, the purpose of which is to determine the boundary for the nation-state. The project would have been launched as a Royal Commission on the Boundary Problem had it been in Canada, for example. Subsequently, a group of behavioralists and statisticians discovers that, under certain specific conditions, German shepherds (police dogs) are more intelligent and empathically more moral in certain aspects, excluding ability to read and speak, than the politicians and civil servants who launched the project. Even though this situation seems to be apparently inconceivable from a scientific and common sense

point of view, it represents a very serious and potentially dangerous problem in public policy making: how to be sure that those who are formally designed as decision-makers in both elected (politicians) and appointed (civil servants) positions are qualified to do their job? Therefore, the main issue of the boundary problem is the actual quality of the boundary decision-makers in real-life politics. Taking into account the demise of the Lockean paradigm[57], one has to start thinking in terms of the combined genetic and personal life experience of the decision-makers in politics so as to reconcile scientific world view and the human resources policy. From a purely mathematico-physical point of view the very process of delimitation should not be managed by below-the-average living units from the pool of available living units, within a given political space containing said units. The preceding conclusion is of a normative (prescriptive) nature, providing one excludes other possible factors (variables) from our reasoning such as religious beliefs implanted by institutionalized religion, and existing in society in sayings like "every political power is given by God." It is impossible to reconcile the process of the boundary delimitation with the fact of conducting this process by individuals whose combined quality is lower than that one affected by the process of delimitation. The most extreme example of a violation of this normative principle would have been a situation where the most vicious psychopathic prisoner decides who should be a prison's warden and who should be terminated among inmates. A well known, and now classic, film "Lord of Flies" is an exemplary milestone in the area of adjusting the boundary delimitation

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[57]Masters, 323.

among children forced by their environment to become the boundary decision-makers. The boundary macro-delimiter (bmd) problem has become one of the "hottest" political issues in the United States since the early 1970s. This problem has very serious consequences because violent acts have occurred on the American political manifold in the 1990s, including religiously motivated killings of doctors performing abortions.

3. The ultimate political power

Having described how the boundary macro-delimiter (bmd) works as put in motion by political bodies, usually national governments, it is argued that the ability to define and to sustain (during the time of political activity within a given political space, that is, on the local world line) the boundary macro-delimiter for a given population of living units is the biggest political power possible. Therefore, one can describe a political power, as previously defined with respect to the bmd, as the ultimate political power. This definition of the ultimate political power is not contradictory to its definition as provided by Bailey, but is rather more precise and politically oriented compared to the latter:

> The ultimate power is the power to change the information content of markers or to rule upon their exact meaning in case of disputes. Thus, lawmakers, such as the United states Congress, who actually have the power to determine the information content of markers affecting all citizens, have a high degree of power. Also very powerful are the Supreme Court justices who can decide disputes concerning the exact meaning of synchronic symbolic structure.[58]

This definition is heavily "contaminated" by the American example and its

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[58]Bailey, 199.

understanding requires a closer knowledge of the American polity. It confirms, nonetheless, the old American adage: the Constitution is what the Supreme Court says it is. Additionally, Bailey defines the ultimate power as the power to change internal characteristics of all potential markers. It means that it covers the power to define all potential boundary sub-delimiters. It is considered here that the power to define who is a person is the single most important power, and, as such, should not be taken at par with other powers. The ultimate power, as argued in this work, is the actual power to define all potential players within any civilizational manifold (configuration space):

DEF. 3.3:

The ultimate political power: the power to define who is the person.

This power is exclusively passive in a sense that it is not any physical action except the need to have legislatures pass laws. As such, it is not an action or force at all. It is the most powerful example of how the most important things concerning the political player may be decided through the boundary delimitation, by defining who is going to be the political player without actually exercising any physical force. All political (potential and actual) players must be defined *a priori* as such, in order to be allowed to play at all. The ultimate political power is not necessarily the power of the winner in the political conflict, but the power to define the pool of potential winners and/or losers.

The ultimate political power is the power residing initially outside of the

political space. By term "initially", we understand a time period before the political activity takes place for given players. This time might have begun in an infinitely distant past for certain societies. Through a time-consuming observation and experience, an ancient *homo sapiens* sharply distinguished between his or her own species and between even the most intelligent animals. Certain living entities may have been termed gods if they possessed superior technologies, for example. For others, it may happen even now. For example, a new nation declares independence and has to define its subjects within a provided political space. On the other hand, political players inside an already existing, and a very well defined political space, may redefine the boundary macro-delimiter and all possible boundary sub-delimiters. This redefinition may often be associated with revolutionary changes.

In sum, there are two issues related to the boundary macro-delimiter: abortion and euthanasia. Both are extremely controversial and emotional in nature. They are a binary boundary macro-delimiter, if taken holistically. The first denotes who can be prevented to enter into the manifold without punishment for those who prevent (physicians performing legal abortions); the second defines who can be removed from the manifold without punishment for those who remove. Let us assume that a significant part of the global population suffers from incurable contagious diseases causing extreme physical discomfort to the extent that a contaminated person does not wish to live anymore. Then, millions of sick persons would be more or less pleased to be terminated legally, thanks to legalized euthanasia. Hence, it would be legally possible to terminate a significant part of the global population legally, and on its own

demand, thus reducing the need for matter-energy allocation on behalf of the governments.

Both cases present the problem of direct and explicit limitation of the population. Abortion is a procedure whose macro-consequences result in a decrease of dots on the manifold. There is a difference, however, between euthanasia and abortion. Abortion may be regarded from a technical and amoral Machiavellian view, as a prevention against the use of a huge chunk of energy and resources on the manifold because it concerns the beginning of a life process. Euthanasia simply decreases further use of resources and energy. What is most interesting, however, is that these two issues are full of serious and emotionally charged political consequences for both elected and appointed officials. Social planning on behalf of the professionals in civil service and specialized institutes is restricted by the outcomes of political decisions taking place due to an electoral process in democratic countries. Totalitarian regimes have their hands untied due to the lack of accountability, therefore, social planning and engineering are easier.

C. Population growth

As early as in 1798, T. J. Malthus in his famous Essay Concerning Human Population warned about overpopulation and proved his theory mathematically. There are many improved versions of Malthus's model nowadays, nevertheless, his ideas are quite relevant. Malthus is the father of contemporary restrictionism represented, among others, by Jack Parsons. A very simple equation attempts to

model population growth:

$$\Delta P(n) = b\ P(n) \tag{3.4}$$

where

P(n): the number of persons at the beginning of time period n and

ΔP(n): is proportional to P(n) itself.

Under this model, the population would double in eight years. Moreover, Malthus was sure that only war, pestilence and other plagues were saving the global population from extinction resulting from starvation. Consequently, it would be wrong to help people in their misery unless people were to limit the size of their families.[59] In sum, one can say that eighteenth-century Malthus was the initiator of public policy of global sufferance in order to save the global population from self extinction. The mathematical model was modified by Verhulst in 1840:

$$\Delta P(n) = b\ P(n) - c\ P(n)^2 \tag{3.5}$$

Equation 3.5 is bizarre, to some extent, because it is non-linear as b and c equal 3. Hard to believe, it was not until the 1970s when the Verhulst equation was thoroughly investigated, thanks to computers. It was discovered that this equation represents a

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[59]H. Brian Griffiths and Adrian Oldknow, Mathematics of Models: Continuous and Discrete Dynamical Systems (New York: Ellis Hornwood, 1993), 10.

new scientific domain, called, today chaotic dynamics. Hence, even an apparently simple problem of modeling population growth involves advanced mathematical physics and global politics.

D. Controlling population growth: beyond Good and Evil

As early as in 1949, that is, even before the Club of Rome warned about global overpopulation, the Royal Commission on Population in the U.K. recommended a policy of continuous population review. Among the many recommendations, the Commission stressed the importance of public policy providing equality for women. Equality is an important public policy instrument because, as Parsons argues,

> liberation from prejudices confining them to kitchen and nursery will tend to decrease their fertility. If society prevents women from expressing themselves freely through most of the channels open to men then pressure is applied to them to fulfil themselves through motherhood. Equality of the sexes is an essential part of a democratic and humane program of population control.[60]

Hence, population growth can be controlled by eliminating specific boundary sub-delimiters (encoded, in this case, rather on the conceptual level in the Bailey's sense) assigned to only one group that is capable of reproducing from a binary (two genders, in general) class of persons. It is implied that these boundary sub-delimiters were introduced by the opposite group in order to secure reproduction.

Technically speaking, there can be five stages of public policy concerning population growth:

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[60]Jack Parsons, Population Versus Liberty (Buffalo: Prometheus Books, 1973), 329.

1.) Psychological: education and information,

2.) Social: social pressures, propaganda, the breaking down of no longer tenable customs and social norms,

3.) Economic : progressive removal of positive incentives to fertility like family allowances, free education,

4.) Political/legal: laws regulating fertility, imprisonment, and

5.) Physical: chemical additives to the diet, destruction of illegally conceived infants, execution of illegal parents[61].

Paradoxically, massive and chronic unemployment among males can be a positive phenomenon in light of the Parsons' proposals. Reducing males's buying power, and increasing it for females, efficiently prevents population growth by drastically reducing the number of traditional families oriented towards producing offspring. Women refuse to live with destitute males, and fear losing their own jobs in case of pregnancy. A lack of job security for childbearing females, employment of females in a low paid service sector and layoffs of males from traditionally high paid industrial jobs are all factors that drastically reduce the possibility of having even one child in traditional or common law couples. Such a public policy is so called Restrictionism in the field of reproduction, as proposed by Parsons :

> with all this means in the denial of basic instincts, sex, love of children, and so much else that is warm, generous and expansive - coupled with an expansionist philosophy in the field of production and distribution of all other good things of life.[62]

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[61]Parsons, 341.

[62]Ibid., 340.

There is an obvious conflict between Utilitarianism and Restrictionism as far as global public policy is concerned, especially as regards strategic consequences of these policies respectively. Broadly understood, Utilitarianism

> is the doctrine that political and social decisions should be made on the basis of the greatest happiness of the greatest number in Bentham's formulation... Maximizing the welfare of the greatest number becomes equivalent to giving the largest number of people the greatest amount of whatever it is they happen to want... In a sense, therefore, utilitarianism is a second order morality.[63]

Actual Restrictionism, as put in motion by many governments, does not comply with Parson's demand for the expansionist philosophy with respect to the distribution of material goods. Public policy of Restrictionism has been fully applied to the economic sphere. Free Trade, for example, with its job-exporting phenomenon directed from highly developed countries to developing ones, does indeed increase production. The problem is that working masses in an occidental liberal democracy no longer possess legal tender notes which would secure redistribution. By the same token, new working masses in the developing countries cannot afford what they produce. These are generalizations, nonetheless, they mirror well the phenomenon of Globalization and Restrictionism. Growing poverty and social insecurity prevents population growth in an occidental liberal democracy, when coupled with an aggressive ideological campaign targeting the traditional family. Economic measures against developing countries are not necessarily the most efficient ones. Poor nations are composed of multi-children families regardless of income, even if their income equals absolute poverty according to Western standards. No wonder that the Chinese

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[63]Raymond Plant, Modern Political Thought (Cambridge, MA: Blackwell, 1991), 140.

government has decided to use the most drastic administrative methods with respect to the family's size, even though such methods may seem too harsh to some observers.

E. Dimensions

An operationalized boundary macrodelimiter on the interval/rank level of measurement supplies the manifold with a finite number of dots. A bigger problem is to define dimensions and what they represent. A purely political interpretation of the manifold should contain as many politically-oriented dimensions as possible. Political theory contains an elaborate discussion of the concept of freedom's importance in politics and conflict resolution. Furthermore, political theory splits the concept of freedom into its two integral parts: positive and negative freedom. Positive freedom is freedom "to", while negative freedom is freedom "from". One will further denote positive freedom as F_p and negative one as F_n for the sake of simplicity. Additionally, a new concept, composite freedom, will be abbreviated as simple C.

1. Negative freedom

This concept is a mainstay of contemporary North American, and not only, libertarian political thought:

> The concept of negative liberty depends heavily upon attempts to draw a sharp distinction between freedom on the one hand and ability on the other, such that freedom is to be understood as the absence of coercion, rather than a power or capacity and the associated resources and opportunities.[64]

Moreover, "the strict negative libertarian view is that ability is not logically or

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[64]Plant, 223.

conceptually linked with liberty".[65] When applied to a destitute person in Western democracy, negative freedom is still freedom because "the tramp is negatively free to dine at the Ritz, it is just that this freedom is of no value to him since he cannot exercise it."[66] What is needed, therefore, is negative freedom which is not loaded with moral cargo, to use an air-transport metaphor. Negative liberty *per se* is a state of being, a certain dimension understood as a lack of external obstacles. If the government refuses to supply citizens with passports valid for all countries; if they cannot relocate wherever and whenever they wish, and their desire to travel, that is, to relocate spatially does not take into account financial means to do this, then one says that negative freedom is limited. Freedom of expression and association is an example *par excellence* of typically understood negative freedom, without its spatial component in the geographical sense. Charles Taylor from McGill University argues that,

> freedom is no longer just the absence of external obstacle *tout court*, but the absence of external obstacle to significant action, to what is important to man... Restricting the expression of people's religious and ethical convictions [abstract negative political freedom in this work] is more significant than restricting their movement around inhabited parts of the country [spatial freedom in this work].[67]

Taylor explicitly explains the difference between spatial and political freedom; this fact will help in defining the dimensions of the OCOTM later.

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[65]Plant, 225.

[66]Ibid., 225.

[67]Charles Taylor, "What's Wrong with Negative Liberty?", Philosophy and Human Science: Philosophical Papers, vol.2, (Cambridge: Cambridge University Press, 1985), 218, cited by Plant, 239.

2. Positive freedom

There are two versions of positive freedom. The maximalist version requires that a person can fulfil a specific set of goals or ends and "in so far as a person is realizing such goals is he really free."[68] This definition of positive freedom is prescriptive in nature, because it imposes subjectively defined requirements. Maximalist positive freedom is dangerous and paradoxical, because the power holders can arbitrarily define what is good for a person, that is, they can define *a priori* an algorithm how to achieve happiness. The paradoxical nature of maximalist freedom stems from the fact that it justifies "the use of coercion to secure someone's freedom"[69], resulting in the pure totalitarian and paranoid world of Kafka and Orwell. The only solution to avoid a contradiction of freedom in its very definition is to unload a prescriptive cargo from its content. The outcome is minimalist positive freedom. The latter is " the socially conditioned needs and capacities, opportunities and resources which someone has to have to pursue a conception of the good whatever it might turn out to be."[70] A beautiful and comprehensive definition this is. So many things in so few words. For two reasons of:

1.) prescriptively loaded definition of maximalist positive freedom and

2.) comprehensiveness and neutrality of minimalist freedom,

the latter will be the chosen dimension of the OTM World Model.

