Technopoïesis: Transmedia Mythologisation and the Unity of Knowledge. An Introduction

Tecnopoética: mitologización transmedia y unidad del conocimiento. Presentación

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Abstract

It is difficult to explain why different disciplines are drawn to similar problems. Inter-relations are not always explainable by direct influence. It has been argued that any common ground derives from the fact that people share certain kinds of everyday experiences. Is 'consilience' or the unification of knowledge a utopia or a possibility, as William Whewell Edward Wilson would have it? This thematic issue of Icono14 explores the common premise underlying all human disciplines: the confirmation that technology has a direct impact upon sign production, distribution and reception and, thus, upon the entire system of human thought, cultural representation and cognition. The collection examines transmedial representations of technological advance by looking at their mythical shades of meanings as strategic narratives. As practical knowledge engaged in the creation and use of tools and machines as well as in the development of techniques and methods of organization that perform specific functions in making human life easier, the technologies of the past can shed some light on the future that emerging media can bring about for human groups.

Key Words: *Consilience - Mythical technologies - New media - Semiotics - Strategic narratives - Transmediality*

Resumen

Es difícil explicar por qué disciplinas distintas se ven atraídas por problemas similares. Las interrelaciones no siempre se explican por influencia directa. Se ha argumentado que cualquier tema de interés mutuo deriva del hecho de que las personas comparten ciertos tipos de experiencias cotidianas. Este número temático de Icono14 explora la premisa común que subyace a todas las disciplinas humanas: la confirmación de que la tecnología tiene un impacto directo en la producción, distribución y recepción de signos y, de esta forma, en todo el sistema del pensamiento humano, representación cultural y cognición. La colección examina las representaciones transmediales de avance tecnológico observando sus significaciones míticas y narrativas estratégicas. Como conocimiento práctico dedicado a la creación y utilización de herramientas y máquinas así como al desarrollo de técnicas y métodos de organización que realizan funciones específicas para facilitar la vida humana, las tecnologías del pasado pueden arrojar luz sobre el futuro que los medios emergentes pueden traer a los grupos humanos.

Palabras clave: *Consiliencia - Tecnologías míticas - Nuevos medios - Semiótica - Narrativas estratégicas - Transmedialidad*

1. Introduction: technology changes the way we think

Social evolution is closely connected to the invention of tools, machines and techniques that make work more efficient and life easier. Archeological and architectural evidence have been the main source of information about how technologies were used by the oldest human groups. However, ancient stories can also offer clues to understand the evolution of technology as a social phenomenon and, thus, the future impact of current media changes.

In *Science and Technology in World History* (1999, 31), James McClellan and Harold Dorn explain that the first techno-economic revolution took place some 6.000 years ago when Neolithic communities slowly gave rise to urban civilizations in the Near East. The revolution arose from the need for intensified forms of agricultural production, required to sustain the increasingly larger populations in the cities. Subsistence-level farming gave way to the production of surpluses of cereals to be taxed, stored, and redistributed. This brought along the development of stratified societies, political and economic organizations in the form of centralized political authorities (pharaohs and kings). Coercive institutions, such as armies and police, began to guard palaces, temples and other expanding forms of monumental architecture. Early forms of recording information -hieroglyphs and cuneiform writing- were born, and engineers began to explore mathematics to account for cereals and other goods, and astronomy to regulate seasonal crops. Hieroglyphs and other written records in very diverse formats (papyrus, stone, parchment, and only later paper technologies imported from China) registered the importance of rulers and their supposedly divine ancestors so as to guaranty their power. These early forms of writing also showed the devices and tools used to account for the storage and distribution of different food supplies, including wheeled carts, pottery and vessels, glass and rope making, ship building for transportation, and so on. Different engineering processes, many involving hydraulic power, were used, as well as some flammable products (i.e. petroleum distillates such as naphtha) (see Landels 1978).

In time, more sophisticated dying and inking technologies were used on papyrus, stones, animal skins, clothing and so on. Defensive equipment included metal-

lic breastplates, leather shields covered in thinner metal, leg protections, helmets and so on. Greek and Roman engineers developed advanced catapults capable of launching many projectiles. In the 2nd century CE, Lucian of Samosata reported that during the Siege of Syracuse (c.214-212 BCE), the engineer and astronomer known as Archimedes destroyed enemy ships by building a parabolic reflector using mirror lenses. Another famous engineer was Ctesibius, who achieved great success using the power of water and air in hydraulic and pneumatic devices, for example a water clock (clepsydra). His inventions are mentioned by a number of other engineers such as his student Philo of Byzantium (280-220 BCE) or, centuries later, Hero of Alexandria (10-70 CE), who reported to have created automatic pieces for theaters using pulleys and weights in his *Automatopoietike* or *Archaia Hellenike technologia*. Techniques used by Roman architect and civil engineer Marcus Vitruvius (c. 80-15 BCE) and described in De *Architectura* were very influential in the Renaissance, particularly on work by Leon Battista Alberti and his notion of perspective, as well as on Leonardo da Vinci (1452-1519) and Michelangelo (1475-1564). In the early 1900s, in a shipwreck near the Greek Island of Antikythera near Crete, where the first European civilization emerged around the archeological site of Knossos, a strange mechanism was found, now kept at the National Archaeological Museum, in Athens. The 'Antikythera Mechanism' is a sort of bronze astronomical clock, also described as the first analogue computer, dated between 200-150BCE and possibly originating in Archimedes' school.

The idea of creating artificial humans and automatons is persistent in myths and tales from antiquity. Aristotle and Plato both mention these moving statues in various works. For example, In *Politics* (1253b) and *On the Soul* (406b, ll. 19-20), Aristotle refers to Daedalus' self-moving wooden statue of Aphrodite, animated by mercury (which was thought to be a living substance because of its strange properties). Daedalus' moving statues are also mentioned in Plato's *Meno* (97d) and in *Euthyphro* (11b-d). There are also stories concerning Talos, the giant brass automaton made by Hephaistos and given to Minos, the King of Crete to guard his land from invaders. The story appears in the *Bibliotheke* (1.9.26) attributed to Apollodorus of Athens, and in the *Argonautica* (4.1638) by Apollonius of Rhodes, in which the giant metal man attacks Jason and his Argonauts. In different versions, Talos is destroyed when his ankle is punctured in some inner fluid escapes

his metal body. Philostratus, Pliny, Juvenal, Strabo, Tacitus and Pindar's *Olympian Odes* (7.53) mention walking statues. Ovid's *Metamorphoses*, tells the story of Pygmalion, an artist and King of Crete who sculpted a statue of a woman so lifelike and beautiful that he fell in love with it. With Aphrodite's help, Galatea became animated. Ovid's account of Prometheus is also connected to creation myths where humankind originates out of wet clay (for more information on ancient robots see work by Kevin La Grandeur)

One of the most important references to artificial humans appears in Homer's *Iliad* (Book 8), which narrates the story of Hephaistos, the engineer-god son of Zeus and Hera who assisted in the birth of his step-sister Athena (although records are inconsistent about this). Homer refers to Hephaistos' mechanical servant maidens who were able to speak and do "cunning handiwork" (lines 419-420). The allusion to 'cunning' is interesting here as it refers to the Greek term *metis*, meaning an obscure and conjectural knowledge (see below). In turn, Hephaistos' gift is his 'craft', that is, *techne*.

