In Hindsight:

Complexity, Contingency, and Narrative Mapping

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It's complicated, and (although simplicity is appreciated) it is all the more complicated to make it simple. Narrative complexity has many dimensions, as complexity feeds back on complexity, and both reality and its narrative representation (not to mention their theoretical study) are inherently complex phenomena. Many chapters in this volume deal with innovative aspects in the complexity of narratives, resulting from new developments in the technologies of communication. New complexities in narrative technologies address in turn a reality already made more complex by its technological mediation. But even the simplest narrative is a complex phenomenon *per se*, and my contribution will try to address some dimensions of the complexity of narrative (any narrative) as an emergent phenomenon within a complex reality understood in terms of levels of evolutionary emergence.[*]

Complexity may be defined as the degree of diversity and integration of a system (Penas 1991, D'Souza 2011, Morin 2014)—humans being thus more complex than hydrogen atoms (or bacteria) right from their atomic composition up to the complicated formulae needed to describe the systems which go into their

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makeup, whether genomic, anatomic, or behavioral and ecological. The complexity of a system can be seen as directly proportional to the complexity of the description it requires. The description would seem to require, as a fulcrum, a more complex system, one which can encompass the degree of diversity in the system to be described—and if the reasoning holds, no complex system should be able to describe itself. In a way, symbolic systems—in particular language and the many languages derivative from it, such as mathematics— circumvent or shortcircuit this requirement through an extremely flexible system of representation, one capable of recursion and reflexivity, allowing the emergence of paradoxical yet rational structures, and raising complexity to an entirely new dimension—embedding worlds within worlds of complexity and multiplying reality through a potentially endless play of perspectives, like a maze of combined mirrors and screens. Humans inhabit a symbolic world which, although partly real, is an augmented reality, annotated with the cultural intertextuality which turns every object and every action into a symbol of itself and of its communicational potential.[1]

As emergent phenomena go, narrative is a latecomer in evolution—a recent emergence, resulting from the symbolic revolution of human cognition. The debate about the origin of language is inextricably bound with that of the origin of narrative, since the representation of temporal structures and sequences is, together with syntax, metaphor, or conceptual blending, one of the complex dimensions associated with the advanced symbolism of language—dimensions which require an already symbolic protolanguage.[2] Animal semiotics has its own dimensions of perspectivism and complexity, and needs to be integrated within a generalized semiotics, as shown by Uexküll and others (Penas 1991). Many living beings are known to share information and exchange messages about their presence and

emotional state; some are able to signal about their present environment. Some species (of bees, crows, ants, or monkeys) improve on social signaling and they are able for instance to signal the position of remote sources of food, or to "lie" using false signals. But no animals have been known to tell stories about the past or the future, or shown to have a narrative conception of their self-identity. That is, among the (precious few) cognitive accomplishments peculiar to human intelligence, narrative has pride of place.[3] *Homo narrans* might well be the most adequate name for the species, given that some intelligent apes may solve practical problems quicker than many humans, but not even the brightest ape can tell a story about the episode—nor perceive a story in it, if a story is something tellable. That is, although there are proto-narrative elements in animal cognition and perception, full-blown narrative has developed only in the context of human linguistic and communicational sociality, and can be articulated only through human systems of communication.

But narrative is not a mere quirk, the latest trick of a clothed ape. If "man" so called is in any way "the shepherd of Being" (Heidegger 1996) , or at least of Being as seen from here, his dearest world-storifying tool must be tightly interwoven with the order of the world—a deeper relationship than meets the eye. Behind all fictions, and all stories, there is Story, the human potential for narrative. Underlying it all there is the proto-narrative structure of reality, in the sense that the perception of physical, non-institutional, non-human reality, provides the foundation for such basic narrative dimensions as sequentiality, causality, or transformations. Call this proto-narrative grounding Time, for short; call it universal Evolution, or Becoming—its complexity eludes the scope of this paper. The infinitely complex can only be understood in correlation with the infinitely simple—*everything* being

both a plural and a singular— and narrative is a unique way of relating simplicity and complexity, origins and results; of coming to terms with time, to the extent that the past, and the future of the universe, fully emerge only through narrative.[4] Narrative is also, more specifically, a way to handle the peculiarly human time of action, experience, and social relationships. Each of these dimensions of narrative has an evolutionary background of its own.

We will examine here some aspects of the role of hindsight in narrative hermeneutics, bearing in mind the notion of emergent levels of complexity. There is a narratological dimension in cosmological approaches to complexity which has been insufficiently theorized, and some way ahead may be made by emphasizing the narrativity of evolutionary processes, and the role that narratology can play in making the conceptual models addressing these processes more self-conscious and aware of their own historical situatedness and of their semiotic and generic constraints.

