

Prolegomena to an Art Theory of Event-Scape Architecture

Dr. Andreas Goppold
c/o FAW Ulm, Postf. 2060, D-89010 Ulm, Germany
Tel.: ++49 +89 510 99 770, mailto: mm-diskurs@uni-ulm.de

Abstract

The theory of *Meta-Morphology* introduces the concept of *process patterns*. The present contribution seeks to establish (some preliminaries for) an art-theoretical foundation for the design of *large edifices of process patterns*, or in other words, *an Art Theory of Event-Scape Architecture*. With this term, we combine Virilio's description of the *Event-Landscape* in his book by the same title, and Christopher Alexander's "A Foreshadowing of 21st Century Art", which analyses the pattern languages of ancient carpets. The purely metaphysical concept of Virilio's *event-landscapes* is transformed into practical graphical representations of *process patterns* that follow the style patterns of oriental carpets. This approach had earlier antecedents: deeper research into the culture-historical background of Alexander's work shows strong evidence that early Islamic art employed techniques to empathically evoke visions of exactly the (kind of) *trans-temporal panorama of God's universe*, which Virilio depicts, and this was part of the success story of early Islamic religion. In many respects, this visionary technique was quite alien to Christian occidental mentality which remained bound to visual pictorial representations. (With the possible exception of the spatio-iconography of gothic cathedrals). One could say that this was the most successfully hidden deep secret of Islam. During the decline of Islamic culture after about 1200, it seems to have become lost even to Islamic culture itself. Alexander's title: "Foreshadowing of 21st Century Art" implies that this secret of early Islamic Art is in the process of being rediscovered, as now the sciences and mathematics have advanced to a level where the outcome of the pioneering work of Al-Khwarizmi could be technologically spread to reach a large percentage of the population. The technics of *pro-gramma* (or *algorismus*) have now become common knowledge for a large percentage of the population. The "*Art Theory of Event-Scape Architecture*" is also expected to bring practical results, since computer software systems are large edifices of process patterns. Here, a more powerful practical graphic representation of *process patterns* would greatly enhance the control of the ever-increasing complexity of software systems.

Keywords

Event-Scape Architecture, Process Patterns, General Theory of Patterns, Islamic Ornament, Oriental Carpet Design.

1 Introduction

The present paper extends the thought lines presented in earlier contributions to the CASYS conferences. For more introduction, reference to Goppold (2000a) and (2001a) is recommended. More complete materials can be found under Goppold (www). The aim of the series is the development of a *General Theory of Patterns* (GTP), or

Meta-Morphology. Within the discourse of the CASYS conferences, the *Meta-Morphology* series attempts to illuminate the philosophical, mythological, biospheric and semiospheric depth-structures underlying the present technological drive of humanity with relation to *memory* and *anticipation*. These are in subjective terms, the two dimensions of experienced temporality. (The present is only a virtual, fleeting, vanishing point squeezed in between an endless expanse of past and future). The period of the last 50 years of development of computing machinery is, in the history of ideas, a technological breakthrough of what Hegel would have called: "Die Objektivationen des Geistes". (The Hegelian term "Geist" is difficult to translate into English since it hovers somewhere between, or above, spirit and mind; and to really understand it, one first must understand Hegel).

