

LIFE AND DEATH – HERE AND BEYOND

Solomon Marcus ¹

Death and nothingness

We have in view the representation according to which death is a rupture making the move from *something* to *nothing*. Human beings are always concerned with something, their life is governed by the slogan (in most cases only implicit) *Total disorder does not exist; or, if it exists, it is beyond human capacity to perceive it*. Nothingness is just the absence of any order, of any rule, of any structure, of any thing that can become meaningful for a human being, irrespective his degree of culture and intelligence. There is no positive way to represent nothingness, to imagine it. Only a reaction of spontaneous fear. Various traditions, mythologies, philosophies, religions may imagine different scenarios, allegories for the *after-death*, but they all remain as hypotheses whose coherence and whose plausibility remain for ever open.

Either <life, death> or neither life, nor death

So, it follows that the only way to approach *death* is a negative one: by considering the couple <life, death>, because the only way to approach *nothing* (i.e., no thing) is by considering the couple <something, nothing>.

Life cannot be captured without reference to its negation

But the next step in this clarification process is most surprising: life, in its turn, cannot be captured in absence of reference to its negation. *Dying* makes organic pair with *coming into the world; to be*

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Robert T. Gonzales' questions ³). It seems more appropriate to consider that the stability of the human body is going down progressively. We don't die at some precise moment, because different parts of our body have different itineraries leading to their extinction. But conventionally (for the needs of the bureaucracy of life) we can assume, for instance, as moment of death that when the heart stops.

Dying processes in the living human body

Dying processes begin from the moment of birth, but one can influence their speed. All components of our body have (almost) the same chronological age, but not the same biological age, although these components interact. There is a tremendous gap between Stephen Hawking's very alive, very fresh brain and the rest, near to death, of his body. On the other hand, it is told the case of a pregnant women giving birth to a healthy baby, while her brain was almost dead. So, we enter the problem of the management of different dying processes and healthy processes taking place in the psycho-somatic entity represented by a human person. It is not our job here to cope with the medical side of this problem. We will only point out some aspects of the dying processes resulting from big mistakes in education.

Children's basic needs and rights are not respected

It is important to be aware that most dying processes are produced by mistakes in education, more than by the natural process of aging. Besides the material needs of survival and protection, the need to belong to some social groups, mainly to a family, children have, at each age, some specific needs and some specific rights; they may be not aware of them, they are not capable to give expression to them, to defend them, to act to acquire them. So the adults should take care of

³ Robbie Gonzalez, *The Meaning of Death: How do we know someone is no longer alive?*, <http://io9.com/5915339/the-meaning-of-death-how-do-we-know-someone-is-no-longer-alive> Filed to: Io9 Death Week 6/08/12

them, but in many cases this does not happen. For instance, as soon as the child is capable to walk, his need to change continuously his place should be respected. His curiosity, his need to ask questions should be respected.

Failure in transforming life In a pleasant enterprise

It is children's duty to pay attention to their educator, but the educator should know that children are not trained to keep their attention focused on the same thing for a long time. Children have the right to claim from their educator a discourse that is both intelligible and interesting for their age. Moments like those of entering the school, the passing from childhood to adolescence are crucial; educational mistakes may have irreversible negative consequences, which, judging by their consequences, may become equivalent to crimes. The respective victims may become unable to ever transform their life in a pleasant enterprise.

The pathology of education is for long time in attention of educators. Already in 1971, Ivan Illich published his book *Deschooling Society*,⁴ a critical approach of the educational system in the information era. More recently new warnings appeared; one of them is by Mihai Nadin.⁵

To be alive in learning

Real learning includes as basic ingredients the need to understand, to have a critical attitude, to develop an effort in a state of relaxation and pleasure, to have the right to fail, to commit mistakes, in the attempt to acquire something new. To the extent to which these needs and rights are ignored (and to a large extent they are ignored, for instance mistakes are globally placed under the sign of what is

⁴ Ivan Illich, *Deschooling Society*, New York: Harper and Row, 1971

⁵ Mihai Nadin, *The Civilization of Illiteracy*, Dresden University Press, 1997

bad, deserving to be punished), some negative psycho-somatic effects follow, under the form of *wounds which, after a while, become dying processes*. Everything that throws us in derisory activities, that makes us incapable to develop a personal work, to enjoy it, to enjoy to contemplate some parts of the human historical cultural heritage, may result in a *dying trend*.