Evolutionary theorists are constantly having to come to terms with the implications of new developments in the sciences and in the philosophy of science, and also with the implications of evolutionary thought on every field of knowledge. Cultural development constantly generates new contexts of interpretation, i.e. new perspectives and new meanings for things and phenomena. The complexity of reality is constantly being reinterpreted and retroactively reworked in the light of new data or new frames of thought. This generative multiplicity is also part and parcel of the history of the universe (at a cosmical, local, biological, or cognitive-cultural level), a process of emergent evolution feeding back on itself, which has given rise to the different dimensions of the complexity we face in every phenomenon and event. As a matter of fact, every being, every object and every

human or natural landscape is made of solidified, accumulated history, for those able to see it there, sedimented or in motion. Understanding something is understanding its structure, its contextual connections, but also, crucially, its history and origin, its *historicity*. Montaigne put it thus: "A common nature runs its course. Whoever studied in sufficient depth the present situation might derive from it, in all certainty, the whole of the future, and the whole of the past" ("Apology for Raimond Sebond", *Essais,* II.xii). This is an impressive way of stating the cosmic connectedness of reality as a single process. The hypothetical study invoked by Montaigne, however, is impossible to carry out, because of the complexity of the interactions, because of the unforeseeable emergence of what is yet to emerge (as the emergent can be described only in retrospect), and because our tools for observation and description, our theories and narratives, become additional counters in the game.

That is, the history of everything is constantly being rewritten, at a number of historical levels.[5] In order to organize and map this complex dialectic, a number of levels of contingency and emergence bearing on interpretation may be distinguished; not indeed for the first time, but rather because of their recurrent usefulness as mapping tools, in such evolutionary philosophies as that of Spencer, or in current accounts of Big History. The number and specificity of the levels of historical complexity we distinguish is to some extent a matter of heuristics. For our present purposes we may stick to the aforementioned levels pertaining to *a)* cosmic evolution and *b)* the evolution of the earthly environment; and, at higher levels of complexity, *c)* the levels of biological evolution (from the origin of life and cellular structures, to multicellular organisms and sexual reproduction, through genetic inheritance, epigenetics, and population dynamics), and *d)* behavioral and cultural

evolution, culminating in *e)* symbolic evolution and human history: the development and interaction of cultures, the history of social institutions and technologies, *f)* the individual lives lived within or around them—around the *things* and *events* labelled as such in the augmented reality of our cultural milieu, and *g)* communication, representations, narratives and discourses about all these *things, processes, events, people, institutions,* and levels of emergence, according to a number of genres, protocols and frames of reference.[6]

Although our cognitive ability rests on abstraction and on the identification of classes and kinds of phenomena, every phenomenon in the universe, not just human persons, appears at the same time to be highly individual.[7] In order that science may be possible at all (and Aristotle said that there is no science of individual phenomena), this complex singularity of the phenomenon has to be accounted for as the result of the interaction of simpler phenomena and of more general laws which formalize abstract processes. The theory of biological evolution has had to evolve from single explanatory principles to a more holistic perspective, conceiving of evolution as radically local and ecological: as the complex and historical interaction of multiple principles, not reducible to "adaptation" or "genetic drift" or "the survival of the fittest" or any single favourite explanatory principle (Jablonka and Lamb 2005). Reality as we face it is a vast web of related phenomena, each of which appears to be supervenient, or "just-so", the result of a contingent facticity inherent to the complex structure of the universe itself. Reality is full of *things*—but things belong to classes of things, and every thing and class of things has a potential history. The notion of a global explanation for complex phenomena is a regulative ideal for human understanding, one best exemplified at present by the current interest in "Big History" (Christian 2004), a discipline which arguably provides our

most comprehensive map of evolutionary complexity and of time. There are multiple narrative dimensions to Big History. To start with, it is a story of emerging complexity—the history of complexity itself, as seen from our anthropic vantage point. (On anthropics, see Bostrom 2002).

Some evolutionists (e.g. Lewontin 2003) see no direction in evolution, but anthropic observation provides just such directionality. And hindsight is a crucial component in this understanding of reality as growing complexity. Hindsight is the retrospective unweaving of emergent complexity, while narrative is the instrument of choice for its articulation and communication. Reality contains dimensions upon dimensions of temporal processes associated to each level of complexity—containing *in nuce* the kind of story, so to speak, or the kind of narrativity and structure which is possible at each of these levels of complexification. For instance, there has to be light atoms before there are stars, and the history of the stars is a necesssary prelude to the (hi)story of the heavy elements, which make up our bodies. The notion of a Great Chain of Being provided some ingredients for a preliminary theory of complexity (see Bergson 1959, García Landa 2015a), but evolutionary theory has to be developed first so that this chain could be storified and seen as a process of emergence. For contemporary science, every phenomenon is a chapter in the story of complexity—and Big History becomes the long-sought *Key to All Mythologies*, complete with all the dangers of over-ambitious totalization, and the vulnerability to ironic skepticism, which plague these grand undertakings.[8]