1.1 DNA, Computing, Memory and Anticipation

It is more than a historical coincidence that the DNA structure was presented as an analogy of a binary coded tape storage (derived from the Turing Machine model), quite exactly around the time when the first computers with tape-like storage devices appeared. *Memory* and *anticipation* are key attributes of living organisms. A DNA structure is a molecular memory device, and for a species, its DNA treasure (the genotype) is a codification of anticipations of life situations that any single phenotype is equipped to deal with in its future life trajectory. The elegance of the mechanism can be appreciated by considering the many levels of indirection through which it works. The DNA is the material carrier of a pattern that is commonly called the genome. The first catch is that a gene does not normally correspond to one single local sequence of nucleic acids (as a simplistic Turing Machine subroutine would imply), rather to a pattern of several distantly located sequences that are becoming operative only when they are simultaneously activated. This pattern is transcribed first into RNA, then into amino acids, and these form proteins. Here, we find a huge computational gap that is usually glossed over in all simplistic renderings of the mechanism, since these proteins are a 3-d structure that is formed through the *protein folding mechanism*. This mechanism is computationally intractable. A chain of 100 amino acids would need 10^{27} years of TM type computing to calculate its spatial arrangement. (Barrow 1998: 105-106). To complicate, a bunch of proteins still does not make a functioning organism. When we reach the protein level, it is practically unavoidable to crash against the chicken-egg barrier. Because without a fully functioning cell (and the ribosome mechanism before that) no amount of proteins could be built up to produce a new cell. We finally reach the level of the {conglomerate / colony} of living cells that is usually called an organism. This organism finally displays all bodily and metabolic functions that allow it to survive and reproduce in its natural environment. That is, its bodily incorporation is a result of the patterns of anticipation resident in the DNA which are commonly called its genes. If we compare this at least 4-levels type of indirect anticipation with the rather direct example given in Dubois (1998), of someone taking an umbrella along, because he expects the weather to be rainy, then one may get a glimpse that nature still "has a few jokers up her sleeve" that complicate the game considerably - to use an euphemism.

This being said, we return to the CASYS theme. Computing devices introduce DNA-analogue facilities into the control of machinery. But from the present perspective, as stated above, one should avoid the jump to the inverse conclusion that an organism is "nothing but" a machinery device that is blindly controlled by its DNA, "exactly like" a TM is controlled by its tape. This is currently the vogue in a large consensus-circle of Neo-Darwinists whom one could also call the "Dawkinists", after one of their most vociferous proponents.

Computation is an objectivation of a hitherto very "geistig" aspect of human experience, and it is therefore not only of technological interest, but it also opens up new philosophical frontiers. *Memory* and *anticipation* are coming into technological reach, and by this, into scientific frameworks. From this vantage point, the CASYS conferences are an intra-scientific attempt to break out from the linear, geometricized time-concept of natural science that is bound to its effective causality paradigm associated with the linear time concept of Newton and the spatialized time concept of Einstein (the space-time continuum). But Einstein's concept lacks memory. One could turn the argument around and say that without memory, time is only an eternal present, it lacks depth. Lived, organismic time is structured by memory, and this is a tree structure (*Zeitbaum*) (Goppold 2000a). A memory tree is in current technology implemented as a push down stack (short: a stack). The question might be asked: is a stack necessary, advantageous or even essential for operational memory?

When we recall the discussions in (Goppold 2000a) and (Goppold 2001a), we realize that in the operationally closed *Universe of Meta-Patterns* of a GNN, there exists no pre-established harmony (Leibniz) of a clearly defined set of input signals that the device is constructed to react to and compute upon. To the contrary, an organism constantly re-sets the threshold values of its input organs in accordance to its internal processes. One could say that the TM case deals with the easy problem of computation. The hard problem is, how to establish boundaries between the potentially chaotic mix of indiscriminate neuronal excitations criss-crossing its neuronal space, that is, how to separate out the patterns. This is difficult enough for all the synchronous inputs, but compounds for diachronous ones. A precondition for memory is diachronous separation of patterns. This means to separate when (temporally) one pattern begins, and when it ends. Then it comes to the problem of storing the pattern. At present neurological knowledge, it is unlikely that such patterns are stored by different single neurons. Since such patterns are generated by fuzzily connected neuron groups in the first place, that is also where they are stored. Next, the separation of temporal patterns involves the difficult problem of where to introduce the threshold values that something is a (similar) repetition of something that had occurred in the past. The temporal world is governed by entirely different laws than the spatial one. In the spatial world, two objects occupying different places, must by definition be different. But in time, these two instances are possibly different versions, phases, or transformations of one and the same object. What counts here, is not equality and inequality, but similarity. The seemingly nonsensical reformulation of Nietzsche's dictum: "The Infinite Return of the Eternally Unequal"