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[68]Plant, 249.

[69]Ibid., 249.

[70]Ibid., 249.

3. Conclusion

In sum, it is assumed in this work that both freedoms should be distinguished and separated from each other, as argued by Plant. The interpretation of total freedom may be different, but the very idea of independence and separation of negative and positive freedoms remains unchallenged for the purposes of this work.

F. Operationalization

Operationalization is probably the most "unpleasant" aspect of theoretical thinking. It is, in technical terms, a specification of empirical indicators to represent the theoretical concepts. It forces the social scientist to come down to Earth and answer the question: "so what does it mean concretely ?" Second, it involves a built-in error which has hunted social scientists from time immemorial: validity. According to Bailey's new three-level measurement level, validity corresponds to mapping B, that is, the degree to which the indicator (X") measures the concept (X) it is designed to measure. Third, it requires that a decision be made as to which level of measurement will be used: nominal, ordinal, or interval ? In sum, operationalization is like technology compared to theoretical physics: the former is the ugly and necessary sister of the latter.

1. Negative freedom

This concept is interpreted as degrees of freedom, that is, dimensions of both a spatial and an abstract political nature. Since the number of these dimensions is

theoretically infinite and expressed in numbers, then negative freedom is defined on the interval level of measurement in dimensionless units, beginning from zero. Negative freedom equals one when the person is absolutely immobilized spatially and is deprived of all political freedoms. There is only one possibility left: to be or not to be. The best metaphor for this situation is a situation of an inmate played by Anthony Hopkins in "The Silence of the Lambs". Negative freedom equals zero when the person dies or is being born.

2. Positive freedom

This concept is interpreted as a standard of living from the matter-energy point of view. If so, then the imprisoned person can have a high standard of living while well fed and watching television. The problem is that the standard of living is badly operationalized itself. Moreover, the standard of living is differently interpreted by different authors and there is no final agreement in the subject matter. Bailey, for example, refuses to be unequivocally specific. The easiest operationalization of the standard of living is, of course, the financial resources in a given country. This, however, does not always work properly. What is the value of an American dollar for a tribe of Indians living in the Brazilian interior? They can have a banking account, but for an everyday life it makes no sense, since they hunt for food themselves, compared to a minimum-wage worker at McDonald's in an American city. Earned dollars are "eaten" by high rent, a monthly metro pass, electricity bills, etc., in the case of the latter. Therefore, one has to be cautious in equating a standard of living with

an amount of money (legal tender notes). Standard of living can be measured as a composite indicator, as if one indicator were obviously insufficient. Morris David Brown of Brown University invented The Physical Quality of Life Index composed of life expectancy at age one, rates of literacy and infant mortality. A picky political scientist may argue that rates of literacy reflect more freedom in abstract political space being related, in turn, to access to information and degree of censorship, for example. Other scientists define standard of living as real wages, health care and environmental pollution. The easiest indicator, however, is still money. The problem with money as the easiest indicator remains as first, there exists no single, world currency and second, prices for the same items differ depending on the location of purchase.

In sum, our model rests upon separated concepts of positive and negative freedom. Modern political theory provides a solid justification for such distinction. What seems interesting is the volume of discussion concerning negative freedom. Positive freedom demands a thorough analysis of resources and their use for upgrading the material level of existence of individuals. Ignoring positive freedom is not logical taking into account, not only basic human needs, but also natural resources and the depletion of them that is naturally associated with their use for the population. An analysis of positive freedom always leads to the problem of redistribution, since the latter may not be always fashionable and pleasing for everyone. Both positive and negative are needed for a coherent platform upon which the OTM World Model can be build. The separation renders both concepts mutually perpendicular in the language

of geometry. In more precise language, both dimensions of freedom constitute an orthonormal basis. The following example presents the problems that result from making and not making a clear distinction between two or more concepts for the purpose of a geometrical mathematical modelling in political and decision-making studies.

G. The Executive's Compass as an introduction to the *Orbis Terrarum* Manifold World Model

James O'Toole from the Aspen Institute developed a simple reference frame of managerial-political concepts used by corporations, called The Executive's Compass. The purpose of the compass is to help managers "navigate turbulent waters of social change and political conflict."[71] The compass is a perfect definition of the descriptive, and never ever of the prescriptive approach, to the most important political ideas concerning the definition of the "good" and "just" society, whatever it means for whomever. Briefly stated,

- To Aristotle, it permits some of its members to live "the good life."
- To Hobbes, it provides sufficient order to allow material progress.
- To Locke, it guarantees life, liberty and property.
- To Rousseau, it preserves as much as possible of the conditions of liberty and equality that humankind enjoyed in "the state of nature".
- To Adam Smith, it has nearly absolute economic freedom.
- To Thomas Jefferson, it consists of people who live in small-scale, rural communities characterized by a high quality of life.
- To Alexander Hamilton, it consists of people who live in modern industrial cities characterized by a high standard of living.
- To Marx, it has nearly absolute economic equality.
- To J. S. Mill, it allows nearly absolute social freedom.

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[71]James O'Toole, The Executive's Compass (New York: Oxford University Press, 1993), x.

- To Harriet Taylor Mill, it allows women to enjoy equality of opportunity with men.
- To Weber, it is governed by laws, so that no citizen is treated arbitrarily.
- To Martin Luther King, it guarantees the "natural rights" of all its members, without regard to their race, sex, religion or class.[72]

This, in short, is the definition of the "good" and "just" society. It is the best definition from all those possible, because it seems to satisfy everyone.

A sixty-four thousand dollar question is: what is the good and just society, and for whom is it? The only feasible answer is that the point of view depends on the point from which the stand is made. The ideas represented by various thinkers can be presented by a graphic metaphor: a compass. The compass assumes that Liberty is absolutely opposite to Equality, while Community excludes Efficiency. Moreover, it seems that the "good" society is at the center of the compass since extreme conditions are never satisfying for everyone simultaneously:

LIBERTY

COMMUNITY vs. EFFICIENCY

EQUALITY

Fig. 3.2. The Executive' s Compass, after O'Toole, 27.

Finally, an empirical map of real countries approximates the problem of the "good" and "just" society:

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[72]O'Toole, 19.

LIBERTY

(1,1)the U.S. in 1975

COMMUNITY vs. *Japan(2,0)* EFFICIENCY

Social Democratic Sweden(-1,-1)

Maoist China(0,-2)

EQUALITY

Fig. 3.3 Nation-states on the Executive's Compass, after O'Toole, 133.

The values were added by the author and they are a good approximation of the positions of given nation-states on the Executive Compass.

1. The orthogonalized Executive's Compass

It is argued here that a modified O'Toole's Executive's Compass is more universal and more flexible when compared to its original. As a result, the new compass should be time- and space-invariant with respect to new hypothetical civilizational manifolds. It means that it should be applicable to any socio-political-economic configuration existing in the past, present and in the future, regardless of technological innovations, population, natural resources, modes of production and political systems. The modification is based on a very simply procedure which would

be termed here as an *orthogonalization*.

One must return to basics in order to grasp this easy procedure. Two dimensions are mutually independent in geometry when they are mutually perpendicular; that is, an angle between them equals ninety degrees. When two concepts are operationalized along the same dimension they reflect the same concept which is usually split between a negative side (left to the point zero) and a positive side (right to the point zero). As a result, the operationalized concept on the negative/left side is either taken with the minus sign ("-"), or is considered as a new concept being naturally taken as literary opposite to the concept on the right side. The simplest example is the thermometer. The temperature below the point zero is taken as the same one above the point zero but with the minus sign. Or, we say that there is "cold" below the zero point and there is "hot" above that point on the Celsius scale. By the orthogonalization one understands a procedure during which two separate thermometers indicate the temperature. When there is "hot", only the first thermometer shows anything. The second one does not work and explicitly shows the temperature at the point zero, even though the latter is actually above the point zero. When there is "cold", the second thermometer shows the temperature as it is below the point zero, while the first shows that the temperature is zero centigrade. Now, one has to define a procedure for a method to find what temperature is correctly indicated by which thermometer, under which circumstances. This is very easy. One must simply agree that a thermometer which indicates anything except zero indicates the correct temperature. The temperature is zero, when and only when, both thermometers show

the point zero. In other words, the result is absolutely the same as if one measured the temperature with one thermometer only. The difference is that the one thermometer has to be able to show two different concepts which actually are the same one: the temperature. The two thermometers "pretend" to show the two different concepts as if they were absolutely independent. In any case, one knows what the exact temperature is, the measuring is merely more complicated and time-consuming when using two thermometers. In sum, the operation of switching the procedure of the temperature measurement from one thermometer indicating "everything" to two thermometers indicating "cold" and "hot" is termed orthogonalization. There is one drawback, however, as far as this procedure is concerned. One must always remember that two thermometers cannot show different temperatures, except zero, simultaneously. Otherwise, there would have existed two different temperatures in the same place.

By the same token, all concepts on the O'Toole's compass can be orthogonalized. The orthogonalization of these concepts renders them all independent of each other. Liberty does not invalidate Equality, while Efficiency does not invalidate Community. Any nation-state can be positioned on the new orthogonalized compass as previously. The only problem is that one cannot imagine this compass geometrically. It requires four dimensions to visualize. A dot represents any nation-state in a four-dimensional configuration space. In relativistic physics such a dot is called an event. Every dot/event is characterized by four variables: x, y, z, and t referring to time. The original compass is "easier" because it can be visualised. Its

drawback is that it considers Liberty and Equality as antagonistic *a priori*, for example. Mathematically speaking, the original compass assumes that there are concepts which one should term Libertequality and Communitefficiency. The point zero, then, indicates that decreasing efficiency transforms at that point into communitarianism. Simultaneously, decreasing equality transforms, suddenly, into liberty. What is lacking is the condition under which both transformations take place as a discontinuous and catastrophic process in the Thom sense. The second drawback is that the center of the coordinate system indicates that the value (be it interval or ordinal) of all four operationalized concepts is zero, literally and mathematically speaking. The problem is that it is hard to imagine a nation-state where there is no liberty, equality, efficiency and community at the same time! This paradox arises from a purely mathematical analysis of the compass, but when the results are translated back into the real world, the outcome is surprising. What O'Toole implies is that a good society would be in a state of equilibrium between all these operationalized concepts. Hence, the equilibrium must be interpreted as a paraboloid standing on the point of equilibrium, providing such an equilibrium is stable.

[Fig. 3.4.]

Otherwise, the center of the coordinate system must be on top of the paraboloid. An interesting situation occurs then. The horizontal axes of the paraboloid are defined by mutually perpendicular Libertequality and Communitefficiency dimensions regardless of the kind of equilibrium.

What is missing is a third dimension, let us say the classic vertical "z". This dimension, therefore, is the only measure of the "goodness" of the society providing the equilibria are not neutral. If the equilibrium is neutral, then the whole surface is flat, and the only measure of "goodness" is the proximity to the center of the coordinate system. Then, "goodness" can be measured as the length of the vector defined by the coordinates [Liberty, Efficiency] or [Liberty, Community] or [Equality, Community] or [Equality, Efficiency]. The shorter the vector the "better" the society, providing the scientist agrees upon such a definition of goodness. Of course, the vector's length may be used in the case of non-neutral equilibria, but this would unnecessarily complicate the calculation, since the vector would have had to be three-dimensional. One must also assume that the paraboloid is spatially symmetrical, otherwise the vector can assume different values of its length, while having the same value on the "z" axis. Therefore, its projection on the "z" axis is a justifiable simplification, retaining a proper power of the calculation. As we see, operationalization of these concepts, and the calculation of the "goodness" on the interval or ordinal level of measurement, is not as easy as it might have been expected. The reader is invited to rethink this case as a good example of physico-mathematical analysis.

The orthogonalized compass can show the same relationship between the concepts, but does not have to do it if, under certain circumstances, this would not be the case. Therefore, the orthogonalized compass is superior to its predecessor by virtue of giving the scientist new degrees of freedom. All concepts reside on separate

axes, hence are not antagonistic. "Goodness" ("Badness") can be measured as the length of a vector in a four-dimensional space.

DEF. 3.4.:

The orthogonalized compass: a four-dimensional configuration space of independent civilizational concepts

The orthogonalized compass should be regarded as a normative model for all those wishing to use it, but by no means should it be thought that the definition of the dimensions nor the definition of "goodness" are of a prescriptive nature, in general. The whole perception of the reality may differ between the social scientists, therefore, the imposition *a priori* of the defining concepts is unacceptable *ex definitione* due to explicitly empathic thinking towards other scientists. Finally, both the orthogonalized compass and the OTM World Model comply with the second requirement of good architecture in the Blaauv sense. A good system design is a three-level one and contains the architecture, implementation and realization. The orthogonalization refers here to a way of a system design in which the architecture is characterized by:

> 2. Orthogonality. This principle requires that functions which are independent of each other are kept separate in its specification.[73]

2. *Mathematics of Orthogonalization*

The verbal description of problems related to the Executive's Compass and Orthogonalization can be reduced to a simple mathematical operation. As we know,

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[73]Klir, 26.

dimensions can be presented as row elements of a one-row matrix:

[x, y, z,.....]

By the same token, the dimensions of the Executive Compass can be presented as

[Communitefficiency, Libertequality]

Orthogonalization refers to a transformation of *a priori* antagonistic concepts into a superior coordinate system, where these concepts may be, but do not have to be, antagonistic. Actually, this is the whole idea behind Orthogonalization in the social sciences. Social scientists often work as if they possessed all the truths related to the human world, while leaving difficult and fundamental questions to philosophers. Hence, they use, without much hesitation ready-to-serve antagonistic sets of concepts and merely try to fit their ideas according to these coordinate systems. The idea of Orthogonalization is to "free" the social sciences from such bold assumptions.

STEP1:

[Communitefficency, Libertequality] → Orthogonalization →

[Community, Efficiency, Liberty, Equality]

STEP2:

Orth. Compass 4x4:	Comm.	Effic.	Lib.	Eq.
Sweden	1	0	0	1
China	0	0	0	2
The U.S.	0	1	1	0
Japan	0	2	0	0

Fig. 3.5. The process of Orthogonalization as applied to the Executive Compass.

$$\begin{bmatrix} 1 & 0 & 0 & 1 \\ 0 & 0 & 0 & 2 \\ 0 & 1 & 1 & 0 \\ 0 & 2 & 0 & 0 \end{bmatrix}$$

The matrix corresponds to Fig. 3.5, where rows correspond to four nation-states respectively, and columns indicate their scores on four independent variables, according to the rules of matrix algebra.

The Orthogonalized Compass shows what may be wrong with *a priori* antagonized concepts. There is no liberty in... Sweden, for example. By the same token, the inventors of the *Volvo* display a blatant lack of efficiency.