The main theoretical goal of this thematic issue of Icono14 is to explore the relationship between the different modes of knowledge as they are related to myths. The practical goal is to explore how these findings apply to the contemporary transmedia situation, and if a unification of knowledge (*consilience*) is possible. Naturally, there are limitations to this comparative study across cultures, for although our objective, as editors, was to include a greater number of papers from non-western communities, this goal has been partially achieved (only the papers by Hogrefe and Pérez-Amezcua focus on non-western indigenous accounts). Nevertheless, despite differences in timing, we argue that the brief path, traced above, on the impact of technological advance in the ancient western societies can give insights into similar evolutions in other parts of the globe.

To return to the early accounts on the different types of knowledge, in the Western world, Plato's most brilliant student, Aristotle, discussed the faculties of the soul required to attain truth in his *Nicomachean Ethics* (Book VI, Ch. 3). He classified them in three main types: *epistēmē* (1139b18-36) or universal knowledge, shared, circulated and preserved in cultural memory and heritage. For Ar-

istotle's mentor, Plato, *episeême* was more a kind of logical deductive ability to know the real, based on foundations that did not required justification (*Republic* 477b), that is, universal explicit (natural) knowledge. The second ability is *techne* (*Nicomachean Ethics* 1140a1-23), that is, skills or capacities to accomplish tasks that operate on variable spheres. In chapter 4, Aristotle defines *techne* as a trained capacity to create through reason (*logos*); in other words, knowledge of specific principles and patterns, and thus, frequently translated as "craft" or "art" in its meaning of systematic use of knowledge for intelligent human action. Plato highlights that crafts (*technai*) such as geometry and calculation are differentiated by their specific functions or 'erga' (*Republic* 346a). In other words, it is a form of organizational know-how or codified knowledge. Finally, *phronesis* (*Nicomachean Ethics* 1140a24-1140b12), which is a sort of practical wisdom and idiosyncratic knowledge that comes from life experiences as a result of trial and error; to some extent, it is intuitive and cannot be shared. Aristotle distinguishes *phronesis* from *sophia* (theoretical wisdom, which involves epistemic reasoning). He also held that these types of knowledge corresponded to three basic human activities: *theoria* (thinking), aimed at universal knowledge and truth, *poïesis* (making), whose end goal is production, and *praxis*, the objective of which is doing or action.

In recent discussions of Aristotle's *Rhetoric*, such as the collection edited by Alan G. Gross and Arthur E. Walzer (2000), *phronesis* is discussed in relation to an older quality, attributed by Homer to Odysseus, the paragon of craftiness and cunning, that is, *metis* or conjectural intelligence. Drawing on work by Marcel Detienne and Jean-Pierre Vernant (2009), *metis* has been found to exemplify and earlier form of world knowledge prior to the development of the synthesis of Platonist and Aristotelian models. Carolyn R. Miller writes that this "conjectural worldview concerns the individual case, rather than universal knowledge, probability rather than certainty, qualitative rather than cumulative or quantifiable information, and inferential rather than deductive thought" (2000, p.138). *Metis* originates when a rupture occurs in familiar stable reality that allows for predictions. The new shifting and disconcerting reality requires both conjectural knowledge (*metis*) and practical intelligence (*techne*) targeted at concrete decisions. *Metis* is, thus, a name for an idiosyncratic uncodified and personal mode of knowledge encapsulated in practice that contrasts with the universal models of knowing as described by Aristotle.

In Greek mythology, Metis was Zeus first wife. She was an Oceanid Titaness, daughter of primordial Oceanus (Ogenus) and his sister Tethys, the equivalent of Apsu and Tiamat in the Mesopotamian cosmogony, associated also to the winged Egyptian goddess Ma'at, who symbolized the order and harmony of the universe, justice and wisdom. Metis is the personification of wise counsel as she helped Zeus in his war against his father Kronos (according to Hesiod's *Theogony*, Kronos devoured his descendants to avoid being overthrown by them; Metis gave Zeus, who had escaped helped by his mother, a beverage that made Kronos disgorge them again). Zeus had three wives, Metis, Themis and Hera, and a number of other conquests. Themis gave birth to the Fates, and Hera was the mother of Ares and Hephaistos. The same prophecy of Metis giving birth to a son who would overcome him, caused Zeus to swallow his wife. Metis often took different animal forms in order to escape Zeus' advances. In this case, the god had tricked her into turning her winged self into a fly so that he could engorge her as he wanted to keep her wisdom and preserve his superiority. Metis was pregnant with Athena, and she gave her unborn daughter a helmet and armour for protection. In his *Olympian Ode*, the Greek-Theban poet Pindar (c. 522-c. 443 BCE) wrote that Athena was born out from her father's head with the help of Hephaestus. Other sources argue that it was Prometheus, and even Hermes, who split Zeus's head to allow Athena to leap forth (Leeming 2004; original Greek sources: Pseudo Apollodorus i.2-6; Hesiod's *Theogony* 471, 886, 924; Plato's *Symposium* 203).

In a book chapter entitled "Beyond Reality", the British professor of the History of Science Stephen Gaukroger explains that until the 5th century BCE, *metis* signified nature's ability to change, to be one step ahead and reverse any apparently logical situation of apparent order. Zeus represented this order: the *logos*. *Metis* stood for cunning, very valued in the Mycenae civilization, and attributed to figures such as Prometheus and Odysseus/Ulysses. A knowledge shift occurred, and a new cluster of concepts centred round the notion of *epistēmē* emerged, taking over *metis*. Gaukroger argues, that the shift can be traced back as early as Plato and his inquiries about the relationship between virtue and *techne*. In *Gorgias* (465A), for instance, *techne* is defined not just as practical ability or craft, but as an account of something; that is, a distinction between non-cognitive and cognitive skills (Gaukroger 1999, 42). Gaukroger goes on to explain that Plato distinguished between "cogni-

tive skills that can be conveyed in the form of results, or can be learned through imitation, and those which require a form of contemplative understanding," and he adds that virtue is of the latter kind. Plato's concern with ethics, inherited from his mentor Socrates, inaugurates the shift towards *epistēmē* as a form of universal understanding, a kind of historical a priori that grounds knowledge and its discourses/representations within a particular epoch (see also Foucault's *L'Ordre du discourse*).

James McClellan and Harold Dorn contemplate this knowledge shift in parallel to the evolution of the two great scientific traditions of antiquity: the practical sciences, patronized by institutional powers to ensure technological innovation and economic progress, and scientific theorizing, initiated by the early Greek concerns for natural philosophy. In *L'Archéologie du Savoir*, Michel Foucault goes on to explain that different *epistēmēs* might co-exist and interact as representative of shifting power-knowledge systems, and that this was the case in the transition that took place in the late medieval and early Renaissance Europe with the combination of Neo-Platonism and Aristotelianism (see also McLuhan 1962). Timothy Reiss sees this knowledge transition involved in a shift from "patterning", in a mytho-poetic frame of mind where signs were organized on the basis of pattern similarities and differences by means resemblance and repetition, towards the expression of knowledge as an analytic and referential reasoning practice (Reiss 1997, 30). Arising from oral cultures, discourse in the mytho-poetic *epistēmē* became a tool for ordering the mind, giving rise to scholastic thinking rules of logic.