expresses this fundamental problem. Nietzsche had also remarked that mathematics is baseless on principal grounds because nothing has ever been the same as anything else throughout the whole course of the universe. A stack-like organization of experienced events is indicated by Aristoteles: He worded the truism that everything has a beginning, a middle, and an end. He became more explicit with his theory of drama, where the buildup, the climax, and the release, is given in analogy to physical processes of impact and rebound, or dampened oscillations. The unravelling of superimposed rhythms follows a stack pattern. In our human experience, the civilitary effects of linear clock time and sequential time reckoning may mask some deeper stack structures of memory. On one side, it is easier to remember recent events than long past ones, on the other side, it is very difficult to recall and recount a longer event sequence backwards in time.

1.2 Computing as Event-Scape Architecture

The main body of the present contribution will deal with possible repercussions of the technological advances of computing in the understanding of memory and anticipation that may result in a reorientation of the philosophical and artistic appreciation of humanity. Following the approach already taken in the previous contributions, it will illuminate some cultural depth-structures that seem relevant. Computer programs are in the history of thought, an unprecedented mass movement involving the design of *large edifices of process patterns*, or in other words, we are witnessing the emergence of a new craft, or art form: *Event-Scape Architecture*.

1.3 Computing, Temporality and the Textile Arts

Although programmed computing machinery is a phenomenon of the last 50 years, at least one of the historical roots of computers can be shown to have a long-standing relation with temporality. Besides the better known precursors of calculation machines in the line of Pascal, Leibniz, and Babbage, the other equally important root of computers derives from the loom sequencing techniques that are commonly associated with the name of Jacquard. The following is a quote from the Encyclopaedia Britannica:

(Britannica: Jacquard): The Jacquard system was developed in 1804-05 by Joseph-Marie Jacquard (q.v.) of France, but it soon spread elsewhere. Jacquard's loom utilized punched cards that controlled the weaving of the cloth so that any desired pattern could be obtained automatically. These punched cards were adopted by the noted English inventor Charles Babbage as an input-output medium for his so-called analytical engine and were used by the American statistician Herman Hollerith to feed data to his census machine. They were also used as a means of inputting data into digital computers but have now largely been replaced by electronic devices.

The technology that Hollerith's company was founded on was ultimately derived from weaving, and computing was more the side line show. Only some time later, when this company became known as IBM, was computing the main profit center. Now, the textile technologies have a long-standing intimate connection with temporality, as is evidenced by the mythologies of braiding, weaving and spinning women, like the *Nornes* and *Moirae* in the European culture circle, but equally found with world wide

distribution in all cultures of mankind. (Goppold 1999d: 163-167; Goppold 2000a: 4., Goppold 2000f).

The formal algorithmic descriptions of computing and the actual physical realisations on the machines are two different worlds. It needs a lot of transformation with compilers to bring these two universes into commensurability. In the world of integrated circuits of computer chips, packets of electrons are driven through the twisted mazes of the gates and connection lines. Since the only things moving on computer chips are electrons, the actual computation processes taking place in the machinery are about as immaterial as anything humans have ever created, discounting for a moment the wonderful edifices that the great religions and idealistic philosophies have erected. The processes happening on the chips come as close as possible to pure event patterns, with almost no material counterpart.

Weaving a tapestry may give a common-sense tangible way to relate what is happening inside the computing machine. To make a textile representation, we could encode the RAM bytes by colored threads (8bit= 256 colors), and for the ease of calculation, we set 10 threads to one millimeter. Then we project the RAM number of bytes on the width of a loom, and each step of the CPU clock would correspond to one thread added lengthwise. The accumulated changes in different places will display on the finished tapestry. By this, a 64 KB RAM of the olden days would translate into a tapestry of 6.5 m width, about the largest tapestries ever created. Current day 64 MB RAM would explode that format with 6.5 km width. But that would yield a very uninteresting tapestry because there are only minimal changes in single points that are as wide as the data bus and the CPU registers: 32 to 64 bits= 4 to 8 bytes. The rest is just uniform stripes. And since program RAM usually doesn't change, most of the fabric would be the same from beginning to end. This would be a very dull tapestry, indeed. The main problem with this textile representation is that it is actually not about *event patterns*, but a series snapshots of the machine *states*.