The Executive Compass in its original form assigns the following values (approximated by the author upon a visual inspection):

	Communitefficiency	Libertequality
Sweden	-1	-1
China	0	-2
The U.S.	1	1
Japan	2	0

The reader may ask; what is wrong with this matrix ? The answer is that, from a purely mathematical point of view, Sweden scores minus one on the Communitefficiency and Libertequality scales. But, what is negative Communitefficiency and Libertequality in general ? And, does minus one on the

Libertequality scale mean that Swedes are stratified and enslaved simultaneously ? One must not forget that Orthogonalization does not help if the original matrix contains incorrect data. Multiplying incorrectness by the factor of two does not produce correctness by virtue of self-multiplication (providing data really are incorrect).

To summarize, in order to make more sense out of this managerial and mathematical quagmire, one should, rather re-write data concerning the positions of given nation-states on the Executive Compass, that is, start from scratch. It was shown here that not assuming *a priori* antagonistic relationships between Liberty and Equality may be easier, and more feasible, as far as common sense conclusions are concerned.

H. The *Orbis Terrarum* Manifold World Model

The model is descriptive in its nature and does not attempt to predict the future of neither the global nor any local community. The lack of dynamic processes such as population growth, to mention a classic example, eliminates it from the category of predictive models. Also, the model is not explicitly prescriptive even though commentaries to it may be regarded as potentially prescriptive (normative) in nature. While positive freedom is very simple to grasp, negative freedom is difficult because it represents a set of dimensions. Every gain, in degrees of freedom of both types, represents net gain in new dimensions. Therefore, negative freedom is actually a

binary set of dimensions of a composite nature. Instead of adding every possible dimension to the OTM, all of them are "smashed" into the negative one. This procedure is justified by the recognition of the fact that all dimensions processed in this manner belong to the same class of dimensions, while not being energy levels.

Having discussed two types of freedom which constitute the orthonormal basis, one should now introduce right now the following axioms which delineate an interplay of the two freedoms in their extreme cases.

1. Interplay of freedoms

AXIOM 1.: When a person is in a state of absolute immobility in:

a.) physical dimensions such as freedom of movement, that is, freedom of spatial translation;

b.) abstract political dimensions such as freedom of expression and/or association and/or voting, freedom from persecution;

then his/her negative freedom equals zero. As a result, a person's total freedom also equals zero, regardless of the amount of positive freedom assigned to the person. The lack of any negative freedom renders any amount of positive freedom irrelevant for a person since, any amount of positive freedom assigned to the person cannot be used for a person's purposes, due to the lack of volume of the composite spatial/abstract configuration space needed for the spatial translation of assigned matter and energy. Hence,

$$\boxed{If\ F_n = 0\ then\ C = 0} \tag{3.6}$$

AXIOM 2.: When a person is in a state of absolute deprivation of energy and matter, where these things are translated into the level of living and indirectly and approximately measured as the amount of legal tender notes possessed (not possessed) by a person, then that person's positive freedom equals zero. As a result, a person's total freedom also equals zero, regardless of the amount of negative freedom assigned to a person. The lack of any positive freedom renders any amount of negative freedom irrelevant for the person, since negative freedom cannot be used due to the lack of possibility of spatial translation of matter and energy due to the lack of the latter and the former. Hence,

$$\boxed{If\ F_p = 0\ then\ C = 0} \tag{3.7}$$

Taking into account the two axioms, one finds that total freedom resulting from the interplay of both freedoms is always equal to zero, if only one of the freedoms equals zero. Of course, total freedom also and always equals zero, when both freedoms equal zero. This particular situation is termed pseudosingularity.

Hence,

$$C = 0 \text{ when } (F_n = 0 \text{ or } F_p = 0)$$

$$C = 0 \text{ when } (F_n \text{ and } F_p) = 0 \tag{3.8}$$

The conditions for total freedom outlined above mean that an equation defining total (composite) freedom must have a zero value at the beginning (center) of the orthogonal Cartesian coordinate system, and that the values of that composite freedom must also equal zero on both axes (dimensions) defining the orthonormal basis.

It is evident now that composite freedom cannot be additive, that is, it cannot be a sum of its two components. If one component, only, equals more than zero, while the second component equals zero, then a composite sum equals the value of the second remaining component. The result contradicts both axioms. Therefore, composite freedom must be multiplicative because then, and only then, the requirements presented by both axioms can be satisfied.

THEOREM: Hence, one can present the following theorem based on the two axioms:

$$C = k F_n F_p \tag{3.9}$$

where,

C: composite freedom,

k: a certain constant,

F_n: negative freedom (freedom "from") and

F_p: positive freedom (freedom "to").

A verbal, simpler, and thus more legible for a humanist version of theorem is:

DEF. 3.5.:

Composite Freedom: (Negative Freedom)(Positive Freedom)

It should be clear now that any discussion concerning the superiority of one type of freedom over the other one is like asking the following question: which hand should be cut off in order to live and prosper, the left or the right one ? It is estimated here that 99.99 % of all living units in the universe, and possessing upper limbs, prefer to have both hands and prefer not to be subject to such a trade off. Consequently, all ideologies of both the left and right of the political spectrum may be seen in the light of the preceding example.

The product of two freedoms is a scalar while both freedoms are scalars too. The theorem defines the equation of a curved surface in a three-dimensional Euclidean space. Equation 3.9 defines a scalar field in a space defined by three dimensions: composite freedom, negative freedom and positive freedom. This surface is termed

here a composite freedom configuration space or simply the *Orbis Terrarum* Manifold (OTM). The curved surface is a two-dimensional, differentiable manifold defined by negative and positive freedoms.

The equation presented by theorem corresponds to a function of two variables f: f(x,y) = kxy where x and y are independent variables as often presented in textbooks. The equation corresponds to an equation z = kxy, which can be presented as 1 = kxy/z by dividing both sides by z; then kxy/z - 1 = 0. By reinserting the names of the variables, one obtains an equation of a surface:

$$k \frac{F_n F_p}{C} - 1 = 0 \qquad (3.10)$$

where,

$k > 0$,

$F_n \geq 0$,

$F_p \geq 0$ and

$C \geq 0$

Equation 3.10 is the fundamental equation of the *Orbis Terrarum* Manifold World Model. On the curved surface of the OTM, the dots, representing living units defined as persons by the boundary macro-delimiter, are positioned according to the values of

two types of freedom assigned to each and every person. Thus, the OTM World Model is R-mapping. Equation 3.10 defines a hyperbolic paraboloid:

[Fig. 3.6]

The OTM World Model is realistic from the common sense point of view for positive values of all types of freedoms, only. One may argue that indebtedness is negative positive freedom; nonetheless, a purely financial analysis is beyond the scope of this work. Positive values exclude three-quarters of the manifold. Hence, merely the upper right part of the OTM defined by normal sections to the hyperbolic paraboloid, is our World Model:

[Fig. 3.7]

2. Composite Freedom: interpretations

Composite freedom (C) corresponds, and only corresponds, in this model to the potential in physics. As such, it depends on the position of a dot on the OTM surface. There is no time as a dimension, therefore, the potential depends only on negative and positive freedoms. Every dot, a person, has a certain potential being merely a function of negative and positive freedoms. Let us remember that when the potential depends explicitly on a position, and does not depend explicitly on time, then the potential corresponds to a potential energy. Thus, composite freedom corresponds

to potential energy. Power is the capability to secure more than one's equitable share of both negative and positive freedoms, with respect to others. Power is no longer the power as defined for physics. It is a political/civilizational power of living units in the civilizational/political configuration space (manifold). This kind of power is capability, where the latter always denotes a certain potential in physics, not an action or a force.

DEF. 3.6.:

Composite Freedom: a quantity corresponding to the potential energy on the *orbis terrarum* manifold, and which is proportional to energy required for a given level of living and proportional to degrees of negative freedom allocated for the person and available in a given civilizational system.

The gist of the whole concept of Composite Freedom is that it replaces a neverending and pointless (from the holistic point of view) debate about an alleged superiority of one concept (type, dimension) of freedom over another. A question: "what is more essential and more appropriate for the purpose of describing a person's freedom and standard of living: negative or positive freedom ?" is rendered pointless. The multiplicative nature of Composite Freedom takes care of all cases of both types of freedom simultaneously, while leaving them intact in their orthogonality from the theoretical point of view as presented by modern political thought.

Power can be interpreted as a dynamic concept or as a static one. To use a very advanced hybrid metaphor: the dynamic concept of power is *reonomic* in nature,

while the static concept of power is *skleronomic* in nature by, definition. Moreover, "there is hardly another concept within sociology that is more troublesome."[74] One of the dynamic definitions of power in the social sciences assumes that "power is one of those concepts that refer to intangible processes."[75] Further classification of power splits it into authority and influence, as types of control over political players and institutions.

Game theory interprets the concept of power in a way that is useful for this theory from the point of view of contending players. Reinhard Selten, one of contemporary authorities in the subject matter, asserts that:

> power is the capability to secure more than one's equitable share. Those who are able to this are powerful whereas those who cannot even secure their equitable shares suffer from a power deficit.[76]

This is a microeconomic approach where shares are understood in very materialistic terms. A great deal of attention should be focused on the notion of capability in this metaphor. Moreover, capability indicates a certain potential situation, something that may happen, but does not have to happen, nor it is executed right now.

Also, game theory supplies political studies with a more political definition of power in its traditional, and not in solely microeconomic, terms:

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[74]Beth Ensminger Vanfossen, The Structure of Social Inequality (Boston: Little, Brown and Company, 1979), 138.

[75]Ibid., 137.

[76]Reinhard Selten, Models of Strategic Rationality (Norwell, MA: Kluwer, 1988), 275.

> **Political power is when actor A is composed of a group of individuals acting as a coalition and actor B is any individual member of that group. Here, a group is defined as "number of individuals with a common interest (Olson, 1968, p.8). To be more precise, we should say that, if the group is of size n($n \geq 3$), B is any individual member, while A is (n-1) other members as a coalition: (n-1) other members should make a joint and coordinate effort to manipulate variable x which is taken as a parameter by any individual member. If each member is willing to accept the relationship between him and (n-1) other members as a whole, it may be said that he chooses to be "governed." The assumption on which the above argument is based is that all men are equal and that there is strength in union. This is what Hobbes and Locke meant by political power.[77]**

This definition of political power does not take into account the that arises situation when someone does not wish to belong to a given group (A in this case), but is governed by that group anyway. One must be very cautious with exclusively theoretical approaches to political terms, because the outcome may be too idealistic. Actor B may be born into group A, may not have means to leave that group nor to begin an independent and self-sustainable life, in economic terms. Similarly, actor B may not be permitted by actor A to leave that group. In sum, if actor B suffers from a matter-energy deficit (low standard of living) and has extremely limited freedom of action, then, according to the above definition actor B, is a masochist. These are intrusions of real-world thinking, which must be taken into consideration when attempting to define, once and forever, the most difficult concepts in political studies. A collection of such definitions is, however, very helpful in gaining insight into the subject matter from the game-theoretic point of view. Social power differs from physical power that is defined as:

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[77]Hiroshi Tanaka, "Power as Maximizing Behavior", Behavioral Science, vol. 34, 1989, 204.

$$\boxed{P = \frac{dW}{dt}} \qquad (3.11)$$

where,

W: work (energy):

t: time.

Physical power requires a certain amount of energy to be spent in a given period of time. Hence, a static definition of power that does not involve time is physically void of any sense. Composite freedom is congruent with power in the Selten sense, when one considers capability as potential. The one's share may be of either a purely

1.) pecuniary nature as in the microeconomic approach,

2.) abstract political nature in the libertarian sense or

3.) of both natures, simultaneously.

DEF. 3.7.:

Composite Freedom ≡ Civilizational/political power

Justice can be measured, then, as a difference in values of composite freedom assigned to any two individuals. It means that justice, or rather injustice, is proportional to the difference between two values of composite freedom. The bigger the difference of values of composite freedom for any two dots, the bigger "injustice" is, while the absolute value of composite freedom is relative. It is very important to

remember that it is not claimed here that every dot (person) should always and everywhere have an identical value of C. Our world is too complex, and one should not impose a categorical demand that every person on Earth must always have the same value of composite freedom, under any circumstances. This kind of social experimenting never worked and will not in the future. "Injustice", then, is merely a metaphor for a certain more or less abstract scalar quantity of non-negligible usefulness, yet not of an absolute importance..

DEF. 3.8.:

Measure of "injustice" ≡ Δ C

The OTM does not explain why there is a dispersion of dots, and how the distances between them are formed and maintained. Political studies deal with this problem when taking into account different formations involving persons. Capitalism and communism, democracy and totalitarianism; all these civilizational systems of economy and politics did not solve the global population's problems during their travels along the global world line. Only one region on the global manifold approximated, for a while, ideal conditions for human existence: Scandinavia, especially Sweden after the Second World War. This local sanctuary was eliminated in the early 1990s, however. Because the global population tried so many socio-political and economic formations, an obvious sense of weightlessness seems to have arisen, having played with many variables and apparently no constants. There is, nonetheless, a powerful constant: a human nature conditioned by a person's genetic

composition and environmental influences. Hence, an answer to global illness is linked to this constant, and not necessarily to a set of variables representing particular formations on the global manifold (civilizational configuration space). Russell's Theorem explains this phenomenon in a blunt manner:

> If there were in the world today any large number of people who desired their own happiness more than they desired the unhappiness of others, we could have a paradise in a few years.[78]

This statement coincides with Rawl's classification of practical reasoning, according to the following scheme: Practical Reasoning - Concept of Right - Individuals - Requirements - Natural Duties - Negative - Not to injure, Not to Harm the Innocent.[79] Rawls defines injustice as inequalities (here: ΔC), that are not to the benefit of all. This is an interesting prescriptive (normative) statement, an analysis of which is beyond the descriptive character of the OTM. One may say, from the mathematical point of view, that if the dispersion of the dots does not meet someone's standards then one has to deal with the constant. If variables are exhausted, it is obvious that the constant must change in order to yield a different solution.

Russell's point of view may explain why the things worsened with respect to positive freedom after the Second World War, despite Keynesian economic policies in the West:

> Insofar as Keynes' work represented a radical challenge, it is not surprising that the establishment and the rentier class were unwilling to participate in their own euthanasia.... In Keynes' view, the "euthanasia of the rentier class" could only come about after a long period of full employment in which state intervention and the specific targeting of investment

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[78]Bertrand Russell quoted in Psychology Today, July/August 1996, 88.

[79]John Rawls, Theory of Justice (Cambridge, MA: The Belknap Press, 1973), 109.

would produce an economy in which there was no longer any shortage of capital...[80]

Self-defense mechanisms employed by the rentier class resulted in a scandalous, in empathically moral terms, stratification of the global and, particularly, North American society, in which the upper class succeeded in a gradual elimination of the enlightened middle class by replacing it with computers and software, contrary to Frederick Winslow Taylor's premises. This allowed for a cancerous, qualitative hypertrophy of itself that is secured by extreme negative libertarian ideology revealing a highly negentropic, civilizational shift. Why nobody is ashamed of doing this is better explained by Russell's Theorem than by any theory pretending to be more scientific and objective.