According to Reiss, scientific-rational discourse, first overlaps and, later, smothers the mytho-poetic. Reiss's analysis of Johannes Kepler's and Galileo's writings demonstrates this transition towards a Cartesian mode of thinking, where representation stems in the observer's perceiving/thinking mind (subject of enunciation) and gradually shifts to a more abstract mode where the word/sign and the phenomenon/matter are brought to coincide in the act of mimetic representation (Reiss 1997, 36). The latter move is associated to an epistemological shift: from the perceiving subject to the observed empirical object (experiment). The use of optic technologies (such as the telescope) would have enabled this viewing transition, just as our screens (computers, tablets and smart phones) open contemporary worlds to the virtual cyber-sphere.

A 3000 year old piece was found in 1853 in King Sargon II's Assyrian palace of Nimrud, Nineveh (contemporary Kuyunjik, Irak) and is considered the first known lenses to have been fabricated. Many similar pieces were found in the sites of Egypt Old Kingdom (c. 2686-2181 BCE). These early lenses were made from polished rock silica and quartz crystal. Coating one of the sides with silver paint, they were also used as mirrors. The Greco-Egyptian astronomer and astrologer, Claudius Ptolemy, who defined cone vision and how size and shape were determined by the visual angle combined with distance and orientation, also records the early use of lenses and reflection and refraction mechanisms in his scientific treaty on *Optics* written in the 2nd century CE, a work that contains some of the earliest insights on perceptual vision.

Ptolomy's geocentric conception of the world remained unshaken until de publication in 1543 of Nicolaus Copernicus' *De revolutionibus orbium coelestium*, which raised questions against Aristotelian physics and cosmology, displayed in *On the Heavens*. The 16th and early 17th centuries remain controversial as to the impact of mathematical reasoning on natural biology, reflected for instance in work on optics and camera obscura by Austrian Johannes Kepler (1571-1630). His contemporary Galileo Galilei (1564-1642) wrote to Kepler in 1597 indicating his belief in the Copernican system, a belief sustained by discoveries on earth magnetism in a work published by William Gilbert in 1600, the same year that Giordano Bruno was executed by the Roman Inquisition guilty of heresy for his pantheistic ideas and his belief on the plurality of worlds. In 1588 Galileo obtained a position as instructor at the Accademia della Arti del Disegno in Florence, a place where perspective was being explored and taught by using lenses and mirrors (see Edgerton"Brunelleschi's mirror, Alberti's window, and Galileo's 'perspective tube'", 2006). Between 1595 and 1598, Galileo improved the compass for military purposes, and devised a number of other inventions. In 1604, a natural event marking the appearance of the most recent supernova in our galaxy, visible to the naked eye was recorded by various sources, including Kepler and Galileo in Europe, as well as various other records in Asia (see Stephenson & Green 2002). Later called 'Kepler's star' and 'Kepler's supernova', Kepler tracked the object for a whole year while he was in Prague, and recorded his studies in *De Stella nova in pede Serpentarii* (1606). In 1608, the Dutch Hans Lippershey devised and described the first

telescope. Under his indications, Galileo constructed one the following year, and began manufacturing a number of them which he sold to sea-merchants. The next two years saw the publication of Kepler's *Astronomia Nova* (1609) and Galileo's *Sidereus Nuncius* (1610 *Starry Messenger*). Kepler's and Galileo's discoveries and studies would have a decisive impact upon Isaac Newton's (1642-1726) experimentation. The British scientist and alchemist built his reflecting telescope in 1668. Almost twenty years later in 1687, Newton published *Philosophiæ Naturalis Principia Mathematica* relating Kepler's laws to his 'Universal Law of Gravitation' and the 'Laws of Motion' (King 2003).

While Galileo's engineering and his application of mathematics to experimental physics was innovative, his methods were based largely on the theories of analogy, proportion and inverse proportion, passed on by Italian mathematician Leonardo Fibonacci of Pisa (1175-1250). Fibonacci had travelled in Algeria and North Africa and popularized the Hindu-Arabic numeral system in his *Liber Abaci* (1202 *Book of Calculation*). Another decisive influence was that of *Euclid's Elements*. Consisting of 13 treatises attributed to the Egyptian-Greek mathematician (c. 300 BCE), the book was first printed in Venice in 1482 and translated by Niccolò Fontana Tartaglia in 1543, only some twenty years before Galileo's birth. This new translation had the advantage of coming from a Latin version based on an earlier Greek source, rather than via de Arabic translations that contained some errors in the theory of proportion (Book V) that Euclid had inherited from Eudoxus of Cnidus, a disciple of Plato and possibly tutor of Aristotle during Plato's absence in Syracuse.

I bring to the fore these issues of translation and the differences in symbolic representation because the late 1500s and early 1600s mark the expansion of Gutenberg printing press as well as the rupture of the ancient unity between calculation, natural philosophy, and alphabetic writing. As noted by Plato in *Timaeus*, the term 'element' designated the building blocks or basic structures of the world, replicated in analogic manner following the rule of three, and referring also to the letters of the alphabet and the way units are replicated in discourse (see López-Varela 2014). The ensuing separation became a problem in philosophical debates between demonstrative and dialectical reasoning, as scholars tried to explain how singular items of experience were part of universal knowledge. While

demonstrative reason proceeds from first truths about an external ideal form, apprehended intuitively (perhaps via *metis*) and demonstrated by a number of steps based on sample repetitions and resemblances, dialectical reason is social, problem-centred and based on community praxis (applied knowledge skills or *techne*). Reiss refers to this modern form of discourse as "analytico-referential." By "analytico" he means related to serial (cause and effect) logic. By "referential", Reiss alludes to the correspondence of word to object. According to Reiss, and as Jacques Derrida has also pointed out, the new rational form of discourse appropriates the objects of the world by intensifying, dominance on their presence. "It is the *visibility* in the organization of signs that is called rationalist thinking" (Reiss 1997, 9 emphasis added).

Reiss identifies five characteristics of rationalism, deriving from the use of technology, mainly the telescope that narrows the visual field and isolates the object, incorporating a distance between viewer and object, and establishing knowledge as fixed and finite. These characteristics are: 1) objectivity, 2) the use of metaphor as an ordering device, 3) omniscient perspective (coming from nowhere but whose certainty is ensured, however paradoxically, by the 'idea' of absolute certainty and universal reality); this can be broken down into components, like geometrical propositions or the pieces in a machine, 4) probability theory, and 5) linear narration of causality, dependent on orderly cause-effect relations. All these elements constitute the definition of knowledge as object, that is, through the creation a boundary, gap or *differance* between the liminal, being that of which one is conscious, and the ineffable, being that for which there is no articulation (the sublime or sub-liminal; Reiss 1997, 39). This last form is conjectural knowledge or *metis*.

In the last lines of this section, I would like to suggest that the 20th century has seen the emergence of another *epistēmē* that might be described as *technopoetic*. The mytho-poetic and rationalist *epistēmēs* posited reality paradoxically as changing but ontologically timeless, that is, where change was conceived as accidental and not essential to reality. The *technopoetic* has seen an epistemological shift in the direction an inherent directionality to time (temporal becoming) as a source of temporally asymmetric phenomena. Theorists and scientists from different angles and disciplines, as well as artists has shown this shift in their different approach-

es to reality as process; among them, semiotician/logician Charles Sanders Peirce (1839-1914) and his fellow-pragmatist John Dewey (1859-1952), philosophers from Friedrich Nietzsche (1844 –1900) to Alfred North Whitehead (1861-1947), Henri Bergson (1859-1941) or Martin Heidegger (1889-1976), More recently, scholars such as Paul Ricoeur (1913-2005), Gilles Deleuze (1925-1995), his colleague Pierre-Félix Guattari (1930-1992), and Edgar Morin (1921-); physicists such as Ilya Prigogine (1917-2003), mathematicians like Warren Weaver (1894-1978), and biologists such as Humberto Maturana (1928 -) and Francisco Varela (1946-2001). All of them have proposed complex dynamic paradigms of process applied to their respective fields.