2 A Foreshadowing of 21st Century Art

A more fruitful approach for a suitable graphic representation could be a reflection of aesthetic and practical concerns analogous to those of oriental carpets. For this a work by Christopher Alexander (1993) will provide the pattern: "A Foreshadowing of 21st Century Art". The pattern ideas of Christopher Alexander have already been taken up in the *Software Patterns Movement* of the OOP community. (Appleton (www), Coplien (1995, 1998), Gabriel (1996), Gamma (1995), Salingeros (www)). But the "aesthetics" of the software patterns created and described in these publications are only "in the eye of the beholder", burrowed deeply behind the otherwise quite confusing maze of symbolage that any program in any programming language presents. Only for the exclusive circle of software engineers who can understand its deep structure, its "aesthetics" is appreciable. But even for the experts, this comes only after long and deep "meditation" over the code, which means that the engineer effectively emulates the machine, and goes through the program steps one by one, until s/he understands the

problem, and/or the solution, when s/he is lucky. But every software engineer knows that there are many times when they are out of luck. On deeper analysis, it becomes apparent that the problem is similar to the tapestry case given above. The code does not show the event structure of the program, but only what the machine is supposed to do to produce this event structure. One main requirement of art is that it contains some way of transmitting an essence of its artfulness to its appreciators, or in other words, to *evoke an empathic effect* in the viewer/listener. One doesn't need to understand composing theory to be moved by Beethoven's *Eroica*. And one doesn't need four years training in art theory and history to have a memorable impression when visiting the *Sistine Chapel*. Of course, to be a real connoisseur, one needs training, but it is not the same training as that needed to produce the art. So, what is still needed for a 21st Century Art of *Event-Scape Architecture* is a clearer representation of the process patterns.

2.1 Spatial Rhythm: The lost dimension

A comparison with the European Gothic cathedral shows another aspect of the problem: The cathedral gives us an integrated aesthetic experience at all levels of magnitude: From the whole monumental building with its arches and spires at the 100 and 10 m scale, down to the fine detail of the small rosettas, flower ornaments, and statues, at the 1 m to 10 cm scale. This integration and balance across four orders of magnitude in scale has been extensively described by Alexander. Because it is easy to transform the geometric pattern into a temporal one, we can speak of the *spatial rhythm* of a cathedral. By this transformation, the *spatial rhythm* can evoke the *neuronal reverberation* or *empathic transmission* that was described in Goppold (2000f). (And this is exactly an essential element that has been lost to much of contemporary architecture). There is a simple technical reason why this is so difficult to implement in current SW patterns: the event patterns of the program are hidden behind the linear-text type arrangement of the alphanumeric code. It is a problem that programming shares with writing culture as a whole: to appreciate the work, one has to sequentially step through it. In SW code, the problem is compounded by the innumerable logical interdependencies of its components.

One observation exemplifies the predicament: All through the history of SW production, regardless of which programming technique was used, programmers made mighty efforts to have their programs conform to certain layout patterns, called "pretty printing", which obviously have nothing to do with the machine execution of the program, but they are almost indispensable for the human reading and understanding of it. This "pretty printing" is an attempt to introduce some of the lost expressive power of visual patterns which can be taken in with one glance, in the linear-sequential world of the Turing Machine-governed SW theory.

