Architecture and Fire
Zografos, Stamatis

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On Fire

Above all we must recognise the fact that new experience says no to old experience, otherwise we are quite evidently not up against a new experience at all.

Gaston Bachelard, *The Philosophy of No* (1940)

The methodology of fire: Bachelard’s model of knowledge production

A study on memory and fire points towards the employment of specific philosophical theories. This is primarily the work of Gaston Bachelard, who is well known for his writings on memory and fragmented time as well as his psychoanalytic approach to fire. Fire’s conflicting temporalities of ‘life and death’ and ‘eternal return’ lead also to the necessary deployment of a philosophical rival to Bachelard, Henri Bergson. This rivalry is largely because Bachelard strongly opposes the temporal continuity in Bergsonism. On a different level, the theoretical conflict between Bachelard’s fragmented time and Bergson’s temporal continuity is not accidental, but rather reflects Bachelard’s model of knowledge production, which is adopted in this book as a methodology.

In his 1938 book *The New Scientific Spirit*, Bachelard develops his theory of the formation of objective knowledge that is achieved through modern sciences. He disregards natural sciences and alchemy as precursors of modern sciences, claiming that they are products of the imagination and therefore irrational creations of the mind. These creations function like obstacles to the establishment of objective knowledge and therefore the mind has to overcome them. This ongoing effort to overcome them is what generates scientific knowledge itself. This may not be an easy task, as it often requires an ‘aggressive’ attitude that could potentially shake the foundations of a whole discipline. In fact, a solidly established discipline may require a radical restructuring and a break with its own past. This is what Bachelard calls an *epistemological rupture*. Commenting on the nature of new knowledge, in *The Dialectics of Duration* he writes: ‘All knowledge taken at the moment of its constitution
is polemical knowledge; it must first destroy in order to make room for its constructions. Destruction is often total and construction never completed.\(^5\) His views on the formation of knowledge through an ‘epistemological rupture’ were formed during his work as a secondary school teacher and later on as a university professor. From the early years of his teaching career, Bachelard opposed the French education system. He argued that ‘the humanistic culture générale of French pedagogy did not stimulate pupils to research: it gave the impression that knowledge was already established and that past texts were the most authoritative’.\(^5\) His answer to this problem was the formation of a new scientific spirit that could be attained through the study of positive sciences, such as physics and chemistry, for these sciences were practised with polemic dynamism that opposed past knowledge. Bachelard explains that

the scientific spirit is essentially a way of rectifying knowledge, a way of broadening the horizon of what is known. Sitting in judgement, it condemns its historic past. Its structure is its awareness of its historical errors. For science, truth is nothing other than a historical corrective for common and primary illusions. The intellectual life of science depends dialectically on this differential of knowledge at the frontier of the unknown.\(^7\)

He traced the emergence of the new scientific spirit to 1905, the year when Einstein published his theory of relativity, and compared it with the established scientific spirit, which was that of knowledge acquired through textbooks. The latter, for Bachelard, ignored the individual passions, interests and creativity of researchers, and stagnated any efforts of collaboration between them. He thus recognised the new scientific spirit as a product of a dialogued philosophy that was very different from the monologue that took place within the closed world of philosophy.\(^8\) Cristina Chimisso explains that Bachelard’s comparison between the dialogue of science and the monologue of philosophy exposes two of his main philosophical theses:

First, science is the product of the dialectic between theory and practice: concepts need to become technical to be precise and to develop, and technical applications are performed according to theoretical procedures and on scientific objects, that is, objects created by science. Second, the dialogue between theory and practice is a dialogue between human beings: science is necessarily social.\(^9\)

Scientific knowledge advances by negating the work of the imagination, which is for Bachelard an epistemological obstacle. As the imagination
negates rational knowledge, it negates science too. Therefore scientific knowledge is produced dialectically through a ceaseless no to its own past, that is a negation to negation, a dialectic reminiscent of Hegel. As such, the dialectics in Bachelard’s philosophy are understood in two different ways, both as philosophical dialectic and as dialogue.

