

Signs Are Taken for Wonders *Solomon Marcus, Between Art and Science*

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Solomon Marcus (b. 1925) is a famous Romanian scientist whose fields of research and teaching span mathematical analysis, theoretical computer science, measurement theory and general topology, linguistics, history and philosophy of mathematics, poetics, semiotics and applications of mathematics, natural and social science. From the very beginning of his career, Marcus showed a deep interest in analysing the complex relationships between literature and science (mathematics), trying to identify those arguments that plead for what might be called ‘the unity of knowledge’. In his book on mathematical poetics, for instance, the scientist demonstrates that poetry and mathematics are both routes towards self-knowledge (as well as modalities of creating ideal objects). Moreover, his work as a whole underscores the increasing importance of aesthetics in the ‘hard’ sciences. This article will focus on those strategies used by Solomon Marcus in his essays, as well as in some autobiographical pages, as neutralisers of the tensions between art and science or between self-reading and world-reading.

Signs are taken for wonders. 'We would see a sign!'
The word within the word, unable to speak a word,
Swaddled with darkness.
(T.S. Eliot, *Gerontion*)

1. Bridging Literature and Science

In an interview from June 2006², Solomon Marcus confesses that his introduction to the field of mathematics occurred in an unusual manner. Although, as a secondary school student he had been mainly attracted to the study of the humanities (especially poetry, theatre and philosophy), after discovering non-Euclidean geometry (in the summer of 1944), Marcus radically changed his preferences. In the autumn of the same year he left his native town, Bacău, in order to study mathematics at the University of Bucharest. Yet, this “shift” towards a rigorous, mathematical

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² Solomon MARCUS, *How Semiotics Unifies Human Knowledge*, interview by Kristian Bankov.
[http:// archivesaudiovisuelles.fr/ FR/ _video](http://archivesaudiovisuelles.fr/FR/_video), June 12, 2006.

way of thinking did not amount to a repudiation of literature and arts. On the contrary, the originality of his thought-system consists mainly of a permanent interplay between the two, which allows him to conceive of the continuity between apparently dissimilar scientific fields. Multiplying and correlating different perspectives gradually became his favourite method of exploring the world. Everywhere in Solomon Marcus's essays there are echoes of this endeavour to find that 'translucent zone of mathematics' where hard sciences and humanities meet and fertilize each other.

The gist of Solomon Marcus' approach – his striving to 'build bridges' – can best be fathomed when one tries to make an inventory of words recurrent in his writings (this keyword-identification process is always a useful exercise for a better understanding of an author, as it was noted)³.

The most frequent terms in Marcus's work are 'dialogue', 'unity', 'transdisciplinarity', 'dissipation', 'bridging' and 'integration', in concurrence with his theory of the globalization of the cognitive process *per se* (an aspect emphasized upon in the above quoted interview : « you cannot understand a field, if you don't relate it to other fields »)⁴.

Moreover, this idea will be a mainstay throughout his works (starting with *Mathematical Linguistics*, *The Paradox*, *The Time, Art and Science*, *Invention and Discovery* and ending with *The Convergence of the Extremes* and *Universal Paradigms*). Abstract, generic concepts are analysed from unconventional angles (e.g. physical time vs. psychological time; astronomical time vs. atomic time; the time of historical linguistics compared to geological time etc.), often in stark contrast to the principles of binary logics (such as *tertium non datur*). The reader's impression is that the scientist aspires to achieve a comprehensive description of the universe, corresponding – to a certain extent – to its secret order : « We are in front of a veritable kaleidoscope (the universe, translator's note), which we attempt, to the best of our abilities, to order, so as to enjoy its astounding beauty, and above all to change our way of comprehending the world, as well as other human beings and, finally, ourselves »⁵.

Proofs of a constant preoccupation with finding efficient remedies against routine and intellectual stiffening, against preconceptions, fundamentalist ideas and inflexible oppositions can be found everywhere in his works, as well as of his fascination with signs, of any kind, from those

³ Ștefan CAZIMIR, in Lavinia SPANDONIDE, Gh. PĂUN (eds), *Întâlniri cu / Meetings with Solomon Marcus*, vol. I, sec. ed., București, Editura Spandugino, 2011, pp. 446-447.