2.2 Paul Virilio: The Event Landscape - A Perspective over Time

Christopher Alexander's title: "A Foreshadowing of 21st Century Art" implies the emergence of a new of aesthetic appreciation, that separates the postindustrial, multimedial civilization now emerging from the mentality of the mechanized Newtonian

age of the 17th through 20th centuries, much as the emerging Renaissance consciousness saw a separation from medieval mentality. Jean Gebser had, some 50 years ago, seen this historical pattern, and had drawn up his version of the "Foreshadowings" of the coming transformation. But he could not yet account for all the crucial natural science and technological influences on the new type of consciousness emerging. Especially, he could not envision the effects of the just-then starting computing movement. His framework of the *mental structure* was based on a spatialization of the world, hence the other key term of his work: the *perspectivic mind*, which subordinated its world in the hierarchical framework of *spatial visualization*. Spatialization of time was, as we recall, also a main component of Einstein's theory.

Paul Virilio (1998) has given us another important document of the new type of consciousness emerging. We may note, though, that this image is entirely contained within the perspectivic metaphor which Gebser assumes that the world is breaking away from. It is called the *Event Landscape*.

Virilio (1998, transl. A.G.): For God, all of history is an event landscape. For Him there is no succession, because everything is there in the moment... This hardly imaginable transhistoric landscape extends across all eons, across all epochs, and from one eternity to the other. And in this hardly thinkable landscape arise, since the beginning of time, the generations, which draw contrasted outlines against the horizon of an eternal present... A time landscape, in which the events are taking the place of a surface pattern... in which the past and the future are emerging out of one and the same movement, and their synchronicity is manifesting self-evidently.

This view is the prototypical panoramic perspectivic view from a high mountain, like that related by Petrarca 1335 from the summit of Mt. Ventoux (Gebser 1973: 38-45), or that related in the Bible in Matth 4,3-11 and Luc. 4,3-13. It is the grand panorama over the history of the universe. It is a perspective that can rightly only be enjoyed by God, because it is too good for us mere mortals.

2.3 The Hidden Essence of Islam: An Event Landscape?

And this is exactly the type of emotive element, *the power to evoke an empathic effect* in the viewer/listener, that was referred to in the above paragraph, which is a necessary ingredient for our envisioned "Art Theory of Event-Scape Architecture". The profundity that Christopher Alexander has embedded in his title "*foreshadowing...*" comes from a specific aspect of early Islamic art that the common consciousness in the West probably has never understood and therefore this essence of Islamic thought was entirely lost to the Christian world: Its profuse ornamentation. We will remember that the word *algorithm* is the modern rendering of the latin word *algorismus* which is again an attempt at transliterating the Arabian name of *al-Khwarizmi...*

(Britannica: Khwarizmi): Khwarizmi, al-, in full MUHAMMAD IBN MUSA AL-KHWARIZMI (b. c. 780, Baghdad--d. c. 850), Muslim mathematician and astronomer whose major works introduced Hindu-Arabic numerals and the concepts of algebra into European mathematics. He lived in Baghdad under the caliphates of al-Ma'mun and al-Mu'tasim in the first golden age of Islamic science. His work on elementary

mathematics, *Kitab al-jabr wa al-muqabalah* ("The Book of Integration and Equation"), was translated into Latin in the 12th century and originated the term algebra.

The *Kitab al-jabr* is a compilation of rules for arithmetical solutions of linear and quadratic equations, for elementary geometry, and for inheritance problems concerning the distribution of money according to proportions. The work was based on a long tradition originating in Babylonian mathematics of the early 2nd millennium BC and traceable through Hellenistic, Hebrew, and Hindu treatises. Its elementary and practical nature contributed to its survival when other works on the same subject were lost.

Another work on Hindu-Arabic numerals is preserved only in a Latin translation, *Algoritmi de numero Indorum* ("Al-Khwarizmi Concerning the Hindu Art of Reckoning"). From the title originated the term algorithm. Al-Khwarizmi also compiled a set of astronomical tables, based largely on the *Sindhind*, an Arabic version of the Sanskrit work *Brahma-siddhanta* (7th century AD), but also showing Greek influence.