There must be processes and recurrences in nature before anticipations of those processes become possible—and those anticipations, guiding action, constitute an ecological interaction with the environment that we call *mind* (Mead 1967). In this

sense there is an evolutionary continuum between mere sensitivity to the environment (as we find in bacteria or plants) and the higher mental functions (Bergson 1959, Mead 2002). Concomitantly, the evolutionary roots of the narrative mind extend as far back as do responses to change in nature. A rudimentary brain is a rudimentary time machine. More complex brains are able to handle a variety of sequences of action, present, past and future— and are able to predict and model time in more complicated ways. We have defined "man" as the narrative beast: but narrative praxis is highly complex, and narrative structure itself is complex, made up of many layers of action, action representation, and perspectival models. In this deep evolutionary sense the prehistory of narrative extends back to the origin of the history of time itself, and the history of sequences of change, action, and their management by living beings. In this sense narrative incorporates many emergent physical and perceptual systems which, in a way, become "proto-narrative" retroactively, once narrative emerges from their potential and they become the building blocks of narrative structure. This is one way in which narrative, like any complex phenomenon, carries along its own cosmic history. Culturally situated narrative practices, too, carry within them their inscribed historicity, and this is a major subject for scholarly study in the humanities. Cinema, for instance, is a recent development among narrative genres, although the proto-cinema of dreams, complete who knows with its flashbacks and paradoxical structures, is surely not exclusive to human minds alone (—*pace* Napoleon, all animals are not equal, and some beasts are indeed more *proto*-narrative than others).

This is one reason why the many complexities of narrative must be carefully distinguished: some narrative stuctures take root in more general mental abilities, while others are highly evolved or specifically human, or need to be contextualised

in history and culture. A complex life experience has a narrative dimension in its own right, as far as some structural levels of perception and action are concerned, but *narratives* proper are not just mentally experienced: they must be socially shared, communicated through language or images. And it is this sharing of experientiality, with its associated semiotic media, technologies and genres, that is most distinctive in narrative proper, i.e. in the narrative acts and objects performed and exchanged by humans.

Hindsight, and its close relatives *narrative configuration* (Ricœur 1984), *anticipated retrospection* (Brooks 1984), or *the logic of narrativity* (Sturgess 1992) are highly elaborate cognitive operations. The most elaborate forms of such cognitive maneuvers necessitate the semiotic structures of representational feedback: that is, they need to be externalized and articulated through signs, before they are internalized again and assimilated as part of the individual's cognitive potential. Memory or anticipation are rooted in animal experience, but there can be no elaborate hindsight, or plans, or retroprospection, without the symbolic tools of language, drama, and conceptual blending (Fauconnier and Turner 2002)—or without semiotically articulated narratives. Both classical and experimental narratives provide strategies to map, explore and communicate complex dimensions of temporal experience, helping to make them thinkable and usable in social communication.

But an interest in *narratives* should not deter narratologists from studying *narrative,* or narrativity—narrative and pseudo-narrative structures lurking everywhere (if reality, being evolutionary, is inherently proto-narrative in nature). As regards the growth of complexity, the reader may be referred to the standard

evolutionary epic or Big History (see Christian 2004 and Chaisson 2006, as well as the classical antecedents in Spencer or Bergson). My argument is

1) that the levels of analysis and phenomena required for a narrative perspective, such as bodies, causes and effects, events, perceptions, etc., emerge historically in the cosmic process, and therefore complex phenomena (including narrative) carry along, inherently, an evolutionary history of the "ingredients" which go into their makeup; and

2) that, given that our perspective on time and Big History is inescapably narrativistic, everything in the universe, in order to be thought and understood as part of a complex history of emergence, acquires a *proto*-narrative dimension, as a result of the very perspective required by the cognitive instrument that enables us to conceive of evolutionary processes in the first place.

There is, more specifically, an inherent narrativity in evolutionary theories and explanations, especially as regards their retrospective nature. An account of complex and supervenient phenomena requires the insights provided by hindsight, by retrospection. It also requires, however, a critical perspective on the potential fallacies which accompany narrative explanations, notably hindsight bias.[9] There is insight to be achieved through hindsight, an insight we cannot renounce, but critical narrative knowledge necessitates a dialectic of vigilance and deconstruction in order to counter the self-fulfilling dynamics of hindsight bias or backshadowing.

A narratological toolkit of concepts must be developed or adapted in order to deal with the narrativity of complex events at the higher scale. And we must also bring out the inherent narrativity in the (non-narratological) concepts and perspectives we bring to bear on phenomena. Let's do a bit of that here. Working on such concepts is an instance of cognitive mapping—the building of mental maps

which relate areas and disciplines of knowledge to one another. (The very notion of a 'Third Culture' bridging the gap between the disciplines of the sciences and the humanities, exemplified for instance by sociobiologically-inspired criticism or by ecocriticism, is an instance of cognitive map-building).

One of the concepts we need is *narrative anchoring*—the mapping of small or individual narratives onto narratives of larger processes or events—e.g. biographies onto social histories.[10] Thus, creation myths may be mapped, analogically, as cosmological narratives akin to current evolutionary explanations and anchored to them in our current mental maps. To be sure, such "narrative anchoring" needs to take into account another dimension of narrative conceptualization—the fact that these narratives are different "language games" or genres. Our conceptual toolkit will also require, therefore, a cognitive mapping of the generic differences among narrative games and representations. (To give a simple example, take the generic difference between a historical novel and a historical testimonial account). Such a cognitive mapping of modes of representation will be named *narrative mapping* insofar as it applies to narratives and to the narrativity of other representations. Both narrative anchoring and narrative mapping are operations we perform, both explicitly and implicitly, in a number of ways—a suggestive topic for further narratological research.