In the West (and once more we acknowledge the limitations of this collection of essays that should have included an article on the conceptions of process in Asian and African communities), this epistemological change has also meant a shift in the conception of how the world is semiotically represented. In discourse, a 'tensed account' that expresses more than just a fixed sequence of events ordered by cause-effect or before-after relations has replaced the observing subject standing for a noun (no longer a single entity whose varying locations are instants in time expressing the indexical 'now' *Dasein*). The new 'actant' performative 'agent/user' is a verb that lengthens or shortens duration. This change is also reflected on the contemporary importance of performative and memory studies. Duration is an act of memory in which only a small part of human past becomes representation. Its rhythm depends on human actions upon things because the objects that surround us reflect our possible action upon them and we establish continuity through relative movements that we attribute to objects in space. This conception can be traced back to research by Henri-Louis Bergson in "The Cinematographical Mechanism of Thought and the Mechanistic Illusion" (*L' Evolution Crèatric*e 1907).

As the century approached the 1990s, the widespread use of computer systems contributed to the development of this systemic approach that contemplates knowledge as made of various (fractal) levels of communication structures; dynamic open systems with permeable interdisciplinary borders which include ideological, political, economic and axiological structures. Very importantly, because all human actions are increasingly performed by means of digital instruments, the changes point in the direction of a huge shift in the ontology of symbolization.

While the "analytico-referential" *epistēmē* focused on individual particles or units whose collective actions will add up to the system's behavior if followed through time in cause-effect fashion, in the *technopoetic*, the individual unit does not matter so much; what matters are the recursive symmetries between different 'levels' of the system. The regularities emerge not from knowing about individual units but from understanding correspondences across scales of different lengths. It is a systemic approach, emphasizing overall symmetries and the complex inter-actions between micro-scale and macro-scale levels.

A wide range of disciplines became interested in exploring the possibilities of disorder, chaos theories, non-linear formats, and net-worked complexity. The theories of becoming contemplate disorder and chaos not as absence or void but as a positive force. In mythical accounts (i.e. the Sumerian epic poem *Enuma Elish*, Persian Zoroaster/Zarathusthra, Greek Hesiod's *Theogony*, etc.) chaos is contemplated not as void (as it was initially interpreted) but as a non-form from which creation takes place. The new vision of orderly chaos had a lot to do with the development of technological communication systems and the separation of information from meaning. Information is defined as a mathematical function depending solely on the distribution of message elements, independent of whether the message has any meaning for a receiver. In the 1940s, the work of two engineers at Bell Laboratories, Claude Shannon and Warren Weaver, was decisive in transforming the notion of information. This made possible to see random or chaotic systems as rich in information rather than poor in order. Envisioned as information, the complexity of chaos is due to the impossibility of defining exactly the initial conditions that might make the system predictable. Katherine N.Hayles, author of *Chaos Bound: Orderly Disorder in Contemporary Literature and Science*, one of the clearest accounts on the relationship between chaos theories, poststructuralism, deconstruction and contemporary narrative, has argued that such systems do in the long term become ordered because of their recursivities, which replicate themselves overtime (Hayles 1990, 23-25). Indeed, this model has been replicated in various disciplinary fields, including molecular evolution (explained in Coveney & Highfield 1991, 214-18 and 223-226), cell division and autopoïesis (Ibid. 1991, 227-30; see also Maturana & Varela), as well as biological shapes (Ibid. 1991, 232-236), the dynamics of the heart (Ibid. 1991, 236-242) and advances in medicine and neuroscience, evolution and popula-

tion dynamics (Ibid. 1991, 243-256). Other examples are work on thermodynamics and self-organization processes in equilibrium (where thermodynamic equations are reversible) and far-from-equilibrium conditions, bound to a one-way direction in time (Prigogine & Stengers), climate change, quantum gravity cosmologies (Roger Penrose) and even as "chaos: a reason for having sex" (Coveney & Highfield 1991, 257-8). Jean-Francois Lyotard (1923-1998) has explained postmodernity as the intellectual shift breaking away from totalizing perspectives (metanarratives), forms of universal (epistemic) knowledge, and moving toward local, fractured systems and modes of self-organization.

Interestingly, the *technopoetic* turns to the concept of *metis* as a conjectural and oblique form of knowledge that takes advantage of disconcerting and ambiguous (fuzzy initial conditions in the dynamic system) situations, where knowledge modes interact and move across levels in order to anticipate shifts in the process. In the *technopoetic epistēmē* universal generalizations (the old Aristotelian concept of *epistēmē*) are no longer possible, as systems are dynamic and open, and one can only establish probabilities of occurrence. In this context, know-how skilled *techne* and practical *phronesis* may not grasp mutable situations and uncertain train of events. In his volume *Tacit Knowledge in Organizations*, Philippe Baumard claims that it is here when a fourth dimension of knowledge emerges: "that no words can fully contain, a knowledge of short-cuts, of sagacious envisioning, of perspicuous intervention, even more mutable than the situation it has to cope with, discreet, operative, conjectural: *Metis*."(1999, 101)

2. Methods

This thematic issue of Icono 14 pays methodological attention to media technologies as semiotic systems of production, distribution and reception, placing knowledge theory and practice at the center of a longstanding rift between the hermeneutical and the empirical traditions in media and cultural theory. The papers collected deal with cultural questions concerning the relations - combination, integration, re-mediation and transformation- between art, myths and new media, the delimitation of border crossings, both at the material level of physical reality, and the semio-cognitive and cultural implications.

The research is also based upon the idea, already developed by authors such as Marshall McLuhan, Siegfried J. Schmidt, George Landow, Katherine Hayles, among others, that media materialities are not neutral and that all acts of production, distribution and reception of cultural objects modify human perception, conceptual imagery and the semiotic structure of human selfhood and of cultural phenomena. Media changes not only have fostered the process of globalization and the emergence of new political, economic and educational practices. They have also impacted on knowledge distribution systems and conditions of memory storage, influencing social relations and modes of communication. Thus, to fully grasp the effect of a new technology one must examine medium and context together, and establish their relations to previous technologies, since the present environment is itself made up of the effects of those. In the resulting semiotic system two types or interrelations occur: those internal, among the items of the language system (inter-textual, inter-medial), and those external, between the semiotic value systems, involving individual reception and collective systematization (socialization through institutions, organizations, media etc.) of references considered important and relevant to practical life (facts, in the sense of constructed common information and events), and which combine concrete and contingent selections and realizations of cognitive, affective and moral components, thus constituting a complex cultural model.

As indicated, common knowledge is passed on via processes of socialization and becomes collectively effective by virtue of, what Siegfried J. Schmidt has termed, the "operative fiction" that everyone shares the same kind of knowledge (Schmidt 1996 & 2010), enacted through a semiotic order displayed in discourse and other human language systems in a cultural program "performed by agents in the form of offers of options and schematizations of options for purposes of reference to the model of reality valid for all the agents of a society who make use of precisely these functions and expect all other agents to proceed *grosso modo* likewise" (Schmidt 2010, 8). "Only in terms of the unity of the difference between contingent selection and the infinite diversity of observables and un-observables a given reality gains processual identity," he adds (Ibid.)