⁴ *Ibidem.* (all translations mine).

⁵ S. MARCUS, *Paradigme universale* [Universal Paradigmes], Pitești, Paralela 45, 2005, p. 8.

concerning semiotic and semiological approaches, to the signs or traces of his own biography. From this point of view, the few pages in which he takes on the autobiographer's task, represent the most convincing argument for his theory that the human subject has an increasingly great role in the field of semiotics and of hard sciences, in general : « You can understand nothing of Mathematics, of Biology, if you ignore the role of the subject »⁶, maintained Solomon Marcus in the above mentioned interview.

Of relevance in this context is his first autobiographical recollection, of a cat perceived at the window of a neighbouring house. It would not be an overstatement to read into this originary 'sign' an inaugural premonitory 'trace'. On the one hand, it anticipates the semiotician's inclination to identify everywhere and decypher 'real' presences (testimonials of tormenting pseudo-absences), and, on the other hand, it proves that, in this particular case, the self-interrogating subject is a refined spirit, fond of poetical subtleties and keen on contemplating the inscrutable mysteries of the world :

One of the recollections of my earliest childhood is the image of a cat staring at me from the window of a house in the neighbourhood; I was pointing to it, exclaiming: 'ca t! Window !'; its feline look impressed me, and, for many years, I was seized by an endless desire to contemplate the mystery hidden in the eyes of this animal, a mystery which had also fascinated many poets and artists. I remember, then, a carriage drawn by horses; I was inside it, crying: 'the horse will fall away !' All these were happening when I was three or four⁷.

When reading these lines, we have the impression of witnessing a mind confronting its own temptations to simplify or to adopt misleading explanatory schemas, while the process of self-understanding remains attached to a poetical way of looking at the world. Gradually we become aware of how the exploration of the self appears to be accompanied by the exploration of the landscapes of the personal memory, in a manner similar to that of Walter Benjamin. The latter, in a book about his Berlin childhood, recounts how a certain corner of the Berlin zoo seemed endowed with magical properties, anticipating future events. It was, in short, a prophetic corner, where everything that might happen, seemed to already belong to the past.

⁶ S. MARCUS, *How Semiotics Unifies Human Knowledge*, interview by Kristian BANKOV.

⁷ S. MARCUS, « De la provocări, spaima și traume, la mulțumire și bucurie » [«From Challenges, Fears and Traumas, to Joy and Contentment »], in Lavinia SPANDONIDE, Gheorghe PĂUN (eds.), *Întâlniri cu / Meetings with Solomon Marcus*, vol. I, sec. ed., București, Editura Spandugino, 2011, p. 29.

On the other hand, it might be helpful to look at this recollection from the point of view of its capacity of reawakening other (seemingly) forgotten images.

In what follows, we are offered details about his early quest for authenticity, for discovering the individuality of phenomena and the ‘essence’ of reality, which explains not only his infatuation with modern poetry (as an adolescent), but – at least partially – also his future career as a scientist. It is not inconsequential to mention his father’s attempts to initiate his younger son in the Judaic religious ceremonial, which only had a feeble echo with the passionate admirer of Baudelaire, Poe and Mallarmé. Alter Marcus, Solomon’s father, who was a well-to-do Jewish tailor in Bacău, was disappointed by this failure (that is why, perhaps, on several occasions he teased his son’s inclination towards philosophical reflection, as well as his fervour for ‘illuminating’ the others)⁸.

Marcus’s passion for poetry was of great avail for the future scientist :

My father failed in persuading me to practise the family’s traditional religious rituals [...] instead, the existential thrill was revealed to me from another direction, that of the poetical works of Eminescu, Hugo, Poe, Goethe, Rilke, Arghezi, Barbu, Baudelaire, Mallarmé. I have experienced it time and again throughout my life, whenever I had the privilege to admire praiseworthy creations of the human spirit. And I could contemplate such achievements in mathematics, as well as in music, philosophy and other fields of knowledge and culture⁹.