Local, individual or specific narratives are mentally located (anchored) in a mental map of larger narratives; their structural or cognitive modes are also susceptible of mapping onto a mental map of narrative modes—a map which is itself historical, since narrative genres, strategies or media have a historical situatedness of their own. Maps and mapping may themselves be represented in a large-scale map, because they are part of the reality they map. Different trips

require different maps and different scales: we have already alluded to Big History as our most useful map or guide to universal complexity. But Big History and evolutionary theories can be mapped (as discourses) onto a history and evolution of their own. All of these are dimensions of complexity which have to be taken into stride by the aforementioned evolutionary historicist hermeneutics.

Our tools to approach the problem, too, are historical and contingent. This includes concepts, theories, disciplines, institutions, and sweeping further, our culture and our brain. There is a historicity in (critical) discourses we scholars often are quite attuned to, especially if the discourses are dated. We should extend that flair to all phenomena, since all are historical. Our mind itself is historical and contingent, quite a hopeless jumble, the product of supervenient experiences and our evolutionary life history, as noted by Gary Marcus (2008). Human minds (or bodies) have not been designed by evolution according to a plan set out in advance—they are not the result of a rationally designed blueprint aimed at maximal efficacy. The mind is, rather, the more or less stabilized result of a historically contingent accumulation, a structure resulting from supervenience and improvisation. (The notion of historical contingency, and an awareness of the dynamics of hindsight, are central, as well, in the work of another evolutionary theorist and reluctant Darwinist, Stephen Jay Gould, whose thought inspires some of Marcus's reasoning. Contingency and retrospection are also central dimensions examined by evolutionary narratology).

There is not a specific mental module for language, as Chomskian theory would seem to imply.[11] It is rather that the evolution of brain has commandeered for the purposes of language development the components of other cognitive and organizational functions of the brain, recycling them and adapting them to a new

function and purpose. Thus, there is much in language development that depends on the structure of the brain, but it does not depend on a specific component; instead, it depends a series of readapted functions. This view is very much in line with an evolutionary mechanism much emphasized by Gould, exaptation (or the serendipitous recycling of existing structures in order to serve a new function). Marcus's account of the relationship between the evolution of brain structure and cognition is a plausible one, and it sheds new light on the importance of path dependence in neuropsychology. In evolution, as in *Macbeth*, "what's done cannot be undone"; within the limits set by exaptation, evolutionary history conditions physical structure—actually, structure is condensed evolutionary history, a history epitomized to a large extent in the development of the adult form from the egg — the much debated *ontogeny recapitulating phylogeny*, at any rate a genetically programmed replay of the path from simple to complex. The development of the brain and its linguistic structures would exemplify this general principle as well. Linguistic functions are the result of an evolutionary *bricolage* carried out on previous structures owing their origin to other functions and developed in other circumstances.

Our mind, then, has not been designed in order to optimally fulfil the functions it performs. It muddles along in the performance, relying on accident and adaptation, on the historical accumulation of abilities and disabilities, and through the exaptation of organs and functions redirected to new ends. We make do with what we have, with the heteroclite collection of mental functions and abilities that we have received as our historical heritage, and which are adaptively developed under the new changing circumstances that human beings encounter or create in their novel environments.

These environments are in turn the product of their own (happenstance, path-dependent) evolutionary history, but they are changing, all the more changing and emergent as a result of our cultural niche constrution, which we call historical, social and economic development, civilization, cultural and technological progress—a continual creation of novel local environments which has radically transformed the original ecological surroundings of *Homo sapiens* and all the subsequent historically superimposed and eventually obsolescent transformations. Every new environment (a new tool, a new technological affordance or communication system) requires an additional tweaking of the established modes of perception, of behavior or of social interaction. For instance—the norms of politeness need to be adapted to new modes of communicative interaction, and so etiquette has to be supplemented by netiquette in computer-mediated communication, or by various netiquettes as required by the different social and technological dimensions of each mode of computer-mediated interaction (listservs, blogs, social networking sites, etc.). And as regards telephones, we've barely been able to realize the communicational consequences of everybody being potentially able to contact everybody else instantaneously (because with cell phones suddenly everyone's at home all the time) when we've got to decide whether to call "in the flesh", to send a short message, or to send a voice message. Every context is a puzzle for politeness, and new choices are full of new implications.

But back to the brain. It carries a history on board, and the mind does, too. Our minds are like our homes: a variegated collection of useful and useless objects, a set of pathways polished by use and efficiency, and of corners where old holiday souvenirs are put out of the way. Things it seemed a good idea to buy one day lie in corners behind doors; some of them we did use intensely for some years but not any

longer; a few come out of the drawer once a year; some of them must be somewhere and we wish we could find them. Homes, lives, minds, are the result of an accumulated history. Or again, they are like a city, a spontaneous outgrowth. Nobody has designed a city; it is what it is and it has the shape it has as the product of spontaneous organization superimposed on the accidents of geography and of economic and political history. It is not by chance that memory should be governed by contextual associations. Our knowledge hangs together in connected networks, and memories are associated to the circumstances and occasions in which we acquired bits of information. We drag our history along; actually it is *what we are*. We are supervenient like it, facts resulting from events which result partly from design and intention (every bit of a city was designed by someone) and from the chaotic and contingent interaction of causes—everything is inherently contingent, until it happens, and thence the apparent paradox that chance and necessity should be a Janus-faced figure rather than just uncanny twins. Among the ingredients of history we do find plans, intention, design, yes: but both the plans and the intentions that were realized and those that were not. Human beings try to design their lives and the future of their societies, and human history is, partly, one of self-making, but it is a self-making which makes abundant use of failure, of intentions wrecked by circumstances, of accidents, and unforeseen events resulting from unique conjunctions of circumstances.