In his book *Le Rationalisme Appliqué* (1949), which has yet to be translated into English, Bachelard applies his scientific dialectic for the advancement of knowledge to an ideal school environment. Through dialogue in teaching, the untaught pupil, whose mind is full of imagination, receives a certain degree of knowledge. At the same time the teacher’s knowledge becomes more reflective than before. This practice initiates a philosophical dialectic, as knowledge clashes with its negation, which is either the pupil’s primary imaginative state of mind or the teacher’s previous experience. This understanding of dialectic is different from the Socratic dialectic, the method of maieutics. The latter aims at accessing knowledge that already exists within the person, whereas the former perceives knowledge as a product of the human mind, seeing it therefore as being historically produced. In this example the pedagogical obstacle functions like the scientific one, as it is employed to produce knowledge by negating the creations of the imagination, which are – according to Bachelard – irrationalities of the mind. He argues that ‘one can study only what one has first dreamt about’, which suggests that attaining the new scientific spirit is the matter of a dream. The first things the human mind dreamt about were natural objects, like fire, water, earth and air, and these are clearly manifest in classical cosmology, natural philosophy, poetry and literature. In *The Psychoanalysis of Fire* Bachelard claims that the ‘fire confined to the fireplace was no doubt for man the first object of reverie, the symbol of repose, the invitation to repose.’ Hence the starting point of science, which is in essence real knowledge, is fire.

In this light, the methodology of this book is based on Bachelard’s model of knowledge production. This methodology aims to generate a conflict, which is in this case achieved through the dialectic between two opposing philosophical theories. Following Bachelard, however, this conflict carries within itself the memory of fire, as fire is to be found in the very essence of knowledge.

**Vernant’s interpretation of the Promethean myth**

The French historian and anthropologist Jean-Pierre Vernant in *At Man’s Table: Hesiod’s Foundation Myth of Sacrifice* confirms Bachelard’s thesis that conflict carries resonances of fire, and reveals the implicit link...
between fire and knowledge. His approach is based on the analysis of the myth of Prometheus as delivered by Hesiod (eighth century bc) in *Theogony* and *Works and Days*. According to this myth, when the Olympian gods received a sacrificial meal as a gesture to reconcile themselves with the mortals, the titan Prometheus played a trick against the god Zeus. Zeus had to choose between two of Prometheus’ offerings: one that was ox meat hidden inside the animal’s stomach, thus having a displeasing exterior, and the other containing bare bones covered in fat and aromatics, therefore having a pleasing exterior. The god chose the latter and from then on mortals received meat whereas the gods received the bones discarded from every sacrifice. This trick enraged Zeus who, in retaliation, hid fire from the mortals. In return, Prometheus climbed Mount Olympus, lit a torch from the sun and brought fire back to them. As a consequence Zeus sent to the humans a counterpart to fire, a “trap” … a gift no less ambiguous. This was the first woman, a creation made out of clay by Hephaestus, who was called Pandora.

Vernant suggests that this myth must be read as a single, unified story as opposed to an aggregate of isolated episodes. If one does so, the Promethean fire, which is the first gift offered to humans, can be perceived as a memory of the initial conflict between the titans and the gods. Then, Vernant adds, Zeus’ offering of Pandora, the second gift in the myth, is made to counterbalance the theft of fire, as it ‘can compensate for fire and provide the balance because she herself is a kind of fire, which will burn men alive by consuming their strength day by day’. Pandora is therefore offered to intensify the conflict between Prometheus and Zeus and, together with fire, establish the mortal status of the human condition. Vernant explains that:

The myth connects the ritual of sacrifice to primordial events that have made men what they are, mortal creatures living on earth in the midst of countless ills, eating grain from the fields that they have worked, and accompanied by female spouses.

Fire and its counter-manifestation, woman, carry the memory of the divine conflict, which sets the boundaries of human nature. Commenting further on this myth, Vernant explains that Zeus’ initial action of hiding fire from humans aimed to deprive them of cooked food. Cooking meat, he points out, distinguishes humans from animals, as the latter only consume raw food. Therefore the Promethean fire, the fire returning this human ability to humans, ‘represents culture as opposed to wildness’. The possession of this fire, which is different from the fire of the gods in
the sense that the former is perishable and needs to be constantly fed, demands a *technics*, ‘a technique of transporting, conserving, and lighting the fire, part of the know-how inseparable from human life’.\textsuperscript{19} In this way, Vernant creates the link between fire and knowledge, as it is through the former that humans recognised their technical ability.