To be alive: binary predicate or a matter of degree?

To be alive, to be dead in our daily behaviour are not binary predicates, they are a matter of degree and of typology. A clear example of a high degree of the attribute *to be alive* was described by Steve Jobs, the late Apple co-founder, in his speech at Stanford University, in 2005 - and his life was an example in this respect:

“Your time is limited so don’t waste it living someone else’s life. Don’t be trapped by dogma, which is living with the results of other people’s thinking - Stay hungry, stay foolish.”

Hungry of what? Of looking for answer to some curiosity and this leads to the need of culture. And what does it mean *stay foolish*? It means to free your imagination, your personal initiative, as opposed to “living with the results of other people’s thinking.”

Expected births, misleading expectations

Birth is defined in dictionaries as “the emergence of young from the mother’s body.”⁶ This is the biological birth, which acquires meaning and a sense of life to the extent to which it is followed by some other births: birth of the need to love human being and to interact with other human beings, irrespective their race, nationality, religion, sex, age etc; birth of the capacity to keep under control instinctual aggressive behaviour and to learn that difference of any kind (including difference of opinion) should be approached by dialogue and arguments and not by violence of any kind; need to contemplate and to understand the inert and the living nature; birth of

⁶ *Oxford American Dictionary*, Oxford Univ. Press, 1980

the need and the capacity to enjoy the smile on the face of a child, of a human being in general; birth of the need to pay attention to apparently insignificant things such as the daily rise of the Sun, the flight of a bird, the passing of a dog or of a cat.

Biological births never followed by a spiritual birth

More demanding needs should have their appearance at various moments of life: to listen and to enjoy music, to feel its capacity to place you in a magic world; to read poetry and to remain captured by its charm; to understand a mathematical equation, its high semantic density; to understand a scientific explanation, to be enchanted to learn that behind the Newtonian law of universal attraction is a phenomenon of curvature in the 4-dimensional space-time; to capture the ideas behind great inventions and discoveries in technology and in science, from electricity, radio and computers to periodic table and the common denominator of logic, visual arts and music, etc. So many births never take place in the life of the most human beings and most of them die as cultural slaves. But the tragedy of these births that never occur is it not of the same dimension, if not deeper than that of biological death?

The biggest failure in keeping life worth to be lived is about morality

I have in view the incapacity to educate the new generations as human beings aware of the high value of the human life, of humanity, of human solidarity; to understand that synergy is more important than competition, in the interaction with the surrounding, in order to optimize the conditions on our planet. Education for the global society is a missing topic in most countries. Rejection of violence of any kind is not an axiom of education. Mass media stimulate violence and, as a result, many boys in the primary school believe that different opinions should be resolved by a beating. To be successful by any means is more important than the respect of some moral standards. The *Ten Commandments* are disregarded. The increasing speed of the daily life no longer leaves place for contemplation, for throwing a look to the past, for rereading of writings whose impact on your life was significant. A deficit of affectivity can be observed at the new

generations. Love is more and more replaced by habit. History, the past of all kinds, the experience of your parents and grandparents are less and less into attention. The slogan *Stand on the shoulders of giants* which is brought into attention by *Google Scholar* is less and less appreciated.

**But there are reasons to say:
Life is more attractive today**

Indeed, we are fondled by possibilities of communication and travel which never existed before, information of all kinds is at our disposal, in a few minutes we learn what happened in any other part of the planet. For a lot of illnesses which hundred years ago were mortal it is now a problem of routine to get rid of them. The possibilities to respect the hygienic rules, to keep clean our body are now better than never in the past. Internet and all types of globalization have their contribution to this big change. Moreover, no world war occurred in the last 50 years (if we don't include here the fight against terrorism). The average length of life is increasing. Birth rate is still down in Europe, high in some underdeveloped countries and we cannot avoid the question: Why more and more population, if we are not able to educate its largest part?