An important note is in order: the reader may be disappointed by an explicit refusal to define "justice" without quotation marks. Alas, no Copernican revolution is attempted here. Hardly anything in this work discredits any sound scientific theory or any other recorded human experience.

3. *Civilizational progress*

It is tempting to define a situation of civilizational development as far as the OTM World Model is concerned. It is our common sense that tells us that a growing level of living and an expansion of civil rights is civilizational/political progress. Hence, an increase of composite freedom can be associated with civilizational progress. The process must involve time. It means that one expects that a given dot

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[80]Harold Chorney and Phillip Hansen, Toward a Humanist Political Economy (Montreal: Black Rose, 1992), 105.

will change its position on the OTM. There are three different cases, once one agrees with the preceding, prescriptive statement. It is not claimed here that an increase of composite freedom for the individual is an absolutely objectively good process *ex definitione* from the collective point of view. Nonetheless, one adopts here a common and popular understanding of political "goodness". This interpretation can be justified by *reductio ad absurdum*: who does not want to be rich and free ?

DEF. 3.9.:

1.) $\Delta C > 0$: In this case the difference is positive, an unbound civilizational progress exists ex definitione. It can concern a collection of persons or all of them as in next two cases.

2.) $\Delta C = 0$: In this case there is no difference in the value of Composite Freedom in a given period of time. This is a civilizational stagnation.

3.) $\Delta C < 0$: In this case a decrease in the value of Composite Freedom takes place and such a situation is termed a civilizational regress.

At least two OTMs are required in order to present the fluctuation of C in a given period of time. This is also a drawback of the OTM; nonetheless, it can be easily overcome by the method of a repeated, graphic presentation. Finally, it is important from the point of view of the social sciences to take into consideration the fact that not all dots (persons) may be permitted to participate in civilizational progress. Who, when, and where is permitted, to paraphrase Laswell, the scope of traditional and voluminous, political studies (the verbal theory).

4.. The gradient.

There is a significant difference between the OTM and any surface in the gravitational field. The main problem is that dots (persons) cannot be considered as little masses falling freely towards the center of the manifold. Every and each dot has its own energy corresponding to the positive freedom assigned to it. Therefore, one cannot use an exclusively physical interpretation of the OTM, while neglecting a general context of the social sciences. In sum, and because of the preceding reasons, the OTM World Model is an interdisciplinary hybrid *par excellence.*

The three cases can be interpreted in the light of classic field theory. The gradient shows the direction of the fastest increase of composite freedom in a given point on the OTM. A line linking all points along the fastest increase is called *diretissima,* in field theory. The reader should immediately notice that the equicomposite lines are orthogonal to all lines of the fastest increase; this phenomenon results from general field theory. Hence, *diretissima* corresponds to the civilizational progress or regress on the OTM.

DEF. 3.10.:

Diretissima on the OTM ≡ the line of the fastest civilizational progress/regress

A close analysis of this metaphor allows for the following formulation of the civilizational progress, which is parallel to the previous one. The gradient is defined

as follows on the OTM:

$$\boxed{\nabla = \left[\frac{\partial}{\partial F_n}, \frac{\partial}{\partial F_p}\right]} \qquad (3.12)$$

Hence,

DEF. 3.11.:

$$\boxed{\nabla C \equiv \textbf{the unbound civilizational progress}}$$

5. The force.

The gradient shows us the direction of the fastest increase of composite freedom. The latter depends on the position, that is, it is a function of it. Physics says that the force is related to the potential energy in the following manner:

$$\boxed{Force = -\left(\frac{dU}{dx}\right)} \qquad (3.13)$$

where,

U: composite freedom and

x: distance.

Indeed, the gradient is opposite to the force. The latter is always directed downward on the OTM. A political interpretation of this fact suggests that only those individuals who score higher on composite freedom exert force on those who score lower. To be more precise, the political force may be exerted only, and exclusively only then, when someone exerting the political force possesses

1.) greater positive freedom,

2.) greater negative freedom, or a

3.) greater amount of both types of freedoms

than an individual upon which the force is to be exerted. Though this type of explanation seems to be *idem per idem* for physicists, even then one must properly translate this phenomenon back to the social sciences. To repeat, an obvious phenomenon of the impossibility of exerting political force on those who are more wealthy and more free in the negative libertarian sense is automatically visible under a physical interpretation of the OTM World Model.

DEF. 3.12.:

$$\boxed{\textbf{Political force to be exerted} \equiv -\nabla C}$$

The political force can be used to lower someone's composite freedom, thus increasing the distance between the upper and lower classes.

6. Summary

In short, the operator ∇ *(nabla)* maps a scalar field $C(F_n,F_p)$ into a vector field $\nabla C(F_n,F_p)$ called the gradient of composite freedom. The vector field is a physical interpretation of the biggest proverbial American (and not only) dream to be realized: a quest for wealth and freedom that defines civilizational progress from the common sense point of view. Hence,

DEF. 3.13.:

1.) The zero-order (rank) tensor field is a spatial distribution of quantitative values of Composite Freedom on the *Orbis Terrarum* manifold.

2.) The first-order (rank) tensor field is a spatial distribution of vectors of unbound civilizational progress on the *Orbis Terrarum* manifold.

At this point, however, the OTM changes its character from a static to a dynamic one. The first-order tensor field implies value and direction of motion of the dots on the manifold.

The most comprehensive definition of freedom is perhaps that of MacCallum:

> X is (is not) free from y to do (not do) become (not become) z.[81]

Hence, thus defined, freedom is freedom to execute movements on the hyperbolic paraboloid. This definition does not require that X (a person) must increase the value of composite freedom; neither does it indicate a direction of change.

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[81] G. C. MacCallum, "Negative and Positive Freedom", Philosophical Review, 76, 1967, cited by Plant, 250.

MacCallum's freedom is freedom to change any single value of either negative or positive freedoms, or both. Hence, composite freedom and MacCallum's freedom are absolutely different concepts. Composite freedom is a state of being, whereas MacCallum's freedom is its change. These two definitions are not contradictory because they are orthogonal, that is, independent. The definitions are incompatible, but complementary.

7. Natural boundaries

Unbound civilizational progress must be differentiated from simple civilizational progress. If the latter were taken as a standard for general civilizational progress, then an absolute removal of all possible boundary macro- and subdelimiters, coupled with an infinite allocation and use of matter-energy, would result in a very rapid civilizational suicide. Since the Earth is finite, positive freedom is limited for all persons, if they participate equally. Since the removal of all behavioral norms would result in total anarchy, negative freedom is limited for all persons, if they participate equally. According to Hartigan

> the Ten Commandments are an example of a moral regimen, not of how human believers can win salvation and eternal life, but rather of how human beings have thus far successfully guaranteed their earthly existence. In short, what we call our human normative systems spring from the same selective biology that sees us as the evolved creatures we are today. They are at one and the same time a cause and an effect of our human condition.[82]

Therefore, it is imperative to destroy as soon as possible the Judeo-Christian civilization, in order to prevent population growth from the restrictionist point of view

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[82]Richard Shelly Hartigan, "Of Facts and Values: Bio-political Perspective", International Political Science Review, 1994, vol. 15, 327.

in the Parson sense. The removal of normative systems would undercut a biological operational mode. Individuals can, and actually do, achieve practically infinite levels of both freedoms, regardless of any normative systems. If, for example, billionaires can get away with crimes and can allocate as much as possible matter-energy for themselves, then they are practically local gods on the Earth.

8. The simple harmonic oscillator

As previously noted, the model does not present gravitational forces acting upon the dots. When negative equals positive freedom, then this situation is geometrically presented by the normal sections of the hyperbolic paraboloid passing through lines of curvature. The normal section, as projected onto the horizontal plane defined by negative and positive freedoms, is a forty-five degree straight line passing through the center of the manifold. It is easy to notice that normal section cutting through the manifold in this case defines another special curve: a parabola. This curve is clearly visible as *diretissima*. When negative equals positive freedom then both can be taken as the same variable raised to the power of two. Hence, composite freedom equals negative (or positive freedom) multiplied by itself. Then,

$$\boxed{U = kx^2} \tag{3.14}$$

where,

U: the potential (composite freedom),

x: one of the freedoms and

k: constant.

Hence,

$$F(x) = -\left(\frac{dU}{dx}\right) = 2kx \tag{3.15}$$

Since k is any constant, then "2" does not make any difference. When the force acting upon the dot is defined by the preceding equation, then we talk about the simple harmonic oscillator. The difference between physics and the social sciences is that persons are not particles; they posses their own dynamic, inertia and trajectories. Nonetheless, an abstract socio-political force acting upon such a person maps this person into the simple harmonic oscillator, regardless of the actual motion on the OTM manifold, providing statistically calculable freedoms are equal.

9. The equicomposite lines: was Erich From right ?

It is important to remember that one assumes in this model that individuals do actually differ in their levels of positive and negative freedom simultaneously; that is, the population is differentiated in all possible manners with respect to their levels of freedom. Individuals suffer from both legal and material inequalities, despite hypothetical formal laws guaranteeing them equal rights thus, presumably, equal degrees of negative freedom. A model assuming that all individuals are actually

assigned equal negative freedom requires that negative freedom is the same for all dots. Hence, negative freedom is constant for all values of composite freedom. The latter, therefore, depends on positive freedom only, that is, $F \propto F_p$.

$$C = k\, k_n\, F_p \tag{3.16}$$

where,

k_n: negative freedom is constant.

Equation 3.16 deals with material/energetical inequalities only which are best approximated by the levels of living in terms of income.

Let us analyze a situation when composite freedom is the same for all persons who are assigned different values of negative and composite freedoms. A collection of all dots constitutes an equicomposite line, that is, C = const. Then,

$$\left(\frac{k}{C}\right) F_n\, F_p - 1 = 0 \tag{3.17}$$

where,

C = const

Hence,

$$F_n = \left(\frac{C}{k}\right) \frac{1}{F_p} \tag{3.18}$$

The equicomposite line is a hyperbola. It represents a situation when a decrease in one freedom is numerically compensated by the other one. A certain equilibrium exists along the equicomposite lines. This situation is described in verbal theory by Huxley and later by Huntford:

> The society described in *Brave New World* is a world-state in which war has been eliminated and where the first aim of the rulers [here: the power holders] is at all cost to keep their subjects from making trouble. This they achieve by (among other methods) legalizing a degree of sexual freedom (made possible by the abolition of the family) that practically guarantees the Brave New Worlders against any form of destructive (or creative) emotional tension.[83]

The equicomposite line corresponds to the statement above, under the condition that sexual freedom is orthogonal to negative and positive freedoms or when sexual freedom is considered as a political one in its moral dimension. In the latter case, Huxley's Theorem must be modified in order to clarify the situation. Huxley's Theorem is applicable only when an equilibrium in a political system is to be maintained by introducing sexual freedom as a dimension compensating positive freedom; otherwise, composite freedom decreases for all persons, providing positive freedom decreases as well.

If the individual is forced by a political and economic system, or does this voluntarily, to "travel" along the equicomposite line in his or her life, then there is no change in composite freedom characterizing that person regardless of varying values of negative and positive freedoms. The best description, however, of the trade off problem concerning negative freedom is given explicitly by From as if it were intended to fit the equicomposite line (the horizontal hyperbola):

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[83]Aldous Huxley, Brave New World Revisited (London: Chatto & Windus, 1964), 42.

> **modern man is still anxious to and tempted to surrender his freedom to dictators of all kinds, or to lose it by transforming himself into a small cog in the machine, well fed, and well clothed, yet not a free man but an automaton.[84]**

Hence, the value of composite freedom is maintained from purely mathematical perspective.

DEF. 3.14.:

From's Theorem ≡ the equicomposite line (hyperbola)

Mathematically speaking, a person limits the number of degrees of spatial-temporal and political freedom, in order to increase or to maintain the value of positive freedom.

10. Statistics.

All classical statistical methods of spatial distribution have their limitations because of a peculiar nature of the OTM. The manifold is warped, instead of being flat. It means that the distances between dots on the manifold cannot be measured using a projection of the OTM surface on the horizontal plane defined by negative and positive freedoms (normal sections to the hyperbolic paraboloid). For every equal increase of positive and negative freedoms, there is a constant increase of the distance between the dots on the surface. The distances are not Euclidean. The only remedy to this problem is to calculate distances between the dots on the curved surface with respect to the surface itself. A mathematical algorithm of conducting all types of

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[84]Erich Fromm, Escape From Freedom (New York: Avon Books, 1971), xii.

statistics concerning spatial distribution on the curved surface is beyond the scope of this work. Nonetheless, it may prove an interesting, but laborious, work for a scientist wishing to work on the interval level of measurement with respect to the OTM.

A social scientist and/or statistician may ask why dispersion of the dots on the OTM should not be measured by the r-Pearson statistic, as argued here. The latter measures dispersion only when one variable is dependent on the other. In this case, negative freedom would have had to be dependent on positive freedom or vice versa. Since both freedoms are generally independent of each other, dispersion cannot be measured by the r-Pearson statistic. A realistic approach assumes a more or less significant differentiation of both variables characterizing every dot. Then, dispersion measured by the r-Pearson statistic immediately equals zero and the whole procedure is rendered senseless. The r-Pearson statistic, so popular in the social sciences, is not flexible enough to define dispersion in this rather complex case. It may happen, nonetheless, that for a given society there is a relation between positive and negative freedom. The model, however, has to be sufficiently flexible so as to comprise all hypothetical relationships in a society where,

1.) positive freedom depends on negative freedom,

2.) negative freedom depends on positive freedom,

3.) there is partial dependence between both freedoms for selected individuals and

4.) there is no relationship between both freedoms, whatsoever, for whomever.

When the dots are positioned in such a manner that they occupy an area resembling a circle filled with the dots more or less randomly, then this situation corresponds to the

last case. This type of positioning excludes the r-Pearson as an appropriate statistic.

The most "unjust", in empathically moral terms, society seems to be the one in which negative freedom depends on positive freedom; that is, where money can buy justice by removing boundary sub-delimiters normally and officially assigned to the person. In such a society, the rich can commit what is normally considered a crime and, subsequently, go unpunished. The range of crimes may vary from common theft to brutal sexual assault and manslaughter. In statistical terms, it means that r-Pearson = 1, or that r-Pearson ranges at least from 0 to 1, where positive freedom is an independent variable. Hence, one can devise the following definition:

DEF. 3.15.:

(r-Pearson = 1) ≡ the most "unjust" society

The OTM World Model assimilates all cases from (a) through (e).