It is not by chance that memory should be governed by contextual associations. Our knowledge hangs together in connected networks, and memories are associated to the circumstances and occasions in which we acquired bits of information—as noted by Locke in his observations on the association of ideas (*Essay Concerning Human Understanding*, II.xxxiii). We drag our history along; actually it is *what we*

are. Among the ingredients of history we do find plans, intention, design, indeed: but we find both the plans and the intentions that were realized and those that were not. Human beings try to design their lives and the future of their societies, and human history is, partly, one of self-making, but it is a self-making which makes abundant use of failure, of intentions wrecked by circumstances, of accidents, and unforeseen events resulting from unique conjunctions of circumstances.

These are matters for narrative: how the supervenient came to be, unexpectedly; or how the causes leading to it became apparent with hindsight. It is the unforeseen that gets to be narrated: whatever it was that resulted from the actors' limited perspective, and can be seen, once the conjunction of forces determined the outcome, from the vantage point of hindsight. Narrative is the story of how it was that the plan went wrong, or how it succeeded through an unexpected route. Causality, complexity, contingency, happenstance, supervenience, feedback dynamics, evolution, emergence and hindsight: there is a story waiting to be told in the unweaving of this network.

Narratological analysis allows us to perceive a retrospective dimension in plans. Of course it is the *prospective* nature of plans which is most evident, and it might strike one as a paradox that plans should have a retrospective dimension. But it is in the nature of prospective human action that it should get enmeshed with retrospection, resulting in the peculiarly *retroprospective* quality of our experience. When a plan or projected action fails, we do indeed retrospect, and we correct it in view of whatever went wrong (a correction which often comes only too late, and by way of symbolic compensation). But more generally, there is an element of retrospection involved in the very nature of prospection and planning. Plans partake of the *logic of narrativity* described by Philip Sturgess (1992): every element of the

plan is designed in advance to fit preceding and subsequent actions, and (as in Aristotelian well-designed dramatic plot) there is nothing in the plan whose removal should not make a difference. The whole is designed with the end in mind, like a Poe short story, so that the plan is the result of reverse engineering: in a certain sense, it is designed from the future we have in mind, towards the pasts (our present present, and immediate future) which have to be modified in order to reach that future: anticipating hindsight, we move "by backward steps", from the future to be generated, to the present which has to provide the means.

Yet little planning is feasible at a historical scale, due to the contingency of historical development. Historical developments are thus accretional rather than intentional, and humans seen from a distance are much more similar to ants than they are in close-up. The overdetermination of the actual results of action can only be discerned retrospectively. The course events will take is not already written (only precariously so in our plans and expectations and in our understanding of nature). Future events can be foreseen and predicted only up to a point. They will usually follow well-established natural laws (or what we think are "the" natural laws)—and probabilities, although we have all heard of *black swans.* Anyway, we predict according to our best estimations, but these predictions are a bit like plans: they bump into the contingencies unforeseen by the predictor (some "contingencies" are foreseen, perhaps in order to make the real ones stand out when they do arise). And the eventual, supervenient outcome of the story finally turns out to be a matter for story, being understandable and tellable only a posteriori, by a historical science, not a physical or mathematical one. It is contingent within certain margins, until it is realized. As the "science" of economics proves (experimentally, it might be said) again and again, outcomes in a complex environment cannot be

calculated by algorithms (Taleb 2007)—they can only be analyzed, and even predicted after the fact by the great vindicator of the predictions that happened to get it right: the historian from his watchtower of hindsight.

Topsight from the watchtower has its own pleasures (*suave mari magno*) but the shore is solid ground only to a point. The standpoint from which we enjoy hindsight is caught, too, in the drift of history, and the conclusions we reach from it may be at best provisonally valid. Witness each and every one of the cosmological theories about the origin and the foreseeable ending of our world—they have sprung up, they have improved on their predecessors and they have been discarded in a brief lapse of the world's time. Except the current one, of course, which is (as Popperian science tells us) only the best we have so far, and will possibly be displaced as well.