In these passages, where Marcus parallels poetic experience to religious fervour (postulating some hidden, if not occult, connection between reading signs and self-reading), we can also discover the firm foundation upon which his integrating method rests: the belief that under given circumstances (especially during difficult times), the constructions of the spirit can offer shelter and can shield against all kinds of dangers (real or imaginary). It is not at random that, on the same page we find recollections about his first days at kindergarten and, then, his first school-days, fraught with small or great fears and anxieties :

⁸ Concerning this aspect, see also Marius Mircu’s (Solomon’s elder brother) fictional ‘testimony’ in his autobiographical novel *Croitorul din Back* [The Taylor from Back], (Bucharest, Cartea Românească, 1979).

⁹ S. MARCUS, « De la provocări, spaima și traume, la mulțumire și bucurie » [« From Challenges, Fears and Traumas, to Joy and Contentment »], in L. SPANDONIDE, Gh. PĂUN (eds.), *Întâlniri cu / Meetings with Solomon Marcus, op. cit.*, p. 32.

I can still recall some events: the first day at the kindergarten on Negel street, in Bacău... I was holding a little basket. Yet, I can't remember what was in it; the first day at the school on Calea Oituz, still in Bacău and the first time I laid eyes on my schoolteacher, Davidescu, in the presence of whom I admired, and then used for the first time, the bead-counting abacus (the variety of the beads' colours was an endless source of fascination for me); I recall witnessing corporal punishment for the first time: one of my colleagues clubbed, in front of a classroom of stone-still children (little did I imagine, at the time, that this scene was only a feeble anticipation of what would come – in the following years, I would witness or suffer a succession of violences, incomparably more serious); the day I used for the first time the pen and the inkpot (I was extremely tense at the thought that I could drop ink and stain my notebook or my own hands, a fault presently sanctioned by our schoolteacher); the fear of not succeeding in distinguishing quickly and correctly between right and left [...]; the fear of not reading the hour correctly (when Davidescu sent me once to see what hour the big clock in the school's corridor was indicating, so as to know whether it was break time, I asked the school-servant to help me)¹⁰.

Obviously, these recollections are not at all unusual or extraordinary, seeming rather similar to those of any child facing the first steps of their pedagogical and intellectual initiation; in this particular case, however, the reader is tempted to search for 'signs' anticipating the scientist's future career. At a close reading of these confessions, we may assign to this little boy, overwhelmed with fears and anxiety, the features of what Eero Tarasti¹¹ has identified as the subject of existential semiotics: an anxious and genuine subject, in a ceaseless quest for authenticity.

Starting from this assumption, we can conceive Solomon Marcus' biographical evolution under the sign of this particular relationship between *self-reading* and *world-reading*. His endeavour to read or decipher all sorts of signs thus appears a way (maybe the only efficient one) of counteracting anxiety through its own creative potential (since the power to resist anxiety is closely related to its force of stimulating the creative dimension of human mind).

In this respect, the (few) autobiographical pages written by Solomon Marcus offer us convincing proofs, as do the scores of evidences hidden in the oblique 'confessions' scattered throughout the pages of his essays.

¹⁰ *Ivi*, pp. 32-33.

¹¹ Eero TARASTI, *Existential Semiotics*, Bloomington and Indianapolis, Indiana University Press, 2001, p. 92.

2. Oblique (Auto)biographical Accounts

Solomon Marcus' volumes of essays generally draw parallels between scientific procedures and the methods used in humanistic disciplines (literature, art, philosophy). But the most important aspect (often neglected by hermeneutists) is his tendency to insert among these essayistic pages elements of intellectual autobiography or memorialism.