The most appropriate type of statistic for the OTM is the nearest neighbor statistic (R_n) widely used in Human Geography:

> In a random pattern, the location of any one point is in no way influenced by the location of the other points in the distribution. It is this random pattern which is used as the base from which all other distributions are measured, i.e., the extent of deviation from randomness is measured by the nearest neighbor statistic known as R_n. This is achieved by determining the mean distance between dots and their nearest neighbour and comparing it with the value where the distribution is random.[85]

The following definition presents a mathematical condition of a society in which both negative and positive freedoms are almost equally distributed among its members. This is a theoretical definition only, and should not be regarded as a prescription for

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[85]William Vincent Tidswell, Pattern and Process in Human Geography (London: University Tutorial Press, 1976), 193.

an overwhelming social happiness. The more clustered the society is, the more "just" it is as far as the spatial distribution of the dots representing persons is concerned.

DEF. 3.16.:

$$(R_n = 0) \equiv \textbf{An idealistic "just" society}$$

It is interesting to note that an apparently binary concept of justice has to be described by very different statistics in order to define both extreme, and only both possible, values of the nominal variable. r-Pearson = 0 does not imply clustering of the dots on the OTM.

11. Global distributions

If one takes into account the global population as it is, then one can rather safely assume that:

1.) the distribution of positive freedom operationalized as real financial resources; and

2.) the distribution of negative freedom operationalized as degrees of political freedom and expressed, for example, as inversely proportional to the frequency of human rights violations as reported annually by Amnesty International, are normal in the sense of the Gaussian distribution. It is not argued here that this must be the case, merely, it is simply a supporting device.

(ALTERNATIVE) AXIOM 3.: Both negative and positive freedom distributions on the Earth, with respect to the global population, are normal in the Gauss sense.

If this is the case, then a general formula for bivariate normal distribution is[86]:

(3.19)

$$g(F_n,F_p)=\frac{1}{2\pi\sigma_n\sigma_p\sqrt{(1-r^2)}}exp\left[\frac{-1}{2(1-r^2)}\left(\frac{(F_n-\overline{F_n})^2}{\sigma_n^2}-\frac{2r(F_n-\overline{F_n})(F_p-\overline{F_p})}{\sigma_n\,\sigma_p}+\frac{(F_p-\overline{F_p})^2}{\sigma_p^2}\right)\right]$$

where,

overlined F_n and F_p : means,

σ^2_n and σ^2_p : variances and

r: r-Pearson.

[Fig. 3.8. Diagram from Sky&Telescope, copyright(c) 1994 by Sky Publishing Company. Reprinted with permission]

In graphic terms, on flat surface, the resulting distribution looks like a three-dimensional Liberty Bell. Empirically proving this axiom would require a laborious and endless data collection concerning positive and negative freedoms for all inhabitants on the Earth. The "bell" itself is already quite a pretty manifold, but it has nothing to do with the shape of OT manifold. The OTM is "sprayed" with dots. The more clustered and denser the dots, the higher the surface of the "bell" as far as the

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[86]John P. Van de Geer, Introduction to Multivariate Analysis for the Social Sciences (San Francisco: W. H. Freeman and Company, 1971), 77.

flat-surface statistics is concerned. The dots on the manifold are born when the "bell" is projected on the manifold downward, that is, toward the plane defined by both negative and positive freedoms. What we are talking about is actually a process of "sinking" one manifold into another one. The "bell", then, looks like a circular cluster with the highest concentration of the dots in the center of the cluster. The center of the cluster on the OTM corresponds to highest point of the "bell". Interestingly, because of the fact that the manifold is warped upward toward higher values of Composite Freedom, the social reality, or distances, is distorted (bigger) there. Actually, all this requires a little bit of a geometric aerobics, so to speak, but is very easy to comprehend.

[Fig. 3.9]

(ALTERNATIVE) AXIOM 4.: The global population is as stratified as possible and the distribution of both freedoms is as "injust" as possible.

In this case, the worst scenario is taken for granted; all consequences of globalization, Free Trade and the end of the work in the Rifkin sense are taken into account in their most extreme versions:

[Fig. 3.10]

The preceding two axioms present antagonistic social situations (according to once adopted modes of classification) of an approximated social "justice" and absolute

"injustice". It is the author's opinion that AXIOM 4 better corresponds to the actual situation, alas.

12. Entropy and negentropy

A spatially clustered group of persons of similar characteristics indicates a negentropic shift from equally probable states to less probable ones, where persons are not randomly distributed and are surrounded by persons with different characteristics. In the case of a heavy clustered society (a "just" society), all persons are "packed" into a very small abstract, not spatial, area defined by positive and negative freedoms. If all persons are contained in a very small area, then this area is the whole area possible and existing for these persons. Other values of freedoms have no meaning since there is nobody "over there". In short, there is nobody with respect to whom one is poorer and less free. It means, that the abstract area of the OTM makes sense only if at least one person is positioned far away from the clustered, if any, area. Then, the more persons who are dispersed over the OTM, the bigger the area of social "injustice". There is no "injustice" if there is nobody far away from the cluster. If all persons occupy a very small area then they possess almost the same characteristics. Hence, there is maximum entropy, and not negentropy. Maximum entropy indicates the same probability for all the persons.

H. The Orthogonalized Chromatic *Orbis Terrarum* Manifold World Model.

When analyzing the OTM, one concludes that there are two potential

drawbacks:

1.) The OTM does not tell the difference between negative and positive freedoms as far as a numerical value of composite freedom is concerned. The equicomposite lines, resulting from keeping the value of composite freedom constant, assign equal composite freedom for two persons who are in two, diametrically opposed socio-political situations: an imprisoned wealthy person having access to all material goods has the same numerical level of composite freedom as a homeless and starving person with a passport valid for all countries. Hence, it is common sense which tells us that two different freedoms should be assigned different values according to one's subjective preferences. The best way to resolve this purely arithmetical paradox is to assign different colors to both types of freedom. Negative freedom may be green, while positive freedom may be red, just for example. In the middle of the OTM, that is, along the forty-five degree curved line originating at the center of the coordinate system, two colors add to each other. In order to achieve the best mix of two freedoms, one should follow this line where both colors either add to each other or cancel each other out. Thus, the improved OTM is called the Chromatic *Orbis Terrarum* Manifold (COTM).

2.) Negative freedom comprises two different types of freedoms: spatial-temporal (x,y, z, t) and abstract political-legal ones. In other words, the dimension representing negative freedom is jammed with two different configuration spaces in order to reduce the dimensions of the OTM itself. This trick is often used in physics, where one dimension represents the three-dimensional euclidean space denoted as Space, and the

second dimension represents Time. The three dimensions are "smashed" into one in order to visualize four-dimensional issues in physics. By the same token, the OTM uses the same kind of "smashing". The only solution is to orthogonalize the OTM, as was done with the O'Toole Executive Compass. This operation creates a new manifold: the Orthogonalized Chromatic *Orbis Terrarum* Manifold (OCOTM).

Negative freedom, then, splits into negative freedom proper in political terms, and spatial-temporal freedom in topological terms. As a result, one has to add an additional dimension: F_s. Equation 3.10 gets modified in the following manner:

$$C = k F_n F_p F_s \tag{3.20}$$

The equation of the surface also gets modified:

$$k \frac{F_n F_p F_s}{C} - 1 = 0 \tag{3.21}$$

where,

F_s: spatial-temporal freedom as an additional dimension.

It is sufficient to keep constant the value of composite freedom, and to substitute the vertical dimension with spatial-temporal freedom. After simple transformations one

obtains the following new equation of the surface for $C = const$:

$$F_s = \left(\frac{C}{k}\right)\frac{1}{F_n F_p} \tag{3.22}$$

Since C and k are constant, then one can draw a surface in a three-dimensional space defined by three dimensions: spatial-temporal freedom, negative freedom and positive freedom. The real OCOTM, however, is composed of many surfaces (infinitely close to each other) drawn for different values of composite freedom.

[Fig. 3.11]

1. The gradient

Since C is analogous to the potential U and $\Delta C = C_2 - C_1$, then:

$$\nabla = \left[\frac{\partial}{\partial F_n}, \frac{\partial}{\partial F_p}, \frac{\partial}{\partial F_s}\right] \tag{3.23}$$

The difference between any two composite freedoms equals then:

$$\Delta C = \int_{1}^{2} \nabla C \, ds \tag{3.24}$$

where,

s: any curve between points C_1 and C_2

Equation 3.24 is a simplification (a modern tensor notation) of a general equation for the change in the potential energy for the system in three dimensions:

$$\Delta U = -\int_{x_0}^{x} F_x \, dx - \int_{y_0}^{y} F_y \, dy - \int_{z_0}^{z} F_z \, dz \tag{3.25}$$

where,

$\Delta U = \Delta C$,

F_x: the political force decreasing the person's negative freedom (libertarian freedom),

F_y: the political force decreasing the person's positive freedom (level of living) and

F_z: the political force reducing the person's spatial mobility (freedom to travel).

ΔC is the change in composite freedom for the system as the person moves from the point ($F_{n(0)}$, $F_{p(0)}$, $F_{s(o)}$) to the point (F_n, F_p, F_s). Hence, if one takes the whole and

complete set of all possible curves, then $s = \sum s_i$. We assume that the system is conservative, then:

DEF. 3.17.:

> **ds ≡ the person's world line through the civilizational configuration space defined by negative, positive, and spatial freedoms from the initial pseudosingularity (birth) to the final pseudosingularity (death)**

where,

the initial pseudosingularity: point of entry to THIS world (the OCOTM),

the final pseudosingularity: point of departure from THIS world (the OCOTM)

Equations 3.24 and 3.25 are of enormous philosophical consequences. It means that only the difference between the initial and the final state counts as the measure of (in)justice = Δ civilizational power = Δ potential civilizational energy, regardless of transitory (temporary) states of being. If one considers the complete world line, and it is additionally assumed that $C = 0$ at the point of entry and at the point of departure, then $\Delta C = 0$; anywhere within the world line $\Delta C \neq 0$. This interpretation is as close as possible to metaphysics and theology, which are beyond the scope of this work. To merely mention the gist of this whole business: $\Delta C = 0$ describes what our life is worth, with respect to the other side behind the pseudosingularity (normal sections to the parabolic hyperboloid). While it is not even attempted here to discuss time travel as the ultimate degree of freedom (in the case of

the OCOTM), for the sake of the reader's mental health, however, let us remember that negative and positive freedoms ought to be colored appropriately, at any rate.

2. The "red shift" global community

If positive freedom is colored in red, then the dots positioned far away from the cluster or from the lowest dots on the vertical axis of the OTM (composite freedom) are actually further away on the surface of the manifold then their position as projected on the horizontal plane. This stems from the very equation defining composite freedom. If it is so, then the distance between a dot having coordinates of, let us say, two units of negative, and two units of positive, freedom and a dot having coordinates of four units of freedom, respectively, is greater than the distance of the first dot from normal sections to the hyperbolic paraboloid (socio-political pseudo-singularity). If one wishes to compare this phenomenon with an astrophysical phenomenon of the red shift, then this is the case. Galaxies that are further away are escaping from us faster. If so, then no wonder that the rich get richer; by no means should it be regarded as a far-fetched metaphor. Pure financial power, expressed in practical terms as the level of living, is secured not by hard physical or intellectual work, but by compound interest where money begets money. The concept of compound interest is so simple that it should discourage most people from working for a minimum wage, for anybody. Nonetheless, people work in slave conditions because they have to work in order to survive, biologically, on the OTM. Hope, no matter how irrational, and responsibility for offspring keep human beings alive. On

the other hand, the situation of the rentier class falls under Point Nine of the Zbigniew Brzezinski's *"Descriptio Orbis Americanum":*

> A greedy wealthy class - which tends to oppose genuinely progressive taxation (even though the most affluent fifth accounted in 1991 for 46.5 percent of all income, while the poorest fifth accounted for 3.8 percent of all income); which in some egregious cases is quite prepared to practice massive illegality in an effort to enrich itself...[87]

Indeed, in The Wall Street Jungle, Richard

> Ney told the story of old-time gangster Lucky Luciano, visiting the floor of the exchange before he was deported to Italy. When the operations of floor specialists had been explained to him, Luciano recounted, "A terrible thing happened. I realized I'd joined the wrong mob.[88]

Harsanyi's utilitarianism expresses itself in a definition of general theory of rational behavior that, according to Harsanyi, is divided into an individual decision theory (utility theory) and a theory of rational behavior in a social setting. The latter is divided into a game theory and ETHICS that is defined as a rational pursuit of the interests of society as a whole. Hence, ethical problems are unavoidable, by definition, under the holistic approach to global problems. Moreover, welfare economics becomes a subdivision of ethics.

The "red shift" global community is characterized mainly by enormous inequalities in positive freedom assigned to persons. Let us simplify this situation and allow us to deal with the most democratic and developed countries. Such countries assign, formally, a very high, and simultaneously equal, amount of negative freedom to all persons while allowing for unlimited differences in positive freedom. The European Community and the Anglo-Saxon world are the best example. One can

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[87]Brzezinski, 105.

[88]Herschel Hardin, The New Bureaucracy (Toronto: McClelland & Stewart, 1991), 109.

define all these countries according to the OTM:

(3.26)

$$\textit{Occidental liberal democracy} \equiv (F_n \approx const) \wedge (F_p \geq 0)$$

which mathematically translates into

DEF. 3.18.:

$$\textit{Occidental liberal democracy} \equiv \left(\frac{\partial C}{\partial F_p} = const\right)$$

By the same token, one can define oriental totalitarian communism during the period of the Cold War, when Europe was artificially divided between the superpowers. The basic characteristic of this system was *uravnilovka* or "levelling down", with respect to positive freedom assigned to blue- and white-collar workers. In order to prevent inequalities in positive freedom, large and medium-size private enterprises were forbidden. In exchange, the authorities were above the law and were accountable to themselves is what resulted in chronic violations of human rights.

DEF. 3.19.:

$$\textit{Oriental totalitarian communism} \equiv \left(\frac{\partial C}{\partial F_n} = const\right)$$

[Fig. 3.12: Graphic interpretation]

Both civilizational formations were orthogonal to each other. If one assigns a very small difference of freedoms that are kept constant in a given formation, then one obtains a rectangular belt stretching from the initial pseudosingularity and is perpendicular to it for given formations. The graphic result is a set of perpendicular and very thin rectangles parallel and, simultaneously, perpendicular to normal sections. At the upper end of each rectangle, the power holders were located. If so, then globalization is unification of the power holders comprising about twenty percent of the global population, according to Rifkin.

J. Conclusion

The OTM (OCOTM) World Model has three main components:

1.) global population of living units defined as persons,

2.) matter-energy assigned to persons,

3.) civilizational space assigned to persons (spatio-temporal and political).