We have seen that the structure and abilities of the human mind are, according to the "klugey" theory of the mind, contingent or rather supervenient—contingency become necessity. The supervenient nature of our mental structure and abilities is inherently bound up with the supervenient structure of the human body: human beings, like any other creature, are the product of contingent evolution and the myriad chance events which receive a precarious law-like form as "natural selection." Evolution, as understood in the Darwinian paradigm as understood by Gould, is a unique unpredictable succession of complex events of descent and selection in ecological/historical interaction. The evolution of life forms, like any other discrete series of events, cannot be predicted in advance—such predictions work only *après coup*. The many dynamic principles which can be isolated in this complex series—descent with modification, successful reproduction, the struggle for life, inclusive fitness, selfish genes, group selection, what have you—are

rationally identifiable and can be isolated for a number of experimental or observational purposes—but their effective interaction is supervenient to the extent that, from another perspective, the evolution of life is one big whole in which the geological and chemical circumstances of the planet, and the vagaries of cosmic catastrophes and population dynamics gave rise to the tree of life as it has existed in the past and as it exists now, a "just so" story if you've seen one.

Evolutionary laws or principles of evolution do not act in the void, so any particular law is by definition an abstraction from ecological complexity—and if we forget this, the clearest identification of an evolutionary law will obscure our understanding rather than illuminate the nature of the events it describes. The actual turn of events of selection and speciation is inherently historical and local, a unique and improbable sequence modelled by natural selection, by gradual adaptation to local circumstances, by the chance extinction of populations, and by the sudden catastrophes which radically transform the environment—leaving sometimes, instead of a thriving tangled bank of species, a post-apocalyptic desert where three or four disparate kinds hold on to a precarious existence, with all the once well-adapted and fine-tuned varieties and transitional forms suddenly wiped out by the changing rules of the game in a landscape of disaster. Species thus appear to the observer as a chance assortment of biological shapes where obvious similarity between some species only obscures the more indirectly common descent of all living beings. The few chance survivors of catastrophes and of the extinctions of lineages diversify once again to occupy ecological niches left vacant, and give rise to the strange tree of life as we see it now, a continuous chain with most links missing, or having never existed at all.

It is to such strange accidents and happenings that we owe the existence of the sexes, without which we would not be what we are or think what we think or write lyrical poems. It is to path-dependent evolutionary supervenience that we owe the development of the partial symmetries between our upper and lower limbs, or between our cerebral hemispheres; to it we owe our five-digit hands and opposable thumb which should perhaps inspire better-designed keyboards. The body whose scales and proportions shape in part our ergonomic environment is a strange organism, with a face without tentacles and a back without a face, with joints and proteins folding only in certain directions. And every new human body which is produced (none has "reproduced" itself so far) repeats a basic shape and a basic history carried along with that shape, congealed in the form of structure.

The ontogenetic history of bodily development partly recapitulates the phylogenetic history of the species, as a kind of summary-trailer of previous episodes in a TV series. Thus, our in amniotic embryonic existence we are always still in the primordial warm pond, getting a first-hand experience of the watery origin of life ("rolling evermore"); and a baby chimpanzee is also, as well, more than half a human child, until we go our different ways in the light of common day.

The third kind of supervenience is, then, this happenstance historical structuring of the mind and the body, this history become structure, which we carry along and, indeed, are. Thanks to the turns and twists of our portable past, we see in color, we throw javelins at the olympic games, and we make plans on how to reorganize social work. Any act of ours, any step we take, can be be read as a recapitulation of this solidified history which has made it possible and has shaped it. Even the athlete who throws neon tubes instead of javelins is doing something original only up to a point, since he uses the movements made possible by the

structure of the arm, and recapitulates the tradition of javelin-throwers. The fact that an event or phenomenon may be an emergent and supervenient contingency, something unique, unprecedented, an unrepeatable conjunction, does not preclude us from tracing the history of its component parts and their origin. It is the other way round: coherent historical processes, the understanding of those processes and the supervenience of both the process and its analysis go together. Narrative is closely involved with our understanding of phenomena: we "tell" ourselves how they come to be by constructing mental models of temporal unfolding, and we share that understanding using a variety of narrative genres: oral, written, or iconic narratives; narratives of personal experience, reports, fictions. The very language we use to analyze processes, events and outcomes is itself a supervenient, historical, organic and cultural structure—not least because the needs and aims of analysis are themselves local and historical. We have already noted that narrative discourse and narrative genres are subject to narrative mapping as well.

We have so far commented on three, or perhaps four, levels of contingency and supervenience. To the supervenient nature of the body, and that of the mind (if these are twain), that is, on the hardware we receive from history, we superimpose the equally supervenient and contingent input of our cultural software. Which has also developed along the historical accidents which have made our culture what it is, and which, within it, has made us what we are. Remember that any distinction of levels or principles is only the dissection of a complex interactive process, murdered in the dissecting. Our personality, our social and intellectual circle, and our life path, the chance elements of our disciplinary upbringing, and the conceptual tools provided by the history of thought have brought us, as an implied writer and reader pursuing our interests in narrative complexity, to this reflection on

the historical locality of our body and our minds, of our lives and projects. Using the (historically developed) concepts, theories and tools for thinking that we have shored up and collected through a combination of chance and method in our intellectual pursuit: evolutionary theory, narratology, and a penchant for retrospection which may well originate in a nostalgic personality structure.

