

Foreword

The multiplying dreamlike images of Eno's visions represent the conceptual forest facing the poet-gardener, his passage through it a mathematical journey full of incident, of impressions sometimes ethereal, sometimes densely vivid and weighty, with here the tangle of undergrowth, there the lucid certainty of the straight path. The tensions of certainty, the mobility of intuition, the torment of doubt.

To seek, to find, to understand!

A quest in which life itself is at stake, almost, an assault on the Alps of knowledge.

Eno suffers, Eno hopes, Eno gets carried away, as his encounters take him from graphs to Categories, from concepts to Systems, as if batted from one to another in the giant pin-ball machine of his enthusiasms. Theoria, Modelia and Simulia all fascinate him, but the Wayfarer and then his Assistant will beguile him with their mathematics. He imagines "himself the privileged listener of a Sibyl possessed of impenetrable secrets".

Each new dash sees him leave behind the previous impulse, but confirms him in his approach. Eno lives, in his progress, the evolutive nature of System. He absorbs ideas and energies as his dream draws him on. Immersion allows him to move "in bold zigzags, potentializing meanings, actualising intuitions." Now his avatar enters into the flow of the Evolutive, constructing its Landscape on the basis of Memory and its store of multi-faceted and evolving impressions.

Their Ramifications form an Archetypal Motif, a "Third Person" conjured up by "the deepest and most archaic of feelings". Interestingly, Eno will represent this fundamental Archetype of the Memory Evolutive System as a Rorschach blot.

And when Eno's journey finally comes to an end, he sees that his quest will go on, taking him out into the world.

Birth of a “Mathesis Singularis”

The “Memory Evolutive Systems” that Eno discovers by happenstance were introduced by the authors of this foreword in the 1980s.

It was an accident of professional life that brought Jean-Paul Vanbremeersch into contact with Andrée Ehresmann. Their ensuing discussions revealed the wealth of possibilities opened up by a category-theoretic approach, which seemed perfectly suited to the description and understanding of the complex processes underlying ageing and disease.

Andrée Ehresmann was then a “pure” mathematician who for the previous twenty years had worked with her husband Charles Ehresmann (d. 1979) on category theory, and on a distinctive philosophy of mathematics:

...a kind of Mathematics much less motivated by possible applications than by a profound desire to find in each problem the very essence of it, the whole general structure on which it depends.... A mathematical theory not only must be rigorous, but it must also satisfy our mind in quest of simplicity, of harmony, of beauty; and a beautiful theory is an inspired creation like a piece of Art.¹

On the occasion of the “3^e Colloque sur les Catégories, dédié à Charles Ehresmann” (Amiens, 1980), Andrée asked Jean-Paul to help her write a short introduction to category theory that would be comprehensible to non-mathematicians. It was during this collaboration that Jean-Paul suggested

¹ Charles Ehresmann, "Trends toward unity in Mathematics", *Cahiers Top. et Géom. Dif.*, VIII (1967), reprinted in *Charles Ehresmann : Œuvres complètes et commentées*, Part III , 1980, Amiens, pp. 759–76.

applying the categories to the problems of emergence and complexity, and it is our research in this area that led to our work on “Memory Evolutive Systems”.

The notion of the MES is intended to model the organisation and developmental dynamics of “living”, that is, biological or social systems. The MENS model developed for neuro-cognitive systems allows study of the formation of higher-order cognitive processes such as consciousness, anticipation and creativity.

Mathias Béjean came to hear of Memory Evolutive Systems in in 2012, at the Mamuphi seminar (held at that time at the Ecole Normale Supérieure, this is intended to bring together mathematicians, musicians and philosophers, hence the name). At first, Eno/Mathias must have been surprised to discover a new kind of mathematics: “He had before him a mathematics that seemed in principle ideally suited to his new mission, but still hadn’t been able to think of one pertinent use for it.”²

He wanted, in any event, to know more, and decided to read our book on *Memory Evolutive Systems*.³ Andrée acquainted him with the MENS model, showing him the slides of our lecture “Comment modéliser la complexité et l’émergence en Art ?” (“How Does One Model the Complexity and Emergence of Art?”), given as part of the Agora Festival at the Centre Pompidou in 2009, which looked at the consciousness and creativity at work in Picasso’s creation of a painting (recorded in a film by H.G. Clouzot). In 2014, our paper on time and incompleteness presented at the Mamuphi seminar revealed to him the ancient roots of the MES and of the philosophy of what Eno/Mathias calls a *Mathesis Singularis* (Part 2, §12), that is to say, a mathematics motivated less by the number and importance of its applications than by – as was said above – “a

² Chapter 2 below, p. 000

³ Andrée Ehresmann and Jean-Paul Vanbremeersch, *Memory Evolutive Systems: Hierarchy, Emergence, Cognition*, Amsterdam, Elsevier 2007.

profound desire to find in each problem the very essence of it, the whole general structure on which it depends”.

Over time, our discussions with Mathias led quite naturally to our writing articles together, notably on the application of MES to design and forecasting. One of these is included as an appendix to this book, following the novella *The Sword of Mathesis* and the author’s account of its writing.

This book is for everyone, mathematicians or not. It succeeds in combining mathematics and poetry in gripping fashion, while the almost mythic character of the superb illustrations makes the whole an outstanding aesthetic achievement.

Andrée Ehresmann and Jean-Paul Vanbremeersch