So much for what is common knowledge, at least for historians of mathematics and computer science. But here, as usual, the hidden elements are the most interesting. And this is exactly the *foreshadowing* element in the early Islamic art which is being continued with the present title: "Prolegomena to an Art Theory of Event-Scape Architecture". The historic phenomenon of the comet-like rise of Islam between 700 and 1200, and the seemingly unstoppable expansion of the Osman empire up to about 1700, is still something that the Western mind is unable to understand, to come to grips with, and there will always remain a shudder and a horror. This especially in the face of the Islamic revival fires kindled everywhere, provoking the well-founded fear that the Jihad is not over yet, and it will not be over, not before the whole world bows in the mosque and prays to Allah. (A similar argument can be found in Samuel Huntington: *The Clash of Civilizations*).

Unless the Western mind will come to terms with the hidden essence of Islamic mentality, and for this, Christopher Alexander's theme may provide the key. The rather simple-minded descriptions of the Islamic paradise with its fruit gardens, water fountains, and the *houris*, the ever-full-breasted and ever-virginal love-maidens devoted to the warriors fallen in battle for the *true creed*, will not do to explain the whirlwind prairie fire (or Desert Storm?) that the early Islamic movement kindled. The special character of early Islamic art may give us some more clues. (Critchlow (1976), Grabar (1992)). The following needs to be worded as conjecture: This movement became so intense and immense because it gave the people an *immediate emotive access*, through *the power to evoke an empathic effect* to the transcendence of God, to "*The Event Landscape*", as Virilio called it.

To substantiate the conjecture, perhaps a *Gedankenexperiment* may help: Let us assume that we are beholding this vision, that the pattern of our life's deeds, achievements, miseries, sorrows and angers, is somewhere there, exactly fitting in with all the rest of the past and future wheelings and dealings of humanity, in the beautiful composition of an immense tapestry. And this is exactly what the oriental carpets (especially those used for prayer), and the richly decorated walls of mosques and official buildings reflected incessantly. Perhaps it will be easier to understand that with this

permanent, direct and immediate experience, one will gain the conviction the question of human mortality is a moot one? (See also the similar issue with *pattern immortality* in Tipler (1994)). This would explain the utter death-defiance that the Islamic warriors displayed in battle (and are still displaying, to remind), even beyond the simpletons who believed in the houri-paradise.

2.4 Event Landscapes: The 21st Century Art ?

The conjecture spells out that early Islamic art was "A Foreshadowing of a new 21st Century mode of empathic pattern transmission" that might become the norm for humanity in the next few hundreds of years. (Such movements always take a few generations to take hold, even with global telecommunications, TV and WWW.) The profuse ornamentation we find on all monuments of Islamic culture reflected a glimpse of that eternal world, of God's "Event Landscapes", that apparently was being beheld by a substantial fraction of Islamic humanity at that time. And this glimpse was it that enabled the fragile humans to overcome the incredible odds which they faced on their march to spread the faith and to conquer the world. This vision faded and disappeared when Islam had conquered its part of the world and took its long cultural decline. But there are strong indications that it is taking its revival now, and that it is a movement that extends to all of humanity, not just the Islamic faith.