Narrative representations or interpretations are inherently contingent, then, as a result of the artist's or the interpreter's intellectual history, and of the historicity of the media, genres or intellectual traditions. Global scientific accounts may have a distinct intellectual cultural privilege as cognitive frameworks onto which smaller histories are mapped—witness for instance the current standard cosmological account—but these accounts are themselves subject to evolution and change (sometimes in spectacular directions and at great speed). Moreover, their cognitive use is always local and situated; so their role as well as that of any other global cognitive framework must be conceived of dialectically, and is subject to negotiation and interaction in these situated contexts. The interpretive insights derived from symbolic interactionism have to be taken into account in any hermeneutic proposal, even in an evolutionary one, if we are to come to terms with the full complexity of the phenomena of representation and cognition.

Our objects of study are historical and subject to narrative anchoring; but the conceptual toolkit brought to bear on the object, and the interpretive situation or perspective, are themselves historical and ultimately referrable to a global cognitive mapping which accounts for the historicity (or the evolutionary origin) of conceptual tools, objects, perspectives, situations, and personal histories. Every object or event has an inherent history, a narrativity which can be teased out of it,

and every theory brought to bear on the object or event has a historical situatedness, an intellectual history, and an institutional context.

There is therefore an inherent dialectic between (1) the contingent / supervenient aspects of phenomena and of the discursive perspectives we bring to bear on them, on one hand, and (2) the coherent situatedness of both phenomena and perspectives when understood from an evolutionary perspective, on the other; and this dialectic gives rise to an intriguing dimension of the complexity of an object, as approached from a given perspective. An evolutionary narratology needs to examine the implications of the concepts of evolutionary supervenience, retrospection, and hindsight for theories of narrative mapping and of narrative anchoring, theories which are crucial for evolutionary historicist hermeneutics. With some exceptions such as Stephen Jay Gould, major evolutionary theorists have been insufficiently aware of the cognitive implications of narrative structures and of narrative thinking in evolutionary theory.

To come full circle to the issue of contingency, the recent cosmological proposal by Roberto Mangabeira Unger and Lee Smolin in *The Singular Universe and the Reality of Time* (2015) forcefully asserts the nature of reality as a unified web of relationships within a single temporal system, an Enormous History so to speak, as it restores the singularity of time as an irreducible cosmological primitive. To the Einsteinian mathematized space-time, resulting in a block universe of mathematical relationships, they oppose the inclusive reality of time, and demote mathematics to a tool for abstracting time—a tool which is immensely useful but often misleading, and which is in no way a Platonic blueprint to the essence of reality. Reality is the temporal unfolding of events, and path dependence is a central concept in Unger and Smolin's evolutionary conception, as it was in Gould's.

Complex emergent phenomena are path-dependent, and this is a major dimension of what we have been calling the proto-narrativity of the cosmos. Note that I call complex and path-dependent phenomena *proto-narrative* rather than narrative, as there is a cognitive dialectic involved here whereby they both enable and generate the basic structures of narrative (sequence, causality, etc.) and, moreover, become themselves a factual narrative, asking to be told, once they are perceived and understood by human minds.[12]

Unger and Smolin posit a rethinking of cosmology and physics by extending to them the notions of a co-evolution of physical laws and phenomena, and the recognition of the mutability of natural kinds (not just of biological species, but of sub-atomic particles too); they advocate an evolutionary physics based on the natural selection of universes (and their laws), the co-evolution of regularities and structures, and the pervasiveness of path dependence. Their notion of the inclusive reality of time provides, too, an ultimate theoretical grounding for narrative anchoring, as it posits the existence of "a preferred cosmic time such that everything that has ever happened in the history of nature can in principle be placed on a single unbroken time chart" (2015, 139). Human history, and human histories, find thus their natural grounding in the fundamental laws of nature, and narrative understanding reveals its deepest connections with the structure of the reality from which it emerges.

The most important feature of the cosmos is *that it is the way it is*, its facticity resulting from evolutionary path-dependence. Unger and Smolin's model offers thus a suggestive foundation for a cosmological narratology, and most particularly for a theory of narrative anchoring—although (as is the case with other approaches to cosmology) there is room for an increased narratological awareness in their

approach. As it is, the understanding of time appears as the ultimate encompassing narrative map, one which captures not merely the human understanding of things, but the very fabric of reality or "Being". The universe progressively unfolds in time and generates unprecedented levels of complexity, an emergent process which is creative and not as a replay of pre-established models, not as the projection onto time of a timeless set of Platonic models and mathematical ideas.

According to the cosmologist George R. Ellis (2012), in complex systems events are unpredictable until the moment they happen. We could envisage narratives as our way to make them predictable after the fact—which is by no means as easy as it sounds. These cosmological views of Ellis's, and of Smolin and Unger's, return in part to Bergson's (1959) notion of creative evolution, as against the "block universe" of Einstein and Minkowski, which has been a dominant conception in twentieth century physics. A return to emergence is also a return to narrative. Narrative is uniquely tied to the uniqueness of events in the complex universe, and to the path-dependence of evolutionary emergence. Increased interdependence and complexity has been linked by systems theorists to the dynamics of the arrow of time (D'Souza 2011): in this light, narrative is, arguably, the complex system par excelence, and the very tip of the arrow of time—a tip pointing paradoxically both backwards and forwards, reworking time as the story progresses.