High degree of aliveness

Its symptoms are good health, freshness of your senses, of your perception of the world, of your mind; higher level of love, of creativity, of goodness, of virtue, of intrinsic worth, of the capacity to learn permanently, of your interaction with people. Frequent states of enchantment, of detachment from the contingent life, something reaching a state of giddiness, of vertigo. Capacity to realize, in contact with great works of art, of science, of philosophy, of technology etc a mixture of freshness, curiosity, wonder, bewilderment, perplexity, and surprise.

But you cannot be highly alive in all respects

However, perfection in all respects, optimisation of human capacities in all respects are not possible. Any human being, despite

his possible excellence in some respects, will prove mediocrity or stupidity in some other respects. Nobody can optimise at once all human capacities, to bring them at the highest level of aliveness. You are highly alive in some respects at the expense of being at a low level of aliveness in some other respects.

Low level of aliveness, near to deadness

Its symptoms are: frequent states of boredom, incapacity to use the time as a resource of satisfaction, replaced by the need to kill the time by developing all kinds of derisory activities; living as slaves of routine, mechanical gestures, incapacity to think and to behave according to your initiative; dominated by various black holes of human existence: languor, torpor, insipidness, dullness, vice.

The good routine, as a symptom of normal aliveness

Like cholesterol, which is of two kinds, good and bad, routine is of two kinds. The good routine reflects the human need of order and hygiene, of protection and of survival, according to which we follow some rules in the way we wash our body and periodically eat, rest and work, in the way we cross the street and we respect all traffic signs when driving a car, in the way we use various types of machines, from wash machines and refrigerators to mobile telephone, laptop and a sophisticated computer. This type of routine is necessary and it is a symptom of normal life, of a type of aliveness which is acquired by education.

The bad routine, as a symptom of low level of aliveness

Our everyday life is full of *atomic events* such as the act of respiration, of walking, of meeting other human faces, of looking at the sky, at the flight of a bird, of changing a smile with a child. A blade of grass impressed so much Walt Whitman! Many people pay no attention to such things and this is the *bad routine*, malevolent and harmful. If you fail to feel the wonder of the sunrise, of a snowflake, of a blade of grass, of a tree, of drinking a glass of water, of the laugh of a girl, then you fail to capture a large part of the wonder of life, you are deprived of a basic dimension of the human existence and you risk

to fall i boredom. May be, in some cases, this incapacity is compensated by other capacities, for instance in the field of scientific creativity, but I have doubts in this respect.

**The need to love, to understand
Are life's basic ingredients**

In absence of these needs, it seems to me difficult to make life meaningful, to give it a sense. As a direct consequence:

The need of a 'tomorrow'

To have projects, this is an important symptom of aliveness. My colleague Mihai Nadin (director of the Institute of Research in Anticipatory Systems, University of Texas at Dallas; email message, August 10, 2014) considers the anticipatory function as the most significant sign of human life. In agreement with Nadin's reflection, I cannot conceive my life in absence of the next *tomorrow*.

Human semiosis and death

It is generally accepted that the after-death life, if it exists, is something beyond the human sensorial, intuitive or cerebral capacities, all of them being limited to the macroscopic surrounding. The training human beings have received in their long history remained always insight what we call today *the macroscopic universe*. Human language, be it natural or artificial, formal or non-formal, becomes powerless with respect to what happens beyond the macroscopic universe; Niels Bohr paid attention to this fact. See, for instance, David Favrholt's article "Niels Bohr's view concerning language."⁷

Referring to after-death, should we keep silence?

⁷ David Favrholt, "Niels Bohr's view concerning language", *Semiotica* 94 (1-2) 5-34, 1993.

But we can go further and extend Bohr's statement, we can claim that the whole human sign system, not only the language, becomes powerless beyond the macroscopic universe. All scenarios concerning the hypothetical after-death life refer to a universe other than the macroscopic one. So, the only appropriate, intelligent attitude, when we refer to after-death, is to keep silence. Let's try to go deeper in this direction and make explicit all consequences of the fact that our horizon, as human beings, is limited to the macroscopic world.