A triadic relationship arises from a mutual interaction of the three components of the *skleronomic* OTM (OCOTM) World Model:

GLOBAL POPULATION

(the dots on the manifold)

MATTER-ENERGY — CIVILIZATIONAL SPACE

(positive freedom) — (negative freedom)

Fig. 3.13. Triadic relationship

The third component is naturally limited because the Earth is of finite dimensions (spatial freedom), while there are natural limits on degrees of abstract political freedom resulting from self-preserving codes of behavior like Decalogue's, the US Constitution, the Universal Declaration of Human Rights, customs and taboos, etc.. The second component is limited because natural resources including breathing air and water are limited. The first component is limited because it cannot live in THIS world without the previous two that are limited.

Hence, a global problem to be solved is:

What quality with respect to what quantity ?

What quantity with respect to what quality ?

There is another fundamental problem. We really do not know whether the total energy of the system is constant. If, in general, certain forces acting upon the system of the dots are conservative and others are not, then the total energy is not constant. There may exist forces preventing the dots from moving from one point to another on the manifold. If so, then we can say that social structures are analogous to the friction forces. But then, one ought to use a dynamic version of the OTM (OCOTM) in order to include friction forces which, of course, act when a dot is moving. As long as nothing moves "over there", the OTM (OCOTM) suffices to describe a general situation interpreted as a snapshot in a particular instance of time. In this particular sense the social sciences are more difficult than physics: "physicists are not better mathematicians; rather the math of physics is easier. The best concepts

of physics, and the best equations of physics, are simple and elegant."[89] Nonetheless, a purely theoretical modelling of the human universe on the Earth that draws upon achievements in political studies and modern physics is an interesting intellectual exercise. An interplay of ideas and concepts under the holistic paradigm should be more useful than a confrontational and exclusionary one-dimensional approach.

[89]Behn, 412.

IV. SUMMARY AND RECONFIGURATION

A. Summary

The previous chapters dealt with global structures, taking into account different concepts common to modern analysis in Political Science. The models allow for a more precise and mathematically translatable redefinition of very important concepts of modern Political Science. The geometric approach permits for a better visualisation of the subject matter, while rendering it more comprehensible for the artistically gifted reader. Notwithstanding the obvious differences in both the content and the level of mathematical sophistication, the uniting theme for these models is a psychological aspect of the human being, be it *primum non nocere* principle or its antithesis: Russell's Theorem. The point is that the most advanced analytical tools will not, and should not, replace qualitative insights into humanistic systems, as argued in the Introduction. A qualitative approach must be interpreted, not only as a superior one over the purely quantitative/statistical approach, but also as qualitative in the very sense of quality *per se*. Technocratic quantitative approaches tend to sink into a neverending vortex of the curse of dimensionality in the Bellman sense, as argued by Thom. The preceding statements are of a normative character, and may be regarded as an underlining thesis statement from the social sciences's point of view. It is argued, therefore, that the new society (the true global village or the new civic culture) must first deal with the impediments to a new path of transfiguration, if it wishes to succeed at all, as shown in this work. The advanced, mathematical-physical approach to the subject matter is expected to ease this procedure.

The body of this work in its analytical part (chapter II and III), comprises two different types of structural models: the multicultural models based on endogenous human characteristics (arising from the persons' native characteristics such as culture, religion, etc.), and the *Orbis Terrarum* world model based on exogenous human characteristics (imposed on them by the political and economic decisions made by political and economic power holders within a given structure).

The synthesis stresses the importance of the only constant common to all models: the person. The role of the human personality has been discussed within given models. It is argued that the transfiguration would result in the removal of the impediments to the true global village, hence enabling its existence. The true global village must be composed of empathic persons, otherwise, it cannot exist, by definition. The transfiguration of the persons would remove the structural impediments because:

1. The lowest common denominator in the multicultural global society cannot be found when the persons, political players, do not agree to find it, voluntarily, in order to adopt the private-public model of the true global village (the new civic society); and

2. Stratification, as an opposite to clustering, of the global society cannot be annihilated when the political power holders, in the composite sense of freedom, do not agree to do it voluntarily.

Voluntary change in the mode of thinking towards those directions is possible among empathic individuals. The integration of academic disciplines is a condition

sine qua non for transfiguration, since it is technically impossible to transfigure the part into the whole, while the opposite is always true and possible by a means of exclusion as opposite to inclusion. Integration corresponds to the environmental changes affecting the person. Transfiguration, by a means of a still unknown genetic mutation, is also a prerequisite *sine qua non* because of the demise of the Lockean paradigm. Genetic alteration corresponds to changing the person's genetic code responsible for brain functions, resulting in the empathic mode of thinking.

B. Eternal return

This term was coined by a great political philosopher Friedrich Nietzsche. Unlike all previous metaphors, there will not be a metaphor between Nietzsche's doctrine of eternal return and any cosmological principle. Eternal return is often misinterpreted as self-renewal of the universe; that is, there will be second Earth, and everything will repeat itself in a never ending process of a carbon-copy repetition. Such a phenomenon is best represented in physics by Poincare's Recurrence Theorem.

Alas, "whatever eternal return is, it is not a theory of the cosmos."[90] Nietzsche never defines this term precisely; nonetheless, one can draw a conclusion that eternal return is a description of a particular manner of existing in this world.[91] Eternal return is to "finally break the hold that European nihilism has on men".[92]

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[90]Tracy B. Strong, Friedrich Nietzsche and the Politics of Transfiguration, (Berkeley: University of California Press, 1975), 265.

[91]Ibid., 265.

[92]Ibid., 269.

Furthermore,

> Nietzsche understands eternal return to produce in human beings a transformation sufficiently deep and general as to completely change the nature of all interactions men have with themselves, with others, and with the world around them. Men are transfigured.[93]

Hence, one must talk about a certain mental reconfiguration, and not about a self-renewing universe, nor about a history that repeats itself. Mental reconfiguration would bring about a reconfiguration of the global civilizational manifold, since *zoon politikon* is its main component. Moreover, thanks to contemporary Québécois astrophysicist Racine, we already know that the universe will expand, forever, faster and faster, therefore, there will not be any cosmological return.

C. Global and local reconfiguration: the current situation

The following manifesto concerns mathematics *per se*, however, it presents in a brilliant way, the most fundamental problems of contemporary science and humanity. This is a reinstatement of the main ideas presented in Chapter I of this work. It is about the struggle for a new *homo sapiens*:

> The Doctrine of the Whole Man
>
> Mathematics has elements that are spatial, kinaesthetic, elements that are arithmetic or algebraic, elements that are verbal, programmatic. It has elements that are logical, didactic and elements that are intuitive, or even counter-intuitive. It has elements that are related to the exterior world and elements that seem to be self generated. It has elements that are rational and elements that are irrational and mystical. These may be compared to different modes of consciousness.
>
> To place undue emphasis on one element or group of elements upsets a balance. It results in an impoverishment of the science and represents an unfulfilled potential. The doctrine of the whole man says that we must bring everything we have to bear on our subject. We must not block off arbitrarily any mode of experience or thought. "There is a Nemesis",

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[93]Strong, 271.

says Whitehead, "which waits upon those who deliberately avoid avenues of knowledge."[94]

Taking into account a rather widespread ossification of current Canadian academic programmes in political studies, and their incompatibility with surprisingly decades-old "new" trends and discoveries in the subject matter, it is the author's opinion that this work constitutes a thermonuclear attack on both content and structure of higher education, to speak metaphorically. This opinion may only be defended by indicating what is going to happen in a case of a sacred, doing nothing. The blunt attack pales compared to the problems resulting from doing just nothing. Public policy, politics and teaching are done by human beings. *Zoon politikon* interplays with others and is affected by them, and the environment. Truly, it is the center of political studies, even in their holistic and environmentally oriented character. The quality of a political human being is of unrivalled importance, together with the quantity of the population. The three activities mentioned above affect both quantity and quality. As long as they are conducted by one-dimensional human beings in the Adorno-Marcuse sense, there is no solution to multidimensional problems on the global level. A one-dimensional human being living on the multivariable political manifold corresponds to a scalar being immersed in the latter. As such, it cannot understand, nor resolve, problems that are too complex. A scalar human being, as a power holder, decides about the destiny of other scalar living units. Worse, there are, and always were, multidimensional human beings such as Leonardo da Vinci,

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[94]P.J. Davis and J.A. Anderson, "Nonanalytic Aspects of Mathematics and Their Implications for Research and Education", SIAM Rev., (1979), 112-125, cited in Murray S. Klamkin, Mathematical Modelling: Classroom Notes in Applied Mathematics (Philadelphia: SIAM, 1987), v.

Isaac Newton and Copernicus. A tragedy occurs if their actual lives are controlled and shaped by scalar people. A scalar society, composed of scalars persistently awards with the highest income, nude dancers, rock singers and basketball players. This is a one-dimensional culture. According to Adorno:

> any social system which denies basic human abilities creates insecurity. The feeling that we have a power we cannot employ is a frightening feeling. In any case, popular culture is geared to produce a substitute, false security that is none the less effective. It does so in two ways: first through standardisation of its products. All aspects of popular culture - from television soap operas to pop records to sporting events - attempt, in their various ways, to emphasize the familiar and the secure. At the basic level, plots, lyrics, rhythms, the order of play, are the same and interchangeable with each other....At the same time these basically standardised products are given a gloss of false individuality, leaving the impression of a freedom of choice and an individuality of meaning. We can argue endlessly about which pop song is the better, which football team is the better and all the time we arguing about superficial differences and gaining a false security from the underlying similarities.[95]

Often, too often, the scalars rule over higher-order tensor people, such as the three mentioned, and over the environment, by means of public policy on all governmental levels. Despite a propaganda in the mass media focusing on less-than-university educated people and blue-collar workers who should be retrained because of the end of work in the Rifkin sense, political alienation concerns not only those already economically excluded and/or uneducated ones, but also tensors such as Kołakowski, who complains:

> I confess that I did not take part in the last parliamentary election in Britain; when I followed the electoral propaganda I saw that all political parties assume as a matter of course that I am a moron; therefore, I said to myself, for whomever I vote I confirm, that, indeed, I am a moron (...)[96]

The problem is even more serious than it would appear, and it stems from the very

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[95]Ian Craib, Modern Social Theory: From Parsons to Habermas, (New York: St. Martin Press, 1992), 218.

[96]Leszek Kołakowski, "Introductory Remarks", Dialogue And Universalism, vol.5, no.1/95

nature of democracy. Under a classic division of positions between appointed and elected ones, the latter require competition on behalf of the political players in order to be elected. They must present themselves and their programs in the best light. Alas, it has been recently discovered "that leadership skills and the ability to deceive do, in fact, go hand in hand."[97] Moreover, as Dorothy Parker pointed out, there are only three things required of a male by a female: "he must be handsome, ruthless, and stupid".[98] Ignoring genetics resulting in peculiar empathic morality in public policy and political thought is no longer viable, since the intelligence of individuals which the general population is composed is linked to chromosome X. Hence, the intelligence of human beings depends on the intelligence of their mothers. Males inherit their level of intelligence from their mothers, exclusively, while females inherit it from both parents.[99] Ignoring scientific discoveries concerning *zoon politikon* equals ignoring science in the business of science. Since the majority of elected politicians is composed of males, and half of the electorate everywhere is composed of females, then no wonder that we live in the world as it is now, despite the apparent successes of democratic ideas after the fall of the Soviet Union. Democracy itself does not resolve global problems by virtue of introducing the democratic polity on the global manifold:

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[97]Lisa Degliantoni referring to Keating, Caroline and Heltman, Karen in Personality and Psychology Bulletin, vol. 20, no. 3. in "Making Leaders and Mis-Leaders", Psychology Today, March/April 1996, 12.

[98]Frank Pittman, "Brush with Loneliness", Psychology Today, January/February 1996, 88.

[99]Dr. Nancy Snyderman, Good Morning America, ABC network, June 28, 1996.

> nor are free elections in and by themselves any guarantee of a free society. The Nazis in Germany came to power under reasonably free elections. People can be taught in both subtle and brutal ways to prefer repression to freedom. Repressive vested interests in a democracy can dominate the press, radio, television, set standards for "sound" appointments in academic life, and influence the climate of opinion to the point where "free elections" become meaningless, or even a reactionary slogan. The notion of free choice makes no sense where the person making the choice has been systematically deprived of insight into the meaning of his action. Totalitarian dictatorship try to accomplish this by terror and propaganda. Modern democracies may get the same results more effectively by presenting the citizens with pseudo-alternatives.[100]

No wonder our global civilization may head towards a global political, socio-economic-environmental disaster. Being an elected political decision maker requires everything but shyness. But, surprisingly, Harvard's studies have shown that shy children are apt to be especially empathic.[101] Free market and mass media democracy cannot promote shy and thus, potentially, empathic adult decision makers:

> For any society to function well, a variety of roles need to be played. There is a place for the quiet, more reflective shy individual who does not jump in where angels fear to tread or attempt to steal the limelight from others. Yet as a culture we have devalued these in favor of boldness and expressiveness as a means of measuring worth.[102]

Young people are particularly affected by intensively, non-empathic public policies of all governments. They suffer not only economically, but also experience deep frustration due to status inconsistency in the Bailey sense as presented by one of their representatives:

> Growing up, I looked to the stars and was convinced that the solutions to Earth's problems lay there. I read the works of O'Neil, Stine, and Niven, and watched *2001* as well....
> Instead, I exist in this time line of lost opportunities. Looking toward the future I am grateful

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[100]Barrington Moore, jr., Political Power and Social Theory, (New York: Harper & Row, 1958), 208.

[101]Bernardo J. Carducci, and Phillip G.Zimbardo, "Are You Shy?", Psychology Today, November/December 1995, 78.

[102]Ibid., 78.

not to have children, and I feel for friends of mine who do.[103]

It seems that a lot of human and environmental suffering is required before a destruction of the global manifold. No appeal, no protest, no moral discourse can affect the scalars. Only a dramatic, non-linear reconfiguration of the global manifold can result in *metanoia*. Despite hopelessly optimistic attempts of the higher-order tensors, the situation is getting worse. Global pollution, depletion of non-renewable natural resources, corporate and governmental Downsizing, contempt for humanity resulting in mass poverty, ethnic cleansing, politics of exclusion through layoffs of older and experienced workers and not hiring the young educated ones, export of jobs to slave-wage countries; all these phenomena evolve, instead of devolving. The twentieth century was the most ambiguous one ever. Had restrictionism won, there would not have been more than six billion people on the Earth; had utilitarianism won, there would not have been astronomical disparities in the level of living among people today. Currently, a virulent form of restrictionism reigns all over the Earth and results in suffering, fear and hopelessness. The real solution must be found in the twenty-first century.