The study of narrativity is a promising avenue for future reseach bridging the sciences and the humanities. For instance, narrativity is a hidden player in the problem of cosmological fine-tuning and anthropic observation. Any evolutionary development is unique in an unlikely way—and therefore exhibits narrativity. That

some of them exhibit an even greater degree of unlikeliness may obscure this fundamental evolutionary dimension of narrative.

If Time is to be asserted once again as the irreducible fundamental backdrop of cosmic evolution, as the foundation on which complex emergents are built through unprecedented interactions, *narrative* too is a fundamental phenomenon, both a final flourish of complexity, and a fundamental tool in understanding the complexity of all phenomena, since narrative is our way of coming to terms with time, with events, and with objects as they appear in the world—as the product of time and of complex unprecedented interactions.

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Notes

[1] On the emergence of complex phenomena from basic physics, see Gell-Mann (2001). On the semiotics of narrative complexity, see Pier (2016). On complexity and narrative research in the social sciences, see Snowden (2010). Many aspects of narrative complexity are dealt with from other critical perspectives in their own terminology—e.g. Burke's (1966) reflections on symbolism, Ingarden's analysis of the stratified nature of literary narratives (1973), or Bakhtin's (1981) notion of the chronotope.

[2] On protolanguage see Bickerton 2009. On animal lies, see Rowell et al. (2006).

[3] See Gottschall (2012); Harari (2015).

[4] On the phenomenological status of the past and the future, see Mead ([1932] 2002). The past (and the future) have no material existence and are cognitive constructs within an expanded notion of the present, endlessly subject to reinterpretation and rewriting. Mead's perspective has implications for the epistemology of science, cosmology, and historiography—and for a theory of narrative and hindsight. For example, see this passage

on “the moving picture of the histories that have succeeded each other from the myths of primitive ages” up to the contemporary relativistic picture of the universe: “the rapidity with which these pasts succeed each other has steadily increased with the increase in critical exactitude in the study of the past. There is an entire absence of finality in such presentations. It is of course the implication of our research method that the historian in any field of science will be able to reconstruct what has been, as an authenticated account of the past. Yet we look forward with vivid interest to the reconstruction, in the world that will be, of the world that has been, for we realize that the world that will be cannot differ from the world that is without rewriting the past to which we now look back” (36–37).

[5] Christian (2004) speaks of "thresholds of complexity" ranging from the extremely simple primitive universe, to the complex (and unstable) structures of complex symbolic cultures.

[6] On cosmic evolutionism, see Spencer (1937, first edition 1862); Bergson (1959, first edition 1907); Smuts (1927), Christian (2004), Chaisson (2006). On the complex dynamics linking biological evolution, environment, behavior and symbolism, see Jablonka and Lamb (2005).

[7] See Cortes and Smolin (2014) for a mathematical perspective on the uniqueness of events in the fields of physics and cosmology.

[8] The unwritten *Key to All Mythologies* is supposedly the life *opus* of the scholarly fraud Casaubon, in George Eliot's *Middlemarch.* A wariness about the explanatory power of Big History might stem from a postmodernist stance informed by Derridean deconstruction or by Lyotard's critique of grand narratives—Big History being the ultimate Grand Narrative—although the very extent of the multidisciplinary consensus about the relevance of the events in Big History would make it hard to question in most scholarly contexts. More specifically, Big History might be criticized as one more instance (in a sense the ultimate one) of the illusion of centralized control (see Porter Abbott 2008), only with this control displaced to a more modest position of observational or cognitive control. Porter Abbott sees in evolutionary processes an "unnarratable" dimension, as their inherent complexity, when engaged at all, makes them resist narrativization (2003, 2008). As I see it, Abbott's perspective underestimates the explanatory power of observational hindsight in the modeling of *relevant* contexts and *relevant* causes—relevant for specific projects and courses of action. See also Bondarenko and Baskin (2016) on the perhaps unexpectedly powerful integration of complexity theory and Big History, as the study of the dynamics of non-linear systems benefits from a multidisciplinary perspective like the one favored within Big History.

[9] The term 'hindsight bias' is more common in psychology and in the social sciences than in the humanities; see Hoffrage and Pohl (2003). But the phenomenon is not: see the analyses on "backshadowing" in Bernstein (1994) and Morson (1994).

[10] On narrative anchoring and narrative mapping see García Landa (2011, 2015b). Note that Herman (2009) uses the term in a different sense.

[11] More critiques to that Chomskian position can be seen in Deacon (2010). See also Huth et al. (2016) on the semantic brain map.

[12] The editors of this volume have drawn my attention (among other things) to a related issue in the field of phenomenology: Lampert's (1995) emphasis on "back reference" in his analysis of Husserl's intentional synthesis of experiences points to a pervasive role of what I call retroprospective structures in cognition, including a kind of paradoxical bootstrapping closely related to the fallacies and paradoxes studied in narrative theory—whereby emergent meanings present themselves as already being awaited by the past. That is, they project, retroactively, a past which was anticipating them (we are all Whig theorists of history, in a way). Although Husserl's or Lampert's focus is not specifically narratological, this philosophical analysis of experience presents a perspective which emphasizes the central role played by hindsight in the genesis of human experience.

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