As mentioned before, Marcus has repeatedly insisted on the advantages brought, in his own intellectual upbringing, by the intersection between science and art. In the above quoted interview, the scientist laid repeated emphasis on the unusual route he followed: his initial inclination to perceiving mathematics through the lenses of poetry, followed by a complementary one – that of interpreting literature and language through a mathematical lens – both helping him in identifying their common denominator in the science of signs (semiotics). Echoes of this approach can be found everywhere in his books. We can mention, for instance, the chapter on Sorin Alexandrescu and the issue of 'global identity', from the volume *Întâlnirea extremelor*¹²; we can think also of Marcus's memorialistic pages on a famous Romanian poet and mathematician from the interbellic period (Ion Barbu/ Dan Barbilian) or on Grigore Moisil, one of his favourite professors and intellectual models from the Faculty of Mathematics in Bucharest. In one of his articles dedicated to Grigore Moisil, Marcus establishes an interesting typology of scientists : « Scholars are of two types: the ant type, looking for what happens in a specific epistemological area and trying to reach ever deeper into the respective segment of investigation; but there is also the bee type, passing from one flower to the other and frequently changing the area of investigation »¹³. At first sight, one would say that Moisil was of the second type, but – as Marcus demonstrates – if paying greater attention to his behaviour, « we realize that he was sometimes of a mixed type, because he liked to go back to flowers already visited »¹⁴.

It is not very difficult to infer that, through such reflections, the author discovers an oblique way of talking about himself, offering us indirect evidences concerning his intellectual autobiography. Briefly, such articles may be considered (at least in part) unusual, slant self-narrating accounts. The following excerpts from Marcus's essay on Grigore Moisil represent a convincing argument in this respect :

¹² S. MARCUS, *Întâlnirea extremelor [Convergent Extremes]*, Pitești, Paralela 45, 2005.

¹³ S. MARCUS, « Grigore C. Moisil: A Life Becoming a Myth », in *International Journal of Computers, Communications & Control*, vol.I (2006), No.1, pp. 73-79, p. 76.

¹⁴ *Ibidem*.

If the child Moisil showed comprehensive curiosity, the same comprehensivity characterizes the creative work of the adult Moisil. Within mathematics he interrelates all its domains; beyond mathematics, he is looking for the way mathematics may have an impact on natural or social sciences; beyond science he is questioning the relation between math and philosophy, between math and art; beyond culture he is interested in the impact of math in everyday life¹⁵.

And the other paragraph :

To him, mathematics and philosophy were two sides of the same coin, each requiring the other. Already during his childhood and adolescence, his inquisitive nature and his readings paved the way for his philosophical personality (...) [He made] many notes to his readings of history, literature, natural sciences and religion, all of which when he was 7, 8, 9, 10, 11, 12, 13, 14¹⁶.

Obviously, the search for unity between different cognitive fields, coupled with philosophical curiosity are features that the two scholars have in common. Both took to heart the aphorism 'Mundum regunt numeri'¹⁷, with the proviso that the infusion of mathematical thinking in other fields does not entail a rejection of art and ethics. On the contrary, both of them proved admirably capable to provide a credible collaboration between uncertainty and strict, disciplined thinking.

In a similar manner, the memorialistic pages on Ion Barbu/ Dan Barbilian might be considered – at least to a certain extent – disguised reflections on his own identity, a dynamic, plural identity, oriented towards transdisciplinarity (the horizontal movement of knowledge that transgresses the disciplinary borders or simply ignores them) : « Dan Barbilian was definitely a contemplative spirit. He couldn't stop marvelling at the mathematical structure of the universe, pondering for a long time on any of its new or recently discovered properties, with candour and curiosity which characterized both: the scientist, as well as the poet »¹⁸.

¹⁵ *Ibidem*.

¹⁶ *Ivi*, p. 77.

¹⁷ « Numbers rule the world ».

¹⁸ S. MARCUS, *Întâlnirea extremelor* [*Convergent Extremes*], *op. cit.*, p. 99.