At the same time, contemporary universities work against Renaissance ideas of holistic thought and multidimensionality. They produce hordes of precisely manufactured, scalar Ph.Ds, well qualified to be officially certified as little cogs in a machine they do not understand at all. The most fashionable sport today seems to be criticizing and producing critiques of critiques:

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[103]Edward D. Reber, "*2001* at Twenty-Five", Sky & Telescope, December 1993, 5.

> Pseudoscientists frequently reveal themselves by their handling of the scientific literature. They regard any statement made by any scientist as being open to interpretation, just as in literature and the arts, thinking that such statements can then be used against other scientists. They focus upon the words, not on the underlying facts and reasons for the statements that appear in the scientific literature.[104]

Structural change cannot be implemented without a recognition of the human factor. Getting rid of Pseudoscientists is one thing, but replacing them is another thing. A general norm would be finding and supporting creative people. They are characterized by ten fundamental traits and discovering them is not difficult at all. Creative people:

1. have a great deal of physical energy, but they are also quiet and at rest,
2. tend to be smart yet naïve at the same time,
3. combine playfulness and discipline or responsibility and irresponsibility,
4. alternate between imagination and fantasy, and a rooted sense of reality,
5. tend to be both extroverted and introverted,
6. are humble and proud at the same time and
7. escape rigid gender stereotyping.[105]

The latter is a fascinating set of characteristics. For example,

> creative boys are more sensitive and less aggressive than their male peers. This tendency towards androgyny is sometimes understood in purely sexual terms, and therefore it gets confused with homosexuality. But psychological androgyny is a much wider concept referring to a person's ability to be at the same time aggressive and nurturant, sensitive and rigid, dominant and submissive, regardless of gender.[106]

Providing the path of transfiguration is going to be chosen, new hiring procedures will have to eliminate any elements of non-meritorious selection including cronyism, nepotism, party affiliation, ethnicity and all characteristics given at birth but not related to the individual's quality. Intellectual mediocrity, animal tribalism and greed

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[104]Casti, vol. 2, 396.

[105]Mihaly Csikszentmihalyi, "The Creative Personality", Psychology Today, July/August 1996, 40.

[106]Ibid., 40.

were and are strong, very strong. Contemporary humans are willing to commit any dishonest act in order to defend their limited cognitive horizons. They defend their territory like animals, by elimination of potential challengers within an arbitrarily delimited territory such as the university's and corporations's departments . This applies to politics and higher education as well, not only to already disappearing, nine-to-five jobs.

Quality has been betrayed for the sake of easy quantity that increases self-satisfaction without much effort, by means of escape from negative freedom to positive one that is understood as a quick and painless scalar substitute for a chronic and painful tensor reality. Indeed, one may ask whether a creation of the World Government is more urgent right now than ever before. This government would be feasible only if true tensors were given political power. Otherwise, such an enterprise would make all things even worse. Dark scalars ruling over light tensors would make this world much more miserable than it is today. World Government is no longer an issue. The issue is a Tensor World Government, in the author sense, that should allow for the non-linear reconfiguration of the global manifold by means of a Phoenix-like birth of the new. Perhaps a geological, climatic or astronomical, global environmental disaster will trigger this reconfiguration. While still waiting for reconfiguration, one pretends to be optimistic. *Dum spiro spero. Dies nostri quasi umbra super terram et nulla est mora.*

- THE END -

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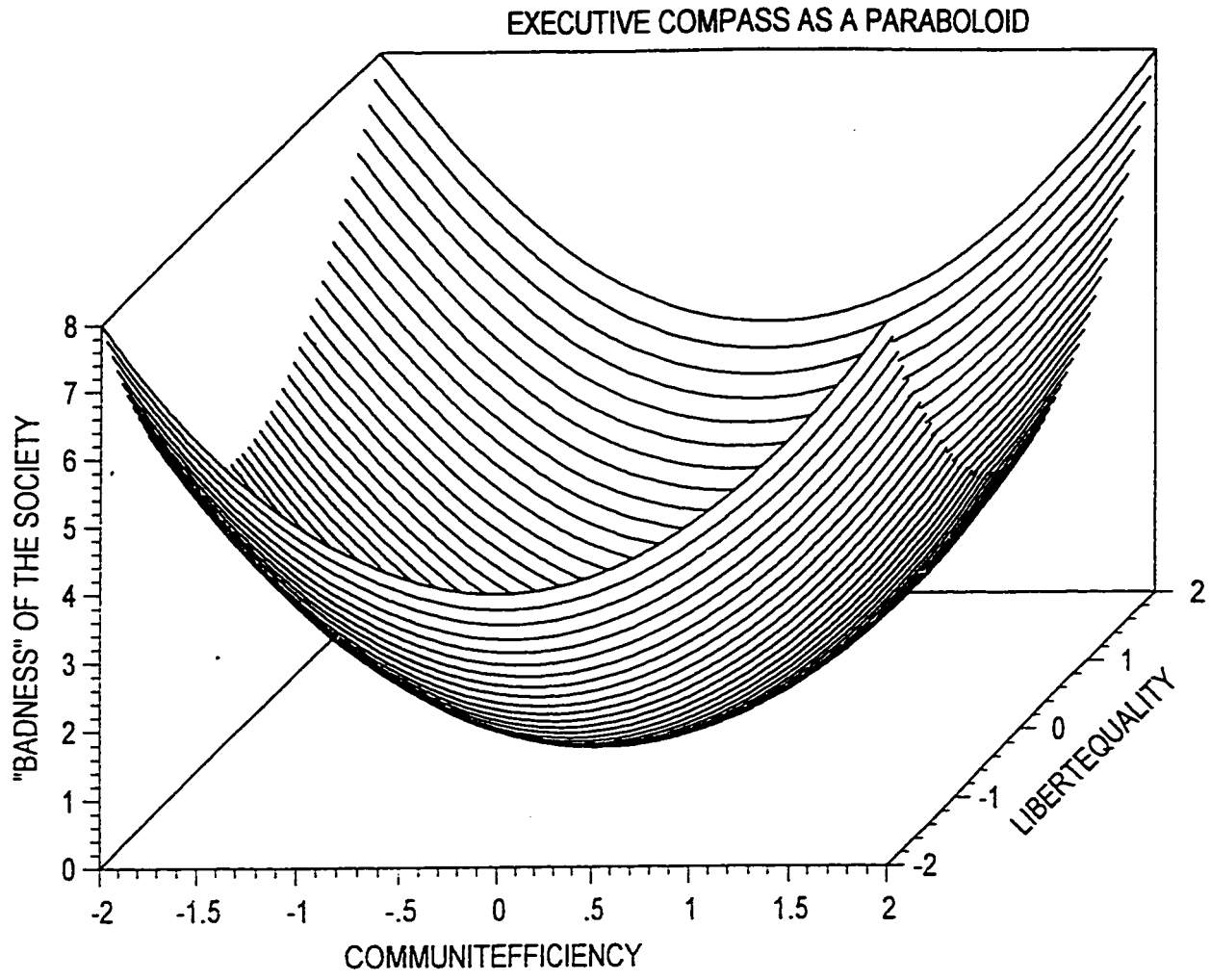
APPENDIX


EXECUTIVE COMPASS AS A PARABOLOID
"BADNESS" OF THE SOCIETY
8
7
6
5
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COMMUNITEFFICIENCY
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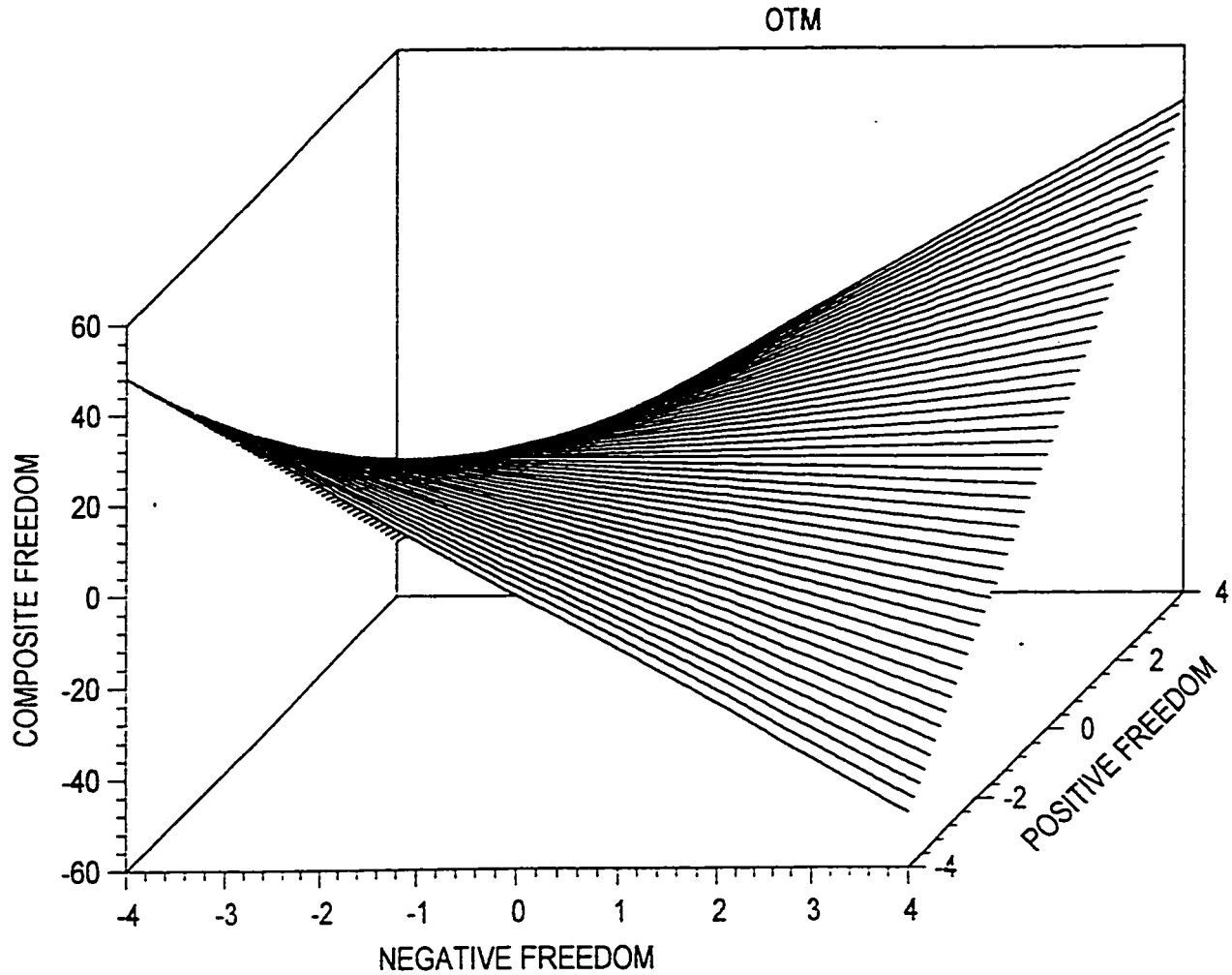
-2
LIBERTEQUALITY

Figure 3.4


OTM
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40
20
0
-20
-40
-60
COMPOSITE FREEDOM
-4
-3
-2
-1
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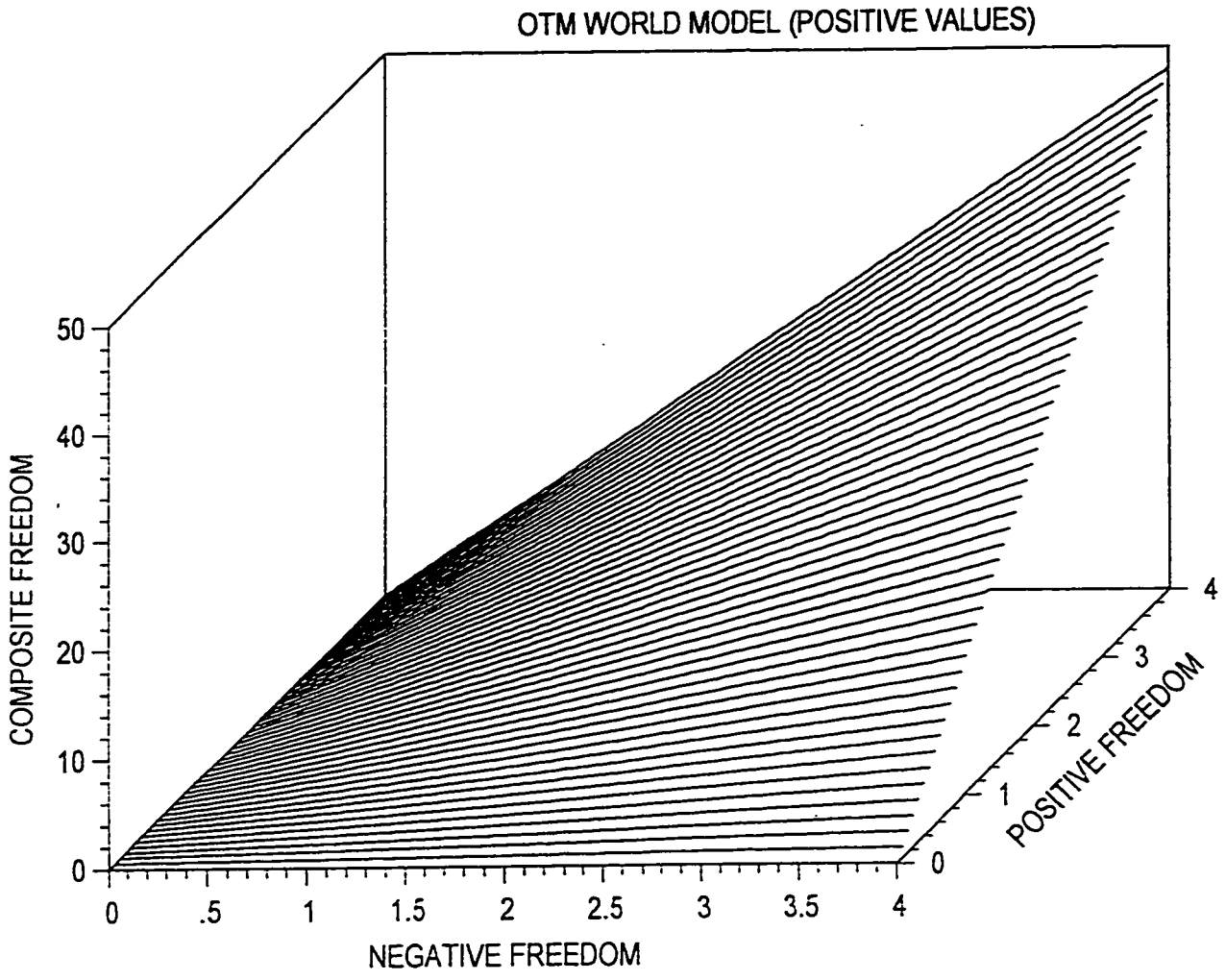
3
4
NEGATIVE FREEDOM
4
2
0
-2
-4
POSITIVE FREEDOM