Following the above introduction, contributions in this thematic issue of Icono 14 inquire into the relationship between *techne* as actional-praxis involving social choice

and *poïesis* from a Greek verb meaning 'make, produce, bring about'. *Poïesis* lies at the etymological root of the 'poetry', incorporates the reconciliation of theoretical and practical knowledge in contextual (specific space/time) action which requires virtue. In Plato's *Symposium* and in Aristotle's *Ethics, poïesis* is contrasted to *praxis* (doing or practical activity) in that it refers to the knowledge of the activities and ends that are worth pursuing. In this spirit, the volume explores forms of cooperation between the sciences and the humanities and ways to achieve 'consilience'. Although the volume lacks contributions from non-Western cultures (only the papers by Hogrefe and Pérez-Amezcua focus on non-western indigenous accounts), the main idea behind the selection of papers is to frame human knowledge as a living semiotic eco-system where experiences result from the processes we perform according to present conditions of action, in turn influenced by the technologies we use, and our capacity to innovate, imagine and create future conditions. Thus, *technopoïesis* presupposes a framework of categories, collective knowledge, values, common actions and experiences regarding all crucial aspects of human life. This systemic framework is not to be understood as a concept, or an entity, but as network of processes ("operative fiction" or strategic narrative), encompassing the negotiated and mediated production of collective knowledge.

3. Discussion

Tracing the origin of the various forms of knowledge in Western culture, we have come across three main types: *epistēmē*, *techne* and *phronesis*. Although Plato and Aristotle realized that nature is in constant change, they explained the process differently. For Plato, the sensible world is subordinate to a transcendent reality of unchanging Forms, that is, a copy of a superior model. This subordination is central to his treatment of theoretical versus practical knowledge. Aristotle also subordinates becoming to being but, instead of placing unchanging reality beyond the sensible changing world, Aristotle conceived it as being dependent upon those existing Forms in terms of categories/disciplines that use different levels of dependency. As explained above, this shift paved the way toward empirical and analytico-referential forms of discourse and knowledge.

In *Origins of Greek Thought* (1982) Jean-Pierre Vernant explored the development of temporality as related to *techne* and myth. Two mythical figures Prometheus

and Epimetheus represent the polarities of this temporalization (both containing the term *metis* in their etymology): advance (etymologically *pro-mëtheia* or foresight) and withdrawal (Epimetheus is the one who forgets >*êpi-mëtheia*). Pursuing this trend, Bernard Stiegler's *Technics and Time: The fault of Epimetheus* (*La technique et le temps, 1: La faute d'Épiméthée* 1994) is concerned with the relationship between these myths and reflections on mortality and thanatology (Thanatos was the Greek personification of death). "Through his *metis*, Prometheus represents, in the misfortunes that strike him, the hero of prescience" (Stiegler 1998, 197) The French philosopher investigates the separation between *techne* and *episteme* and the subsequent instrumentalization of the *logos* (thinking reason). Like Vernant, Stiegler claims that the separation was not present in Homeric times and that, as a consequence of Sophist privileging of *techne* (associated to telling and rhetoric), all technical knowledge was subsequently devalued, with no form of 'self-causality' associated to *techne* (its definition being made in terms of ends and means).

Poïesis comes to the rescue when Aristotle writes that "Every art [*techne*] is concerned with bringing something into being, and looks for technical and theoretical means of producing a thing which belongs to the category of possibility, and the cause of which lies in the producer and not in what is produced."(*Nicomachean Ethics*, bk. 6, 4) As mentioned, *poïesis* is a way of bringing forth all the good qualities (beauty, goodness, truth) of *techne*. The Greek origins of the term, as Stiegler notes, are related to temporal cycles of birth and decay as described in Plato's *Symposium*, for instance. Some forms of *poïesis* are natural self-regulative processes (such as the bio-autopoïesis theorized by Maturama and Varela; in the *Timaeus*, Plato regards *physis* as the result of poïesis; Aristotle considers it the imitation of physis; Heidegger contemplates it as a blossom or a transforming cocoon, inviting a sudden stasis followed by change/metamorphosis). Stiegler discusses how, in the 20th century, *poïesis* has come to be concerned not with a separation between the natural and the empirical sciences, the biomorphic and the technomorphic; but as a form of strategic shaping/making (*metis*) which involves the re-appropriation of the natural (*physis*), not as an immutable essence but as a sort of initial condition which is carefully crafted (*techne*) by performative actions (including discourse and representation in all its forms). Knowledge becomes the task of a craftswoman whose job is not just make meaning, but to cultivate wisdom

and skill to help her discern the meanings that are already there. In other words, the craft of strategic narratives.

Under the *technopoetic* episteme, the inter-dependency among disciplines is not a matter of categories, as some claim: "philosophy deals with those things that do not change and have an independent existence (God), mathematics deals with those things that do not change and have a dependent existence (mathematical abstractions), and physics deals with those things that change and have an independent existence (natural phenomena)." (Gaukroger 1999, 43) For the British historian of science, Aristotle's position shows a cognitive shift by means of which scientific practice begins to be modelled on problem solving rather than on uncovering a hidden reality, a tradition that becomes apparent in the research developed on areas such as optics, astronomy, hydrostatics etc., in the following centuries, and which has a fundamental practical orientation. Although some degree of *epistēmē* seems to be involved in *techne* (in Book VII chapter 3 Aristotle indicates that the goal of *techne* is a productive state which includes both conceptualization and pragmatism), the products brought via *techne* seem to differ from those of nature (*physis*). In line with Aristotle and Stephen Gaukroger, Carolyn R. Miller explains that technology can be provisionally defined as the manipulation of the contingent and the local to achieve material results, distinguishing itself from science in that the latter is the study of the universal to achieve verifiable understanding. Technology is thus "not fundamentally a matter of knowing but a matter of doing" (Miller 1978, 228).

In their introduction to *The Mechanization of Natural Philosophy* (2013), editors Daniel Garber and Sophie Roux argue that the emphasis on *techne* as a productive state may have been an over-simplification of Aristotle's views. Luka Boršić 's review of Gaukroger's *The Emergence of a Scientific Culture* (2006) points out that a discussion on the role of alchemy would have contributed to present the intricacies of the 16th century critique of Aristotle's concept of demonstration and *epistēmē* in a clearer way. Gaukrover refers to natural philosophy, the great Platonic predecessor and opponent, as 'ingenious' in the way it sets out to uncover reality beneath appearance (Gaukroger 1999, 43). Indeed, the term is etymologically related to 'engineering' as well as 'ingenuity', which today is taken as 'simplicity' but that in

Middle English referred to 'craftiness' and the capacity for invention and construction. Ingenious continues to be a synonym of intelligent.

This (poetic) epistemological ambiguity is also present in the occasional re-emergence of Neoplatonic positions since the 17th century, as well as in the open issue of the relationship between 'empirical' versus 'natural' science. It appears, for instance, in the Romantic discussion on the extension of the scientist's free will and the performance of operations that may follow an unsuitable unethical path, as seen in Mary Shelley's *Frankenstein or the Modern Prometheus* (the term 'modern' refers to 'empirical' science) and in the development of the dystopian genre in Science Fiction. The transposition of the development of perspective across the arts during the 16th century (as explored by Samuel Y. Edgerton) and the emphasis on mirrors, not just as analogical structures but as 'fringes' to other worlds, also need further consideration as they bring to the fore forms of multiple coding within analogy, some of which anticipate digitalization (see López-Varela on Lewis Carroll's hybrid narratology). In recent years, the re-emergence of Isaac Newton's occult pursuits and his connections with alchemy and freemasonry keep the controversy alive, almost as s symptom of a lurking desire to look beyond the empirical.