Humans are macroscopic beings

This means that our way to perceive the space and the time, the motion, the forces, the energy, our way to use logic and language, our way to compute, our whole sign system are those in agreement with our empirical-sensorial-intuitive way to perceive the world. Going one step further, we infer that we perceive the space relations according to Euclidean geometry; we perceive motion, time, forces and energy according to the Galileo-Newtonian physics; the logic of our everyday life is governed by the three restrictions of identity, non-contradiction and excluded middle; the way we compute empirically is correctly mirrored in the functioning of a Turing machine.

Self-reference and circularity under interdiction

Moreover, taking into account Niels Bohr's work and the whole philosophy of Quantum Physics, we realize that the only way to be in agreement with our empirical-sensorial perception of the surrounding and with the use of human language is to accept that *our understanding is limited to those situations where a clear, sharp distinction between subject and object can be operated*. So, all phenomena and processes including self-reference, circularity are in conflict with the use of human language, be it natural or artificial, formal or non-formal. See, for more, Solomon Marcus, "Starting from the scenario Euclid - Bolyai - Einstein".⁸

⁸ Solomon Marcus, "Starting from the scenario Euclid - Bolyai - Einstein", *Synthese*, September 2013

Before and after our terrestrial existence, under question

As a direct continuation of the previous considerations, it follows that any reference made by humans, as macroscopic beings, to periods, in the past or in the future, which are beyond their terrestrial existence, lacks legitimacy. For questions such as *Where do we come from?* or *What happens with us after our death?*, we use macroscopic representations, metaphors, allegories of some hypothetical situations which occur in a non-macroscopic universe, a universe different from the terrestrial one. Our senses, our perceptions, our intuitions, our way to perceive spatial and temporal phenomena, our language, our logic, our way to compute, our whole sign system become misleading.

The big change in the understanding of the non-terrestrial existence

When one of Karamazov's brothers in Dostoevsky's *Brothers Karamazov* believes that non-Euclidean geometry is God's geometry, his presupposition is that the only alternative to human Euclidean geometry is God's geometry.

At that time, it was not yet clarified what we learned one hundred years ago: the reality perceived by our senses is only a part of the whole reality; there is the relativist universe of cosmic phenomena and processes, where the non-Euclidean geometries are in action; and, as we learned later, there is the quantum universe, with its way to represent space, time, motion etc. and with the linguistic crisis which occurs in the human tentative to approach it.

Prisoners of the empirical reality?

A millenary history was dominated by empirical representations, in which our sensorial perceptions and the fear imposed by our instincts and our primary emotions prevailed with respect to our reason. The challenge of science and of art is to transgress the borders imposed to us by our history and to make intelligible what is no longer visible, that is to understand what is beyond the sign system we inherited from our parents.

The compromise

The distinction between macroscopic and non-macroscopic, initially understood as a binary one, was replaced by asymptotic processes with infinitely many steps. The move from macroscopic world to the infinitely small of quantum world and to the infinitely large of cosmic processes is no longer abrupt, discontinuous; it is progressive, it does not happen at a determined moment.

So, we have possibilities of approximation of the non-macroscopic phenomena by macroscopic representations. Look, for instance, the way mathematics represents the process of forming a snowflake; the first steps in the respective asymptotic process are perfectly visible, but step by step the next terms in this process are less and less visible, while the structure obtained as a limit of this process is no longer visible, although completely intelligible.

Back to Plato's allegory of the cave

But independently of this aspect, some signs are sent by the non-macroscopic universes to the macroscopic one because both the cosmic and the quantum world have some influence on the macroscopic one. We are in Plato's situation with his allegory of the cave. And so, we accept the compromise to work with macroscopic models and metaphors of the non-macroscopic processes. This compromise is our modest access to the world beyond death.