Figure 3.6


OTM WORLD MODEL (POSITIVE VALUES)
COMPOSITE FREEDOM
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40
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20
10
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.5
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NEGATIVE FREEDOM
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4
POSITIVE FREEDOM

Figure 3.7

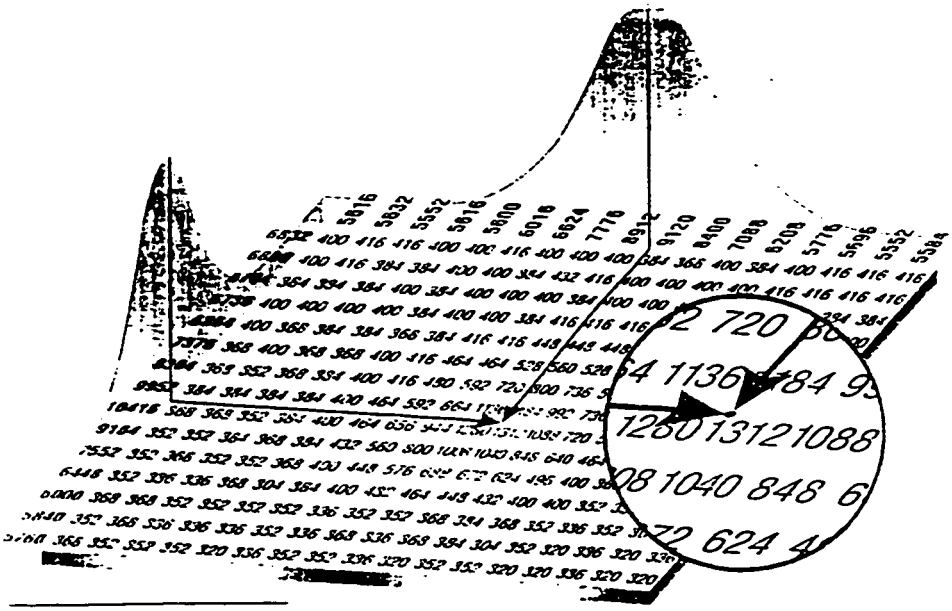
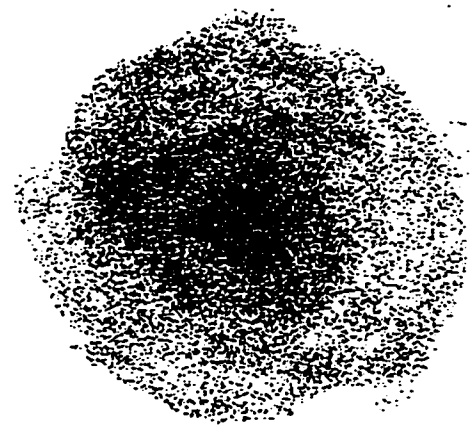


Figure 3.8



AXIOM 3: IS THIS THE GLOBAL POPULATION ?

Figure 3.9

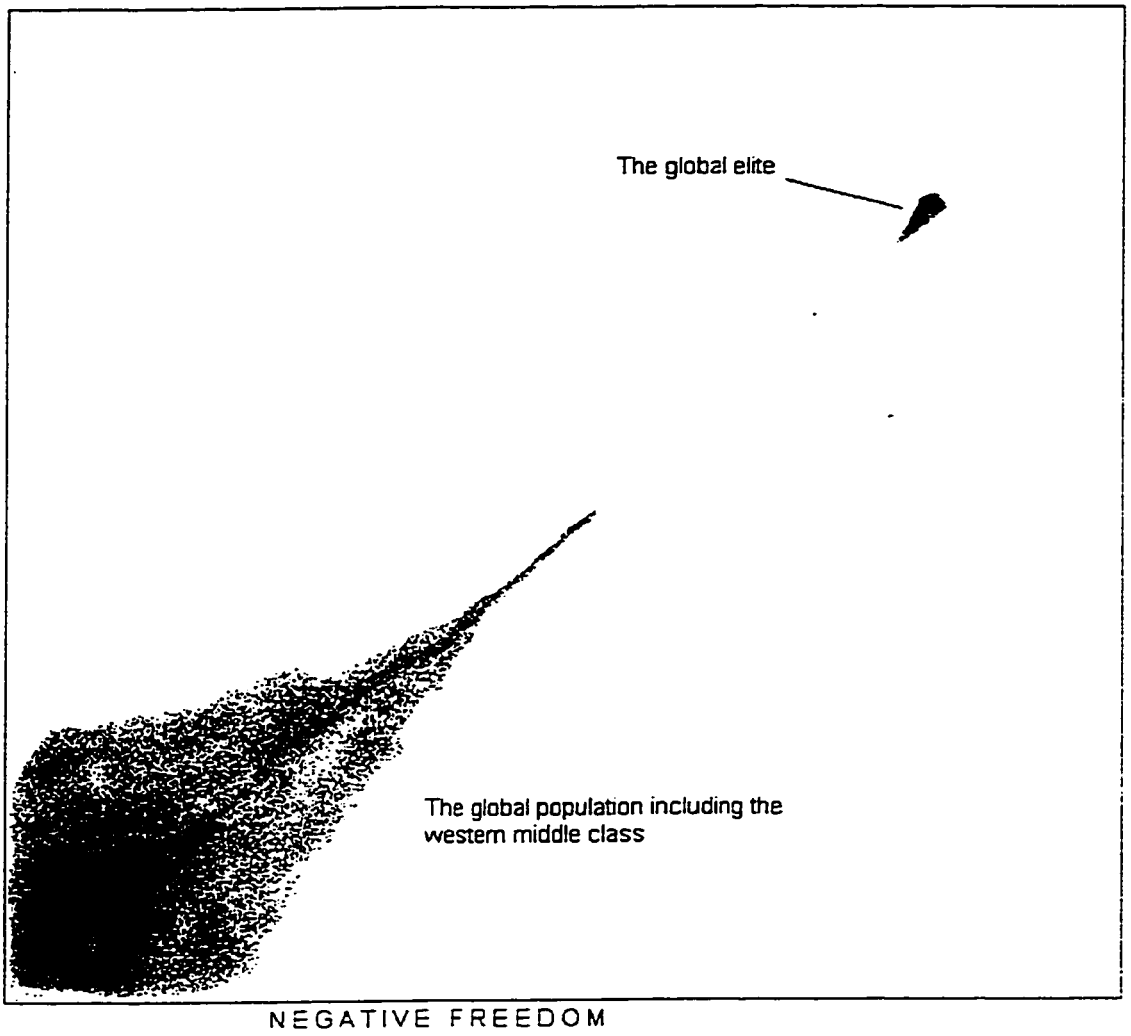
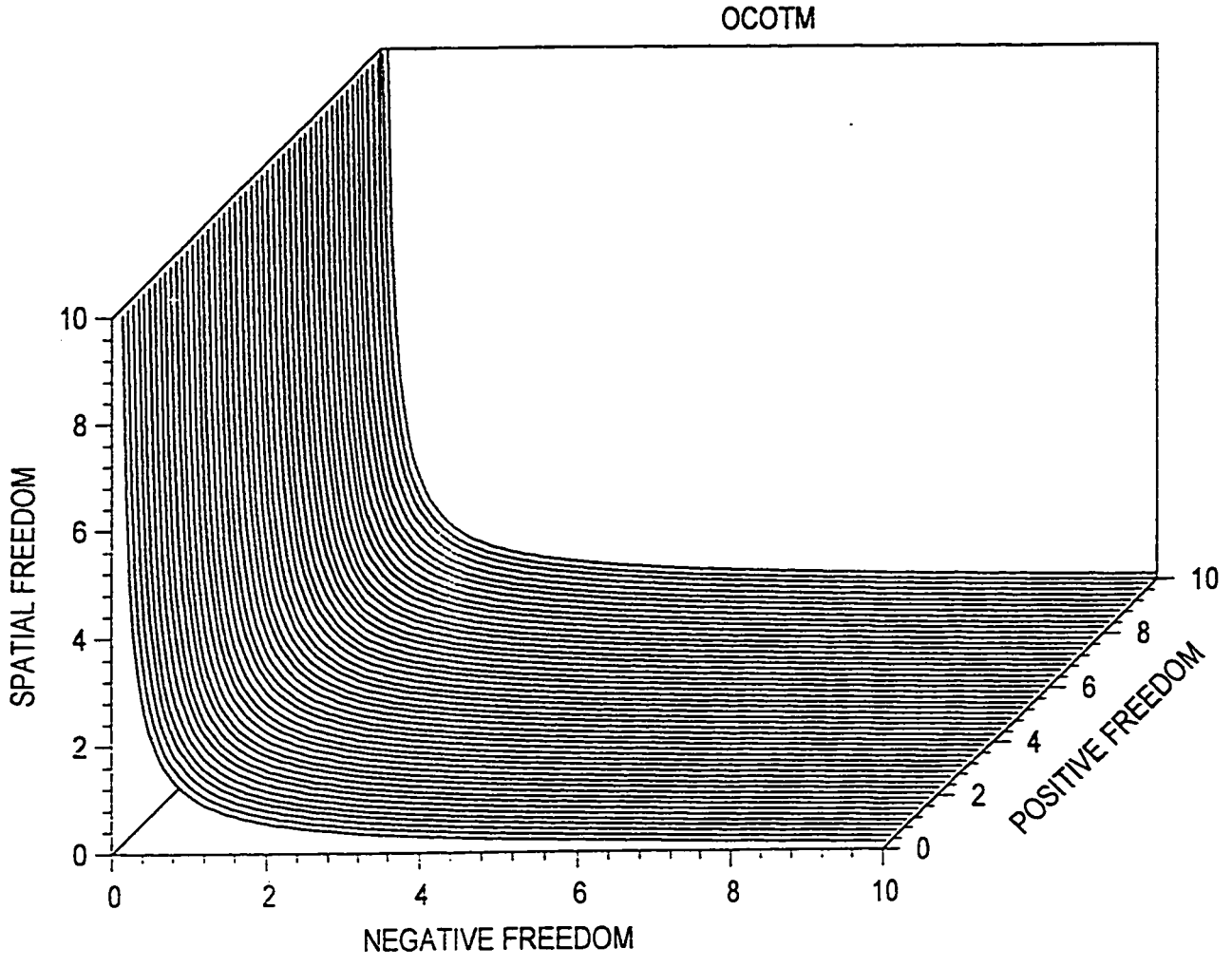

The global elite
The global population including the western middle class
POSITIVE FREEDOM
NEGATIVE FREEDOM

Figure 3.10


OCOTM
SPATIAL FREEDOM
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NEGATIVE FREEDOM
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POSITIVE FREEDOM

Figure 3.11

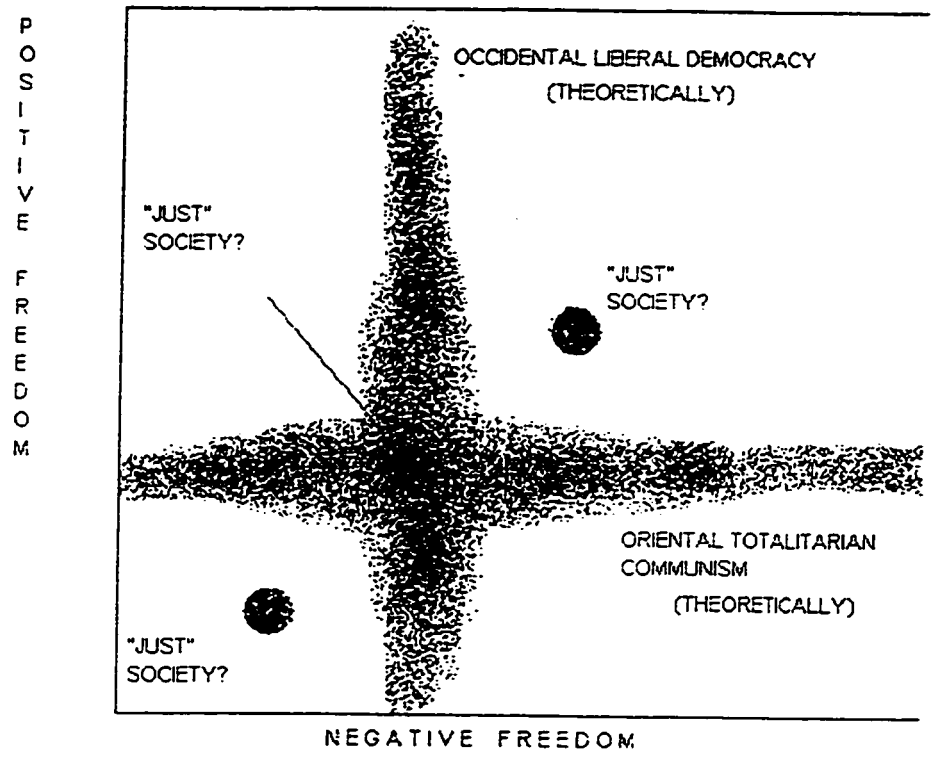
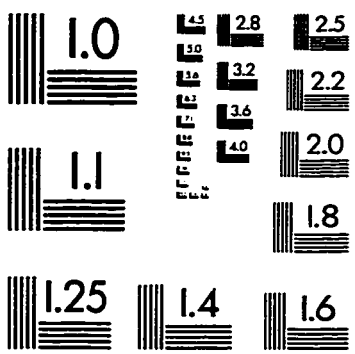
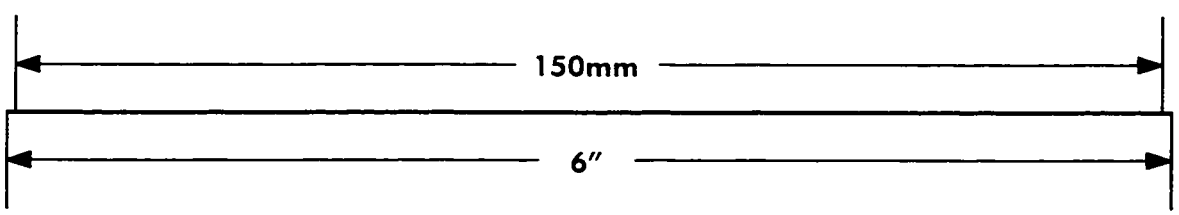

POSITIVE FREEDOM
OCCIDENTAL LIBERAL DEMOCRACY
(THEORETICALLY)
"JUST"
SOCIETY?
"JUST"
SOCIETY?
ORIENTAL TOTALITARIAN
COMMUNISM
(THEORETICALLY)
"JUST"
SOCIETY?
NEGATIVE FREEDOM

Figure 3.12

TEST TARGET (QA-3)





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