It can easily be maintained that such paragraphs hold the value of confessions in the mirror. Moreover, the great interest that Solomon Marcus shows with regard to the consequences of the dialectics ambiguity-precision¹⁹ in Ion Barbu's poetry, leads us towards the same conclusion. Pondering on this dialectics, Marcus reaches interesting conclusions regarding the paradox of poetry as such, that is the acquired certainty that impressive evocation can only be achieved by using precise terms. Another aspect on which the scholar insists is the holistic approach typical of Dan Barbilian's vision. It became manifest, as Marcus demonstrates, in all the products of Barbu's / Barbilian's intellectual activity, from poetry to his lectures on axiomatics (the study of non-algorithmic algebra can reveal – though on a different level – the same tendency towards abstraction, towards distilling essences shown by the poet in the poems collected under the volume *Joc secund* [Mirrored Game]).

We can now assert without a doubt that, through writing about other fellow-scholars, Solomon Marcus described himself – oftentimes vicariously, but always with deep consideration for everything that led to exemplary achievements, yielded at the intersection of disciplines. For, as we have already mentioned, the essence of his approach is placed under the sign of crossing, bridge-building and, above all, under the sign of a plea in their favour; briefly, under the sign of dialogue, construed not only as a weapon against fundamentalist discourses, but also as a valuable instrument for attaining superior epistemological levels, where true knowledge is freedom.²⁰ It goes without saying that this means, above all, awareness of some ethical 'constraints', among which the respect for the Other's values and principles. In other words, the acknowledgement of

¹⁹ Concerning this aspect, see also Virgil Nemoianu's statements : « I regard [...] as the most ambitious and original part of the book pages 100-197, *Paradigms of imprecision*, where Prof. Marcus brings together conclusions of recent research on *fractals*, chaos, interdisciplinarity, computer science and other fields. There he argues in a convincing and elegant way that imperfection, uncertainty, ambiguity and approximation should be considered key concepts of our modes of cognition (not least in the hard sciences), as well as strategies for achieving a valid image of the universe ». (V. NEMOIANU, in *Întâlniri.../ Meetings...* vol.I I, *op. cit.*, pp. 152-153).

²⁰ We can identify here some similarities with Iris Murdoch's considerations on this topic : « I have spoken of the real which is the proper object of love and of knowledge which is freedom. The word 'good' which has been tossed around in the discussion should now be more explicitly considered. Can good itself be in any sense 'an object of attention'? And how does this problem relate to 'love of the real' ? [...] Good is the focus of attention when an intention to be virtuous co-exists with some unclarity of vision. Here, as I have said earlier, beauty appears as the visible and accessible aspect of the Good ». (IRIS MURDOCH, « On *Good* and *God* », in Id. *Existentialists and Mystics : Writings on Philosophy and Literature*, New York, Penguin Books, 1999, pp. 355-356).

a genuine dialogue. After all, even the ‘hard’ sciences have learned this lesson, although undergoing dialogization often means for them, in contrast to their former hegemony, the acceptance of a different status: becoming relativized, de-privileged, aware of competing definitions for the same things²¹.

3. The fascination with signs

Another memorable section of the volume *Convergent Extremes* is the chapter entitled *With Umberto Eco in the Labyrinth of Signs*. Here the reader discovers, alongside some personal recollections (e.g. notes on the circumstances under which the two scholars first met, at a conference organized by the International Centre for Semiotics and Linguistics at the University of Urbino), some interesting remarks concerning the subtle interactions between literary and semiotic approaches in Eco’s novel *Il Nome della Rosa*. A special emphasis is laid on the harmonious relationship between the semiotician and the writer. Umberto Eco is described as « an unusual example of literary and scientific personality, with the scholar present in the literary works, and the writer in the scientific texts (showing boundless inventiveness and imagination in churning challenging metaphors) »²².

Identifying such metaphors is one of Solomon Marcus’s very aims, since in his theory about the horizontal movement of knowledge that transgresses disciplinary borders (the so-called transdisciplinarity), he has repeatedly emphasized the crucial role of images and metaphors.