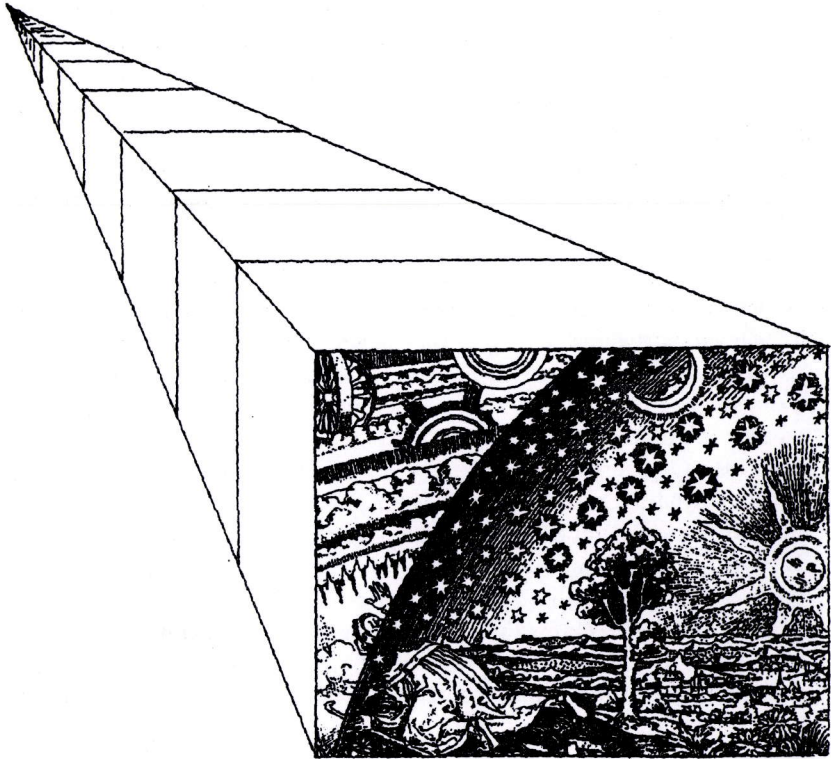
Let us recapitulate: Islam forbade the pictorial representation of living animated organisms, the closest of the creations of God. And necessity is the mother of invention. If you are forbidden to depict the things themselves, you may come to find ways to express the *characteristic patterns that these things produce*, exactly like Virilio expressed it in the above: "A time landscape, in which the events are taking the place of a surface pattern". Now the first prize question is: *what is the characteristic of life patterns?* Of course their *movement*, quoting Aristoteles, whom the Muslims knew in-and-out. And the second prize question is: *how do you project that movement onto the fixating still medium* of a stone wall, a carpet, or a painting, without losing its essence? Now you will find out that the injunction against depicting living animated organisms is a great blessing in disguise, because you cannot fixate their aliveness at all in a writing or painting medium. And by this you evade a deadly trap that the Christian western cultures have fallen in head-over-feet: to confuse still pictures of something that was once living with life itself. And western mentality has not yet been able to get out of this trap.

And by trying really hard, you may come closer to *REality* than reality itself. Of course this necessitates a level of *abstraction* (we recall that metapatterns impose a definite neuronal computing cost factor, and *abstraction is just another name for metapattern*) that the rest of the world was totally unaccustomed to, and that apparently could not be maintained by Islamic culture itself, and so it was lost again. This, in turn will also do its part to explain the towering peak of abstraction and systematization that Al-Khwarizmi, Avicenna, and Al Ghazzali displayed. Thus, we may have to come to grips with a kind of "perspectivic" revolution in the Islamic world between 700 and 1200, that was totally unlike the much-touted perspective of the Renaissance, and

predated it by about 500 years, and it seems to be the theme of the next upcoming consciousness mutation of humanity.

3 An Artistic Rendering of Event-Scapes: The Flammarion Picture

An adaptation by the author (A.G.) of the drawing given by Flammarion in his book "L'atmosphère" may give an indication of the strange new territory that we have entered, and of the unknown things that await us there. For more discussion of the influence of the (original) picture of Flammarion on the neuronal processes of occidental humanity, see Clausberg (1999: 295 ff.).



The Flammarion Picture (modification A.G.)

4 Conclusion

The Flammarion Picture makes an allusion to the old Pythagorean theme of "the music of the spheres" to which one may break through when one is prepared to leave the familiar world our Mesocosmos. Today, mathematically formulated science has reached a level of comparably unfamiliar description of the universe in which we live. Our present-day scientific challenge is the unravelling of the strange spatio-temporal meta-pattern structure by which the neuronal "enchanted loom" of our brain weaves the familiar fabric of our world experience. So, the glass bowl kind of earth envelope through which the pilgrim in the picture breaks through, is in our present situation, actually the cave of our skull, into whose machinery we are now probing. In the last 500 years, scientific, physical time was spatialized and linearized, and if the indications are not misleading, then the next epoch will be guided by a different kind of structured time, that of memory and anticipation, for which we may find models of suitable artistic expression in the imagery of Islamic Art.

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