A number of scholars claim that 'modern' science may have evolved from 'natural' science and alchemy between the 17th and the first part of the 19th century, and that this shift included the transformation of the original theoretical foundations of knowledge inquiry from ontology to epistemology. The shift, as Isabelle Stengers[1] has explained, was enabled by "La généralisation des notions de germe [et de germination], de métastabilité et de tension énergétique […] la généralisation transductive, […] permet de mobiliser une esthétique ancienne, associée notamment avec l'alchimie" (Stengers 2002, 309 cited in in Mellamphy 2015, 3). In other words, the transformation has involved the change from analogic imitation of nature by means of *techne*, ultimately the goal of science (as universal knowledge or *episteme*), to a growing emphasis on the formalization of such analogic operations in terms of (artificial) processes. In "La Naissance de la Technologie," Gilbert Simondon (1924-1989) defended that such practical dimension developed in the West as a result of contact between world regions, including northern Af-

rica, the West and the East, in the territories of the Greek empire. The French philosopher, a major source of inspiration for Gilles Deleuze, maintained the union between technical and theoretical knowledge until the rise of separate scientific pursuits, particularly after the 18th century (2014, 135). Alexandria was an important hub of confluence, where theory and praxis meet in the works of great figures such as the Greek-Egyptian geographer and astronomer Claudius Ptolomy (c. 100-170). It seems that even the term '*alquimia*' derives from the metamorphic nature of the Egyptian desert, both dry and fertile, 'red earth' (*al-deshret*) and 'black earth' (*al-khem*), a term that entered Latin *alkimia* via Arabic *al-khimiya*.

A fundamental aspect of this current exploration on the separation (or not) of 'natural' and 'empirical' science has to do with language and semiotics (see López-Varela 2014). In recent years, the operation of analogies and metaphors (where comparisons are implicit and operate in different orders of reality) has attracted growing interest (i.e. theories on 'conceptual metaphor' and 'relational frame theory'). At the root of this research is the belief that correspondences can be established not just between phenomena belonging to the same level, but also strategically (like *metis*) across various levels. The alchemist used the doctrine of analogies and correspondences in order to achieve the goal of unifying spirit (soul) and matter (body) as two sides of the same underlying reality, making form, which gives actuality to matter, proceed toward the ultimate Platonic and Neo-Platonic ideal of spiritual perfection. If we consider the practical dimension of science (*techne*) and the advancement of discovery in learning by doing; that is, by using tools and techniques to find, evaluate, categorize and transfer rational knowledge (*logos*), including processes of retroactive feedback, then the role of a virtuous (performative) operator becomes even more important. It comes as no surprise that in the Romantic imagination, art in general, and poetry in particular, becomes the means through which this systemic method is transferred.

The arts, however, complicate the analogical panorama as it is assumed that art not only represents reality but it opens up worlds (see Deleuze & Guattari *Qu'est-ce que la philosophie* 1991). It can be argued that art, in unravelling human imaginaries, creates new realities by triggering new forms of perception and experience. The aesthetic experience is unique in mediating correspondences be-

tween different realms of perception and experience -inorganic, organic/living, psycho-sociological/spiritual. This process, which has to do with Freud's 'pleasure principle', that is, with 'likes' (and 'dislikes', despite Mark Zuckerberg's silencing), cannot be mapped as a simple bio-chemical route (i.e. through the release of neurotransmitters) because it involves a complex storyline of conscious and unconscious crossings which are interdependent, and to a certain extent unexplainable in perceptual terms (some being unconscious). As Dan Mellamphy indicates alchemy operates across levels, in a similar way to *metis*, putting back into play (to borrow the concept Derrida popularized) "what would typically be *separate*, *partitioned*, *distinct* and *divided* (re-uniting/re-mixing '[supposedly] radical separation[s]'" such as those "between the human and the animal, between rational and irrational beings [...] proceeding by *aporia*, [or] in the words of Samuel Beckett's *Unnamable*" (Mellamphy 2015, 6).

To give one example, in literary representation, sentences possess multiple meanings, for words refer simultaneously to different orders of reality, one corresponding to the immediate meaning (denotative), and other meanings (connotative) appealing not just to understanding but to the emotional side of the human brain, to the senses and to the aesthetic imagination, areas related to creativity and innovation that humans need to imagine and construct the future (see López-Varela 2008; see also Pinkus 2010, p.55). In this regard, Isabelle Stengers has indicated that "it is alchemy—haunted by the relations between the becomings of the living and those of [inanimate] matter—that has bequeathed to us a rich vocabulary associating mutations 'material' and 'spiritual' [...], [*e.g.*] a spirit 'matures'; ambition 'corrupts'; irony is 'corrosive'; ideas 'germinate', 'precipitate', [...] 'crystallize'." (Stengers 2002, 309 cited in Mellamphy 2015, 5)

Within certain limits, the presence of ordered/patterned lifelike activity in non-living matter seems to have been confirmed by experimental work (i.e. the presence of Fibonacci series in flowers, snowflakes and other fractal structures). Thus, one of the papers in this thematic issue of Icono 14 claims that alchemic (and occult) knowledge continuous to impact upon modern culture in various forms. Its impact has been felt particularly in the 20th century avant-gardes (i.e. prominently in the works of the French Surrealists). The persistence of 'natural'

science may have also influenced the materialistic vision of 'empirical' science by attributing some sort of life to inorganic matter, pronouncing an analogic dependency between the natural and the artificial, the living and the dead. In this sense, and turning Gaukroger's views to his advantage, Mellamphy operates an exercise in *metis*, when he defines 'user knowledge' as "the ability to act quickly, effectively and prudently within ever-changing contexts" (Ibid.,). In a Dionysian turn within a paragraph where he delves into the myth of Metis in a footnote, Mellamphy (via Nietzche) swallows Gaukroger's *The Genealogy of Knowledge*, as Zeus gobbled his wife. When the latter states that "Earth is a place of becoming and change […] in overcoming an adversary—whether this be in hunting, fishing, racing or in working resistant materials such as metals—there are only two routes open: either the stronger will win, or, by the power of *metis*, one reverses the natural course of events through cunning, disguise, quick-wittedness or whatever" (Gaukroger 1997, 295 cited in Mellamphy 2015, 6, footnote 25), Mellamphy goes on to suggest that the new technical objects, the "crafty conjunctions/correlations *allegorithmically –analogical asseverations*" of online hypertexts proceed by *metis*, by *aporia* and detour, recycling, shifting and dislocating. These are also the characteristics of the postmodern condition, as Lyotard would have it.

Indeed, as we move into the posthuman era, the symbiosis of human and machine is well under way. In another few years, nanotechnology will allow not just the download of software, but of nano-particles to be used in the 3D printing of just about any object. Since the 1990s, computers can store information in video-news libraries like NewScape (http://newsscape.library.ucla.edu/) in order to use portions of stored data to draw answers about any question (see also http://www.etc.cmu.edu/projects/si-studio/). There is software that tracks the electrical activity of human nervous systems, collecting data patterns of thoughts and emotions in order to map entire human life experiences, turning them into searchable data files with the stories of our lives (i.e. the British Telecom "Soul Catcher" computer chip). In the move towards 'Silicon Souls', biomechatronics developed at MIT lab http://biomech.media.mit.edu/#/ will allow a new generation of prosthesis than can be installed thanks to a dynamic socket that maps nerve and muscle movements in the amputee's body. These prostheses are extensions of the body as much as of the mind, since they map machine algorithms upon the artificial limbs.