Death as spectacle and commercial success

Everything begun with Nietzsche's slogan *God is dead*. Let us consider a few titles:

- Roland Barthes: *La Mort de l'Auteur* (Author's Death), 1968;⁹
- Ronald Sukenick: *The Death of the Novel*, 1969;¹⁰
- Alvin Kernan: *The Death of Literature*;¹¹

⁹ Roland Barthes, *La mort de l'auteur*, Mantéia, V, Paris, 1968

¹⁰ Ronald Sukenick, *The Death of the Novel and Other Stories*, Dial Press, First Edition, 1969

¹¹ Alvin Kernan, *The Death of Literature*, Yale University Press, 1992

- Simon Bucher-Jones: *The Death of Art*; ¹²
- Nancy C. Andreasen: *DSM and the Death of Phenomenology in America*; ¹³
- John Keane: *The Life and Death of Democracy*; ¹⁴
- Daniel Zupparelli: *Poetry is Dead: What the Hell Happened?*; ¹⁵
- Isabelle Thomas-Fogiel: *The Death of Philosophy*; ¹⁶
- Jamieson Webster: *The Life and Death of Psychoanalysis*; ¹⁷
- Stephen Hawking tells Google: “*Philosophy is Dead*”; ¹⁸
- B. Bonin Bough: *The Death of Culture*; ¹⁹
- Keit Devlin: *The Death of Mathematics*; ²⁰

Do we have questions like *Death of Physics*? After the unification of all fundamental forces? But we also have *The Physics of Death* ²¹ or claims that *Quantum Physics proves that there IS an after life* ²²

¹² Simon Bucher-Jones, *The Death of Art*, Virgin Books, 1996

¹³ Nancy C. Andreasen, *DSM and the Death of Phenomenology in America*, *Schizophrenia Bulletin* 33(1) 2007, 108-112

¹⁴ John Keane, *The Life and Death of Democracy*, Simon&Schuster, New York, 2009

¹⁵ Daniel Zupparelli, “Poetry is Dead: What the Hell Happened?”, in *Poetry is Dead magazine*, January 18, 2010

¹⁶ Isabelle Thomas-Fogiel, *The Death of Philosophy*, Columbia University Press, New York, 2011

¹⁷ Jamieson Webster, *The Life and Death of Psychoanalysis*, Karnac Books, 2011

¹⁸ *Google’s Zeitgeist Hertfordshire Conference*, 17 May 2011

¹⁹ B. Bonin Bough, *The Death of Culture*, Forbes, 12/21/2011

²⁰ Keit Devlin, “The Death of Mathematics, Edge.org, “What *Should* We Be Worried About?”, In *The News*, 2013

²¹ <http://www.fromquarkstoquasars.com/the-physics-of-death/>

²² Victoria Woollaston, “Quantum Physics proves that there IS an after life”, *Daily Mail, Mail Online*, 14 November 2013, <http://www.dailymail.co.uk/sciencetech/article-2503370/Quantum->

referring to Robert Lanza's belief that the theory of Biocentrism can prove how death is an illusion and after-death life is a reality.²³

Death as cemetery

The Bourbaki group decided to dissolve itself in the late 1990s, but the "premature" death of N. Bourbaki was already announced in November 1968. On this, in *The Cemetery for Random Functions*, Lieven Le Bruyn says:

*"Perhaps the fact that Bourbaki died on November 11th, 1968 (exactly 50 years after the end of WWI) is an allusion to the mandatory retirement age for members of Bourbaki. The burial will take place in the Cemetery for Random Functions metro stations Markov and Godel"*²⁴

Death, the new name of a great change

The common denominator of most of these titles is: As a consequence of the increasing dynamics of the evolution of ideas, of approaches, of methods, of disciplines and of their interaction, under the stimulus of the great changes of paradigms in the past century and the inventions and discoveries in physics, logic, mathematics, biology, linguistics, psychology and computer science, in technology, the entity in question changed very much, we no longer recognize its previous, traditional face, so, as a matter of fact, it disappeared, it is dead. In many cases, a crisis is involved.