To him, the presence of beauty in mathematics and in avant-garde physical theory is indisputable and – more significantly – cognate to the functioning of humanities. « Spiritual paradox, metaphor and symbol are the organic continuations of ambiguity, imprecision or graduality as used by mathematicians »²³. Such images engendering theory could be construed, according to Marcus, as cybernetic metaphors of Divinity (God’s omnipotence expressed through cybernetic metaphors), as well as diaphoric metaphors about Divinity. An example in this respect is the metaphor of the library which can be found in a brilliant piece of criticism on Umberto Eco’s novel *Il nome della Rosa* :

²¹ Mikhail M. BAKHTIN, *The Dialogic Imagination. Four Essays*, Michael HOLQUIST (ed.); trans. by Caryl EMERSON and M. HOLQUIST, University of Texas Press, 2006, p. 427.

²² S. MARCUS, *Întâlnirea...*[Convergent...], *op. cit.*, 147.

²³ V. NEMOIANU, in *Întâlniri cu.../ Meetings with...*, II, Spandugino, 2011, p. 153.

The unfolding of Eco's novel is structured by inferable semiotic principles. Its very title refers to a semiotic action (the act of naming). The books –as accumulations of signs – are in the centre of attention ; then the libraries as agglomerations of agglomerations of signs. Each book refers to other books, and once the books are exhausted, the network of references is extended to manuscripts, 'beautiful, calligraphically written manuscripts', which in their turn had been transcribed after other manuscripts [...] What matters, after all, is not the hypothetical original, but the semiosis, which has no end or beginning, or if it has either, can hardly be distinguished [...] Briefly, we find ourselves in front of a fascinating itinerary: from world to library, from library to other libraries, from the latter to books, from books to other books, to manuscripts referring to other manuscripts and so on, and then back to the world²⁴.

Although, at first sight, deciphering seems a central operation, what actually matters is the self-referential process as such, since Umberto Eco's novel is one of a perpetual becoming, in which the signs of the world are left behind and replaced by signs standing for other signs. The primary reality is thus blurred in favour of a reiterating process of generating signs of an arch-codified order.

Similarly, the focus on self-reference is crucial for Solomon Marcus's theory of transdisciplinarity : his attempt to cut across the science of computation, logic, language, communicational skills etc., could hardly be separated from the operation of identifying those forms of self-reference which are active in the above mentioned areas. The scientist's endeavour to find their common denominator thus becomes, to a certain extent, an attempt at configuring an alternative solution « to the traditional disciplinary and 'discipline-making' framework ».

4. Conclusion

Obviously, Solomon Marcus's trans – or para – disciplinary approach represents a truly original and outstanding contribution to the contemporary intellectual landscape. Anyone who read or merely browsed through his writings, is aware of the fact that his way of thinking succeeds in reconciling the humanities with the hard sciences by resorting to a double-integrative movement: on the one hand, the identification of a mathematical pattern that would govern the

²⁴ Monica SPIRIDON, « An 'Undisciplined' Intellectual », in Id. *Întâlniri cu.../ Meetings with...*, II, Spandugino, 2011, p. 463.

universe (his theory of the universal paradigms), on the other hand the emphasis on their connection with such principles as Good and Beauty, in the context of cognitive globalization. In this respect, Solomon Marcus illustrates not only Eero Tarasti's theories on the so-called 'existential semiotics', but also those of artist Iris Murdoch, aware, in her turn that Good and Beauty are concepts « worthy, and also able to guide and keep in check the increasing power of science »²⁵.

Consequently, we have no qualms and can safely compare Solomon Marcus to a white magus²⁶ of our time, who taught us, among others, a very important lesson: that even mathematical signs can be taken for wonders, if you know how to read them.

²⁵ I. MURDOCH, « On Good and God », in *Existentialists and Mystics...*, *op. cit.*, p. 340

²⁶ This formula has been used for the first time by Călin-Andrei Mihăilescu : « Half a millennium ago, Solomon would have been a white magus; in another five hundred years, he will have been the interface, which the cyborgs of the future will be mute without. Yet, about to match this century's size, Solomon is a devoted athlete of knowledge cruising over the sciences ». (Călin-Andrei MIHĂILESCU, « Solomon Marcus Tullius », in *Întâlniri cu.../Meetings with...*, *op. cit.*, vol.II, p.112).