Another example are 3D simulations (such as Harun Farocki's *Serious Games* 2009) which are being used in therapeutic treatment of post-traumatic stress disorder. All these immersive technologies explore the imbrication of digital simulations with body schemata. Along these projects, in the race to connect the world, the Inter-PlaNet (IPN) initiative, launched by NASA in 1998, offers a computer networking protocol designed to operate at interplanetary distances (http://ipnsig.org/), not just 'connecting people', but connecting galaxies. Borrowing from Christian Fauré's blog post, Mellamphy explains how, as in the story of *Metis*, Google has absorbed/consumed in order 'corporealize'/'incorporate' all other browsing intelligences that might have undermined its power.

As one approaches playful intelligence (*metis*) in digitasing tradition (see the book by Henry Sussman under this title), the controversy arises between those scientists who stick to the empirical method, and those who claim that mathematics brings us closer to the underpinnings of a magically constructed universe, matching the artistic search for spaces beyond the looking-glass. Although in his 1948 classic *Cybernetics*, Norbert Wiener already inquired into the possibility as to whether or not it was possible to stop the domain of cybernetic machines without a catastrophic effect on society, today the degree of autonomy of humankind in the struggle to avoid sinking into the web/void of the World Wide Web Tartare, as characterized by Fauré and Mellamphy, is limited. Moving towards the 'cybernectic brain' (Pickering 2010), the idea of escaping the expansion of body schema to planetary dimensions through the inventions of alternative forms of knowledge and abstraction by means of which we could regain control of the technosphere (see Thom 1983 and De Kerckhove in this issue) seems remote. The final question is whether or not the computer is eroding and subverting other knowledge traditions.

4. Scope of the Thematic Issue

Papers in the thematic issue expand the ideas of the Greek mythographer Euhemerus and those of Roland Barthes who believed that myths were assumptions and narratives about social issues that had become naturalized. Frequently, myths involve initiation journeys, sacred rituals and esoteric mysteries, as well as technological weapons and artifacts belonging to powerful figures. Sometimes, myths

involve processes of metamorphosis and change, such as those in alchemy and in the first natural philosophies, present to a certain extent in Science Fiction narratives, cyber-mythical figures like Robocop, Terminator or George Lucas's character Darth Vader, and in the fascination for the Gothic. Myth making also takes place in modernity and postmodernity, in many cases associated to inventions, like those by artists like Leonardo da Vinci and Jules Verne, scientists like Nikola Tesla, and in transmedia convergence. In all of these narratives, myths refer to technologies as both tools and activities that transform social and natural environments, affecting humans as well as other species, and thus involving issues of power, communication, exploitation of environmental resources, sustainability, ethics and so on.

This thematic issue opens with a paper by **Derrick de Kerckhove**, entitled "Babel and Jericho: Architectural Myths for Technological and Psychological Catastrophes", which explores the relationship between *metis*, *poïesis* and *techne* by going back to mythical catastrophes to demonstrate the hypothetical power of 'self-repair' in early cybernetic systems (see also Bates 2014). De Kerckhove illustrates the collapse of pictographic/hieroglyphic language representations and the emergence of the domination of the eye in alphabetic writing by referring to Babel, and mentions the myth of Echo and Narcissus as a story of the fall into silence. He compares digital homogenization to the Jericho effect in its ability "to infiltrate all substances and translate them into itself", converging into "an accumulated power of universal language" with "explosive potential". After he warns about the new architectures, both within and outside the computer, and the inversion of roles between nature and culture in a move toward "Silicon Souls", he turns to recent political events in the UK and in the USA to give us some *metis* relief and reassure us, in a technopoetical pulse, that science is no better than science fiction at predicting reality.

Indigenous catastrophes are present in "Technopoïesis and the Myth of the White Buffalo Calf Woman" by **Jeffrey Hogrefe**, who offers the testimony of his own *hanbleceya* experiences as an alternative way of viewing western posthuman theory and philosophy. The paper struggles to give voice to indigenous people, whose societies, cultures and ways of knowing have been silenced and marginalized in today's techno-world. The paper reminds us that knowledge is performative,

embedded in the ways people live their lives; it is something we do, not something we have; and its transmission must be performed, celebrated, ritualized collectively in specific practices, in connection with kinship regulation, with the physical features of land, as well as with other 'natural' phenomena, including language. Metis can be seen here as "knowledge embedded in local experience (Scott 1999, p.311) as "the 'art of the locality'" (Ibid. 316). Hogefre's paper is an example of this anticipatory knowledge of Native Americans, previously theorized by Philippe Baumard in his *Tacit Knowledge in Organizations* (1999). In the *hanbleceya* ritual, apprentices try to detach themselves from explicit reality so as to penetrate other levels, including the unconscious. The Aristotelian anticipatory logic used to deal with the external world is replaced by a sort of inner invisible knowledge that does not follow the usual ways of contemplating the (Euclidian) world. *Metis*, in its indigenous North-American form, is used in puzzling situations to clear a path. Hogefre demonstrates just how successful it can be.

Continuing with the indigenous trail, **Luis Alberto Pérez-Amezcua** analyzes the transmedial influence of the Aztec myth of the primordial female-serpent goddess, Coatlicue. The paper focuses on literary fiction as well as sculpture and comic adaptations to explore the impact of the myth upon the nativist and indianist movement known as the "New Mexicanity". The re-enactment of the myth carried out by Antonio Velasco Piña in his novel *Tlacaelel* (1979) recreates the importance of *techne* in the figure of his protagonist, Técpatl. It does so, for example, while examining his training as sculptor (the name Técpatl also translates as 'stone'; indeed he is the craftsman of the 'Sun Stone'), and, in chapter XIII, by exploring the explicit reference to the strange hermetic nature of the ritual where Técpatl is served chocolate. Finally, the practical knowledge exhibited by Técpatl seems to contain more intuitive forms of knowledge closer to *metis* that, according to the author, contribute to enhance the 'New Mexicanity'. Turning to the mythical past, these forms of tacit knowledge, embedded in myths (Losada Goya 2015, p.16), unveil the trail of human history and the future of a shifting disconcerting world that requires strategic narratives for survival.

In the Western world, the myth of Prometheus has generally been considered the embodiment of *metis*. In the story, the semi-god makes use of sagacious knowl-

edge to steal the divine fire from gods, and to give it to the humans in the form of *techne*. **Nicoleta Popa Blanariu's** "Transmedial Prometheus: from the Greek Myth to Contemporary Interpretations" focuses on the polymorphism of the myth as it slides transmedially from verbalized narratives toward the visual arts. The paper traces this move in the works of Aeschylus, Shelley, Goethe, Gide, Ridley Scott, among others, showing the association of the mythical and the scientific along with themes of anthropogenesis and eschatology that continue to be present in the popular imagination, for instance in Netflix series such as Charlie Brooker's *Black Mirror*.