A typical example is the crisis of identity many European countries had to face when they became components of the European Union. "Our national identity is in danger" was and still is the slogan of many voices. How to bridge the national identity and the European identity?

physics-proves-there-IS-afterlife-claims-scientist.html

²³ Robert Lanza, Bob Berman, *Biocentrism: How Life and Consciousness are the Keys to Understanding the True Nature of the Universe*, BenBella Books; 1st edition, May, 2010

²⁴ <http://noncommutative.org/cemetery-random-functions/>

See, in this respect: Solomon Marcus, *Identity, Between Crisis and Change of Meaning*²⁵. See also, in this respect: Endri Shqerra, *European Identity: The Death of National Era*.²⁶

Death of the common sense

This surprising joke, *The Death of Common Sense*,²⁷ deserves to be mentioned:

“Today we mourn the passing of a beloved old friend, Common Sense, who has been with us for many years. [...]

Common Sense was preceded in death, by his parents, Truth and Trust, by his wife, Discretion, by his daughter, Responsibility, and by his son, Reason.

He is survived by his 4 stepbrothers:

I Know My Rights

I Want It Now

Someone Else Is To Blame

I'm A Victim

Not many attended his funeral because so few realized he was gone.

If you still remember him, pass this on.

If not, join the majority and do nothing.”

As a matter of fact, an increasing part of the cultural heritage of the 20th century is in conflict with the common sense and this trend is valid in the 21st century too. Syntactic, semantic and pragmatic paradoxes spread in all directions, but school and education did not capture this message. Sorry!

²⁵ Solomon Marcus, *Identity, between crisis and change of meaning*, in J. Bernard, G. Withalm (eds.), *Identitat/Identity/Identite - Akten des 7. Symposiums der Osterreichischen Gesellschaft fur Semiotik, Sigharting 1990 (Angewandte Semiotik 13)*. Wien: OGS/ISSS, 1998, p. 141-160

²⁶ Endri Shqerra, *European Identity: The Death of National Era*. Lamber Academic Publishing, December 2013.

²⁷ <http://rense.com/general92/deathof.htm>

Variants to the rhetoric of death: end, loss, decline

Let us refer now to some other titles:

- Morris Kline, *Mathematics: The Loss of Certainty*;²⁸
- Anthony Ralston: “The decline of Calculus - The rise of Discrete mathematics”,²⁹ (However, the whole development of the last three decades is in conflict with Ralston’s prediction);
- Francis Fukuyama: *The End of History and The last Man*;³⁰
- Ilya Prigogine: *The End of Certainty*;³¹
- Edsger W. Dijkstra: *The end of Computing Science?*;³²
- Rik Spitters: *The End of Semiotics? - The Disney Approach*.³³

All these situations recall the paradox of the knife: If you change its handle do you have the same knife with another cutting part or another knife with the same handle?

Death as distortion of history

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- ²⁸ Morris Kline, *Mathematics: The Loss of Certainty*, Oxford University Press, 1980
 - ²⁹ Anthony Ralston, “The decline of Calculus - The rise of Discrete mathematics”, in *Mathematics Tomorrow*, ed. L.A. Steen, Springer, New York, 1981
 - ³⁰ Francis Fukuyama, *The End of History and The last Man*, Free Press, New York, 1992
 - ³¹ Ilya Prigogine, *The End of Certainty*, Free Press; 1st edition, August 17, 1997
 - ³² Edsger W. Dijkstra, *The end of Computing Science?*, (EWD-1304), Archive, 19 November 2000 (Written for the Communications of the ACM), <https://www.cs.utexas.edu/users/EWD/transcriptions/EWD13xx/EWD1304.html>
 - ³³ Rik Spitters, *The End of Semiotics? - The Disney Approach*, Course: International Master in Media Innovation, written by Rik Spitters, Lecturer: Hans Bouwknecht, on <http://curiousmedia.nl/wp-content/uploads/2013/07/The-End-of-Semiotics-The-Disney-Approach.pdf>

We have in view François Dosse's *History of Structuralism*,³⁴ which is a translation of *Histoire du Structuralisme*, published in France in two volumes: Vol. 1: *Le Champ du Signe*, 1945-1966)³⁵ and Vol.2: *Le Chant du cygne*, 1967 à nos jours.³⁶ Conceived according to the "rise and fall" model (see *The rise and fall of the Roman Empire*), it is a very attractive book containing interviews with Roman Jakobson and with tens of personalities of the cultural French scene of the second half of the past century.