By simulating the processes of material metamorphosis, where chemical elements, not in their essence but in their capacity of combination and recombination under human action, alchemy emulates the evolution of human wisdom and spiritual progress as a form of *poïesis*. In this way, it shows various processes to be faces of a single underlying one (where the term God or The Absolute may be taken to represent universal Neoplatonic values of truth, justice and beauty). For Percy B. Shelley, for instance, the alchemic process is similar to the operations of poetry, requiring the involvement of a person with noble ideals. Taking the concrete example of Shelley and his wife Mary, the paper "The Metamorphosis of the Myth of Alchemy in the Romantic Imagination of Mary and Percy B. Shelley" by **Asunción López-Varela** and **Estefania Saavedra** explores the use of alchemic similes and metaphors in "A Defence of Poetry". In Shelley's essay, comparisons are aimed at establishing links between the spiritual progress towards wisdom (in both a philosophical and a theological sense) and the transformations in the material world performed by human agents. While Percy B. Shelley emphasizes the power of poetry to induce aesthetic transformations, Mary's *Frankenstein* explores the medical (empirical) field and its automatons in order to show how bodily transformations correlate to the topic of the artificial versus the natural, and how this relates to aspects of social responsibility.

Combining psychological and sociological approaches to the study of mithopoïesis as an active mode of cognition, the paper by **Cheryl De Ciantis**, "The Gait of Hephaistos: Crooked Perceptions into Consilience", looks at the paradigm of the crippled god of technology, Hephaistos in Greek mythology, in order to explore

the combination of his blacksmith technical skills and cunning timely intelligence, the Hephaistean *amphigueeis*, a term that translates both as "crippled" or "ambidextrous". Hephaistos's crooked-walking, writes De Ciantis "reveals itself as emblematic of the ability to contain apparent opposites in dynamic tension;" a process that may hold the seeds of a metamorphic consilient consciousness, constantly mutant and shape-shifting before our eyes.

Getting deeper into the subject of the man in the machine, and continuing with another aspect of Hephaistos myth, the paper "Tecnología convertida en mito: la obra artística de Eduardo Paolozzi" by **Mercedes Aguirre** explores the work of Eduardo Paolozzi, a British artist of Italian origin, whose sculptures, most of them in bronze, bring to life figures from classical mythology like Jason, Daedalus, or the Cyclops. Created from a conglomerate of parts, including objects from contemporary technology (radios, transistors, motors) and rubbish, these sculptures reflect Paolozzi's interest for the fusion of man and machine, the animation of the inorganic, and the implicit discomfort with the degeneration and transformation of artistic objects turned into mass production.

Looking at the technopoïetic elements present in other arts, "A Twist in the Song: Retracing Myth and Dante´s Poem in Heavy Metal Music" by **Manuel Botero Camacho** and **Nuria Picón del Campo** looks at music and its power to engage melody and lyrics in a cultural tool with the force of sending any message in the most effective way. The paper explores symphonic metal as a source of mythological knowledge, demonstrating the impact of Dante's *Divine Comedy* upon contemporary society.

In the move towards transmedia, **Jorge Mora** delves into the "Narrative Elements that Serve to Generate Convergences and Inteligibilty in Transmedia Narratives." Initially used by Marsha Kinder to refer to the intertextuality between Films, animation TV series and toys, it was Henry Jenkins who, in what became his book *Media Convergence* (2006), began to explore the impact of transmedia narrative techniques upon diverse media formats. The paper inquiries into the possibility of adapting transmedia analysis to the construction of independent and edutainment communication products.

The paper entitled "The construction of ludofictional divinities in a transhumanist context" by **Samuel Gil Soldevilla** and **Aarón Rodríguez Serrano** further explores the role of divine elements in video games, expanding the topic of Prometheus embodiment of *metis* and its applications to education. It does so by focusing on a semantic-pragmatic classification of ludofictional elements in order to analyse two representative examples of the so-called God-Games: Populous (Bullfrog, 1989) and Cities: Skylines (Colossal Order, 2015). Their analysis shows a crystallization of transhumanists tensions and provides an example of the challenge posited by transmedia narrative convergence.

The thematic issue closes with "A Biopoetic Approach to Technopoiesis as Complex Dynamic Knowledge Construction" by **Juani Guerra** and **Svend Ostergaard**. The paper describes *technopoïesis* as the complex dynamics between four levels of an all-encompassing knowledge configuration which expresses the relation between biology, poetics and external representations based on emergence, feedback conditions, and constrains between levels. The two first levels describe the *poïesis*, the last two levels are specific for the *techno* part. The second level requires the development of a sign system where mental representations are externalized in various semiotic signs. The third level constitutes the emerging material implementation of the diagrammatic representation. Finally the fourth level is where the technology is conventionalized both in the form of a name and in the form of practice, implemented as part of cultural knowledge.

5. Conclusions

This thematic issue is a partial conclusion to the research developed within the program Studies of Intermediality as Intercultural Mediation (SIIM), funded over the past 10 years by several Spanish institutions, including Universidad Complutense de Madrid, Comunidad de Madrid, Ministerio de Educación y Ciencia, Ministerio de Ciencia y Tecnología, Ministerio de Economía y Competividad, and the European Economic Area EEA. More specifically, the issue is framed within a Myth-criticism Network funded by Comunidad de Madrid in 2015 (Acis-Galatea H2015/HUM-3362) and coordinated by José Manuel Losada Goya.

SIIM research program contends that the development of mass media communication, and particularly the digital turn (the transformation of analogue into digital processes) has dramatically impacted the topographical and temporal aspects of representation at the individual and socio-cultural level. The contemporary panorama of vagabondage of subjectivities, ideas, concepts, and disciplinary areas requires comparative explanations grounded on systemic notions of complexity, and accounts of uncertainty, ambiguity and unpredictability. In this situation, attention has shifted to Toffler's figure of pro-sumer (producer+consumer), who engages in co-creation of tacit knowledge thanks to the possibilities of digital networks and the ever growing speed of transmission.

In a constantly shifting world, the fundamental problem is no longer the search for similarity with the real (addressed by terms such as mimesis, essence, etc.). What is required is coming closer to an understanding of all the dynamic bio-cultural nego-tiations; that is, a strategic point of consilience. Because our techno-cultural default is one of temporal intolerance and multitasking, a crucial aspect is how to frame time as a principle of organization that works at the level of memory and imagination, that is, to seek a framework that incorporates dynamic aspects of relationship and includes temporal aspects as a measure of creativity as well as conjectural knowl-edge and practical intelligence. This implies the examination of strategic narratives which, rooted in temporality, can function as catalysts for the constitution, confir-mation and modification of human experiences. Stories and mythical accounts, as in the case of this thematic issue, can be contemplated as cognitive paradigms that provide frames for meaning making processes. Their analysis and interpretation in various media formats, including heritage archaeology, architecture, sculpture and visual media, film, performance studies, or electronic literature and net-art, can help understand the manifold ways in which communicated experiences, and the stories behind them (in this case mythical accounts on technology) can inspire cooperation among social sectors interested in the power of content-wise forms of art.

The papers presented in this thematic issue open up a panorama of complexity that reaches back, in a feedback loop, to the mythical grounding of the discussion on mythical knowledge-forms and technology. The fractal quicksand transitory space of this thematic issue constitutes the shifting territory of *technopoïesis*, a process that attempts to bring science and art to a point of consilience.

Notes

[1]   Stengers is co-author of La Nouvelle Alliance (1979) with Ilya Prigogine, who received the Novel Prize in Chemistry in 1977 for his work on Chaos and Complexity theories.

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