However, its claim to be a history of structuralism has to be rejected. The author ignores the historical roots of structuralism in the 19th century development of natural and social sciences. He also ignores the great movements related to structuralism in the first half of the 20th century, such as *Russian formalism* and *Prague Linguistic Circle*. Furthermore, he ignores the essential role of structure and structuralism in exact and in natural sciences (only three examples: Galois, Felix Klein and Bourbaki in Mathematics, isomerism in Chemistry and heredity in Biology).

The historical role of structuralism in science and in art is also ignored, reducing it to a fashion, which, as any fashion, is rising and dying. The author almost reduces structuralism to its French face, ignoring its universality.

To survive by your accomplishments

The great life may begin after the biological death. As a matter of fact, the test of the quality of a human life is its capacity to survive by its accomplishments. If at least a few people remember you with indebtedness for the help you gave them, with love or at least with pleasure, for your friendship to them, then your life deserved to be

³⁴ François Dosse, *History of Structuralism*, The University of Minnesota Press, 1998

³⁵ François Dosse, *Histoire du structuralisme, Tome 1: Le champ du signe, 1945-1966*, La Découverte, Paris, 1991

³⁶ François Dosse, *Histoire du structuralisme, Tome 2 : Le chant du cygne, 1967 à nos jours*, La Découverte, Paris, 1992

lived. This test takes sometimes huge dimensions. Many great scholars or artists died before their creative works became publicly available and recognized. They may be ahead of their time. Many of Leibniz's manuscripts were examined and published only in the past century and to mention only one surprising aspect of this work, some ideas we attribute to George Boole were anticipated by Leibniz. Another emblematic example in this respect will be presented in the next section.

C. S. Peirce died hundred years ago

The 100th anniversary of Charles Sanders Peirce's death is the right moment to make the point of his work. Recognized for long time as the most important American mathematician of the 19th century, he began to be known, understood and evaluated at his real dimensions only after his death, mainly in the second half of the past century, with the examination of the rich corpus of his published and unpublished manuscripts concerning a diversity of domains, such as mathematics, logic, experimental psychology, cosmology, cartography, historiography, and especially in semiotics. Recognized today as the father of modern semiotics, a considerable attention was dedicated to Peirce's contributions in this respect; it is not possible to extract, in a few lines, the essential of his contributions in semiotics. In some respect, Peirce is the Bourbaki of Semiotics.

Peirce, challenging European science and philosophy

I will mention the spectacular way in which he challenged the European science and philosophy of the 19th century. Until recently, both USA and Europe missed to pay attention to this fact.

Thus, C.S. Peirce shares:

- with Gottlob Frege the invention of the predicate calculus and the interest for natural numbers;
- with Richard Dedekind, the first ideas of recursive behaviour (leading, in the 20th century, to the algorithmic approach and the computational era inaugurated with the Turing machine, followed

- by the appearance of the first programmable electronic computers);
- again with Dedekind (*Was sind und was sollen die Zahlen*)³⁷ the axiomatic approach to natural numbers and the alternative (with respect to G. Cantor's) approach to finiteness, describing finite sets as those that cannot be in a one-to-one correspondence with one of their strict subset;
 - with Giuseppe Peano, the axiomatic approach to natural numbers;
 - with Edmund Husserl, the alternative approach to phenomenology (called by Peirce phaneroscopy);
 - with Bertrand Russell, the interest for the question: are logic and mathematics identical?;
 - with Georg Cantor, a large part of his transfinite arithmetic, including the theorem stating that, for any non-empty set, the cardinal of the power set is strictly larger;
 - again with Georg Cantor, the interest for the continuum and for perfect sets;
 - with Emile Borel, the interest for randomness.

In many of the situations above, Peirce was chronologically the first; but inferior to them in rigour.

The feeling of Computer Science

It happened in the eighties of the 19th century. In a letter to A. Marquand,³⁸ C. S Peirce pointed out *the surprising parallelism between Boolean calculations and electrical switches*, the possibility to use each of them to investigate the other; almost 60 years later, in 1937, Claude Shannon's Master Thesis has the title *A symbolic analysis of relay and switching circuits*, but he makes no reference to Peirce. Ernst Schröder, author of a monumental 3-volumes *Algebra*

³⁷ Richard Dedekind, *Was sind und was sollen die Zahlen*, Druck und Verlag von Friedrich Vieweg und Sohn, Braunschweig, 1893

³⁸ C. S. Peirce, *Collected Papers of Charles Sanders Peirce, Volume 5, Pragmatism and Pragmaticism*, Arthur W. Burks, ed., Harvard University Press, Cambridge, MA., 1934

of *Logic*,³⁹ (two thousand pages in German, published between 1890 and 1905) as a tribute to C. S. Peirce.

Strange, bitter, ironical

In *Wisdom of the West*,⁴⁰ Bertrand Russell writes:

“Beyond doubt, Ch. S. Peirce was one of the most original minds of the later 19th century, and certainly the greatest American thinker ever.”

A. N. Whitehead, while reading some of Peirce’s unpublished manuscripts, soon after arriving at Harvard, in 1924, was struck by how Peirce had anticipated his own process of thinking. But it was too late; Whitehead-Russell’s *Principia Mathematica* does not mention Peirce.

Karl Popper⁴¹ views Peirce as “one of the greatest philosophers of all times.” However, there is only a derisory place for Peirce in Popper’s famous *The Logic of Scientific Discovery*.⁴² S.C. Kleene in his *Mathematical Logic*⁴³ (1968) underestimates Peirce’s contributions.

Is Peirce the Bible of Semiotics?

Beyond doubt, C. S. Peirce was a genius of America’s 19th century. He is really the father of modern Semiotics. But it

³⁹ Ernst Schröder, *Vorlesungen über die Algebra der Logik*, 3 vols. Leipzig: B.G. Teubner, 1890-1905

⁴⁰ Bertrand Russell, *Wisdom of the West*, Crescent Books, Unknown Printing edition 1959, p.276

⁴¹ Karl Popper, *Objective Knowledge: An Evolutionary Approach*, Oxford University Press; Revised edition, November 9, 1972, p.212

⁴² Karl Popper, *The Logic of Scientific Discovery*, Series Routledge Classics, Routledge; 2nd edition, March 31, 2002

⁴³ Stephen Cole Kleene, *Mathematical Logic*, John Wiley & Sons, New York, 1967

happened that his ideas, theories and terminology were often adopted as the Bible of the field and applied *tale-qualè* to sign processes in the today society and in the today culture and science, ignoring the impact of the great changes of paradigm occurring in the mean time: the relativity revolution, making us aware of the distinction macroscopic - non-macroscopic, the quantum revolution, the information - communication revolution. Can be approached bio-computing and quantum computing by the means of Peirce's strategies, without some fundamental changes? The media landscape changed completely. Think, for instance, to the dynamics *home phones, mobile phones, smart phones* occurring in only 20 years. Think at Internet. We still approach them with Peirce's and Shannon's ideas and tools. Semiotics should be aware of the need to look for something new.

Despite the fact that chronologically Peirce's life covered the period of Bolyai - Lobachevsky, Riemann, Planck and Einstein, it is problematic to what extent did he captured the meaning of all these events. This limitation was not Peirce's shortcoming; each historical period has its intelligence capacity.

Peirce in the light of Conway's Game of Life

When Martin Gardner's "Math Games Column" in *Scientific American* (October 1970) presented John Horton Conway's "Game of Life", it became clear that this game captures what is essential in John von Neumann's *self-reproducing cellular automata*, which simulate the way life *survives* from a generation to the next one. A cell is *born* if it has exactly 3 neighbours; stays *alive*, if it has 2 or 3 living neighbours; it *dies* otherwise. Various metaphorical variants of this game were imagined. C.S. Peirce, by his intellectual creativity, he remained in many respects ahead of his time, it is impressive the tremendous gap between the length of his survival as scientist, as semiotician and as philosopher (we can anticipate the need to refer to his work in the year 2114) and the length of his biological life. His intellectual work remains *alive* in many respects; but this does not mean that it will not need a critical examination, leading to some new conceptual frameworks, with a better explanatory capacity.