**Heraclitus’ cosmology, fire and conflict**

The omnipresence of fire in knowledge and conflict is also confirmed by the ancient philosopher Heraclitus of Ephesus. Heraclitus, like Bachelard, is preoccupied with natural elements and he is known to us particularly as the philosopher of fire. Heraclitus’ work dates from the period around 500 BC, some years before the Golden Age of Greece, when issues such as the origins of human nature, the world, the divine presence and the social and economic order were explained according to the culture of religious myths. The rise of natural philosophy marked the beginning of a new movement of thought according to which philosophy was considered as both *investigation* and *instigation*. The natural philosophers, as investigators, examined natural phenomena and tried to give a natural explanation for existing order. At the same time, as instigators, their role was to awaken the sleeping mind of people and elevate their spirit to a higher level of consciousness. Our knowledge of Heraclitus’ original doctrine is limited. This is because his writings were offered as a gift to Artemis and deposited in the precincts of her Temple in Ephesus, where they were eventually burnt by Herostratus. Nevertheless, his philosophy is referenced extensively by other ancient philosophers, and the latter’s writings are our main sources of his work.

Heraclitus’ thought was concerned with questions very familiar to us today. His main inquiry revolved around the way the One manifests itself in the Many and the way the Many obtain within themselves the One. This concept of unity, or of the One, appears in the cosmos as an interaction of four fundamental elements: fire, earth, air and water, with the emphasis on fire as a transforming and generative energy. Specifically,

\begin{quote}
fire’s alternations: first as sea, and of sea half earth and half lightning dispersed as sea, and measured in the same proportion as existed before it became earth (πυρὸς τροπάι πρώτον θάλασσα, θαλάσσης δὲ το μὲν ἡμισυ γη, τὸ δὲ ἡμισυ πρηστήρ...θάλασσα διαχέεται, καὶ μετρέεται εἰς τὸν αὐτὸν λόγον, οκοίος πρόσθεν ἢν ἡ γενέσθαι γη).\textsuperscript{20}
\end{quote}
The significance of fire as the common element of the cosmos is revealed in a different fragment stating that:

this cosmos (the unity of all that is) was not made by immortal or mortal beings, but always was, is and will be an eternal fire, arising and subsiding in measure (Κόσμον τόνδε, τον αυτόν απάντων, ούτε τις θεών ούτε ανθρώπων εποίησεν αλλ’ ήν αεί και εστίν και έσται πυρ αείζωον, απτόμενον μέτρα και αποσβεννύμενον μέτρα).  

These last words come to reveal the eternal nature of fire, or of the Logos, and we are introduced to another fundamental topic of his philosophy, the one of measure, or metron (μέτρον), which is the power that maintains order in the flux of the cosmos, the balance of forces keeping the earth in constant orbit. For Heraclitus, fire is associated with the concept of time and is constantly in movement, it is eternal. However, this movement is not linear but circular, hence its eternal nature. The three other elements of the fourfold – earth, air, water – are constantly present and are more predominant within space, but fire is the element that brings them into visibility by revealing them. Fire’s supremacy is distinct, and when it appears, its most divine and polemic manifestation is lightning, as ‘lightning directs everything’ (τα δε πάντα οικίζει κεραυνός).

The controversy surrounding Heraclitus’ thought is worth mentioning. As the philosopher Kostas Axelos has mentioned, ‘Heraclitus himself is the actualisation of the unity of the opposites.’ Famously, Heraclitus supported the idea that ‘conflict is universal and that strife is right, and that all things happen through strife and necessity’ (πόλεμος πάντων μέν πατήρ έστι, πάντων δέ βασιλεύς. Ειδέναι δέ χρή τον πόλεμον εόντα ξυνόν, και δίκη έριν, και γινόμενα πάντα κατ’ έριν και χρεώι). For him, the universality of conflict and strife is central to human nature, cosmic motion and the workings of nature. The opposites, their opposition and their unity, are manifested in a constant motion, as in the case of a river:

New and different waters flow around those who step into the same river. It disperses and comes together … flows in and out … towards us and away … all things are in process and nothing stays still, and we cannot step twice in the same river (Ποταμίοι τοίσιν αυτοίσιν εμβαίνουσιν, έτερα και έτερα ύδατα επιρρέει … σκίδνησι καί πάλιν συνάγει … καί πρόσεις καί άπεις. Ποταμίοις τοῖς αυτοῖς εμβαίνομεν τε καὶ οὐκ εμβαίνομεν, ειμέν τε καὶ οὐκ ειμέν).
The image of the river is a predominant feature in Heraclitus’ work. We can see it but we cannot dominate it, as it comes towards us and goes away.

In Heraclitus’ ancient philosophy, the cosmos emerged and evolved through the divine interaction of the elements of the fourfold – fire, earth, water, air – with fire as the guiding force. The Heraclitean cosmos is in perpetual flux, for if there is no movement, it ceases to exist. Yet what keeps the world moving is conflict, which is in all cases necessary. The conflict of opposites is the force that leads to the creation of something new: it generates life. This universal and life-giving aspect of conflict is associated with the eternal nature of fire where lightning is its supreme and most polemic manifestation. Accordingly, fire and conflict are interrelated, and are to be found in every dimension, eternally and universally.

What is fire?

In The Psychoanalysis of Fire, Bachelard admits that the answer to the question ‘what is fire?’ is in essence quite vague. In this he concurs with the art historian Alan Krell, who argues that our knowledge of the element has always been ambiguous. He points out that this element, and particularly its manifestation in mythology and religion, is ‘largely overlooked’. Any objective definition of fire is blurred by aspects that are coloured by both personal intuition and scientific knowledge. When Bachelard writes, he is struck by the lack of information about fire in scientific books of the day. Whereas once it used to be a fundamental concern for scientific research, nowadays it appears to lack significance, having entered a zone in which its status is taken for granted: our knowledge of fire is already given.

Fire has been an integral part of human life since the early years of mankind, to the extent that both have ‘come to resemble one another such that the tread of one tracked the tread of the other’. The moment in history when it becomes part of civilisation marks the arrival of a gradually easier and safer life. At the same time, this arrival implies the beginning of a process where humans start to accommodate such change to their lives. This point in history also marks the beginning of fire’s civilising process. From a sociological point of view, in the course of becoming fully human, every individual goes through a civilising process. During this process, people ‘learn, largely from others, how to regulate their own sense impressions and impulses, how to behave and how to think. This we may call the civilising process at the individual level.'
The dangers associated with fire are knowledge passed down to us by our elders. We first come to know that we should not touch it. Later, these prohibitions become a result of our direct experience with the element itself. It is in this sense that ‘fire is more a social reality than a natural reality’. Our acquaintance with fire on the level of natural experience occurs, as Bachelard makes clear, in the same way that Prometheus stole fire from Zeus to give it to the mortals on earth. Regardless of the elders’ prohibitions, the child will steal fire to experiment, play with, and thus possess knowledge of it. This, according to Bachelard, is the *Prometheus complex*, which ‘enables us to understand the interest that is always aroused by the rather trite legend of the father of Fire’.

Fire is most commonly defined in modern encyclopedias as a process of combustion, which manifests itself as heat and light. Compared to earth or water, fire ‘is not a substance as such, but a variable combination of substances in a particular and unusual state caused by a chemical reaction’. The impact of fire may be considered catastrophic, as the final products of combustion can never repossess their initial forms and structures. Combustion is by default an irreversible process. The spread of fire has no rules: whatever is flammable will be consumed. Fire causes heat, and heat in turn causes fire. In another mythic representation, this cyclical process is embodied by the phoenix, which is consumed by flames and then reborn from its ashes.

The element of fire carries within it a very peculiar dimension, which does not allow anyone to express a definite opinion or a particular feeling about it. Its impact may be considered catastrophic, as highly organised matter is reduced to a lower state of organisation or integration. Yet its effects are also conducive to processes of reorganisation and reintegration. Destruction by fire provides ground for life to re-emerge. Overall, both good and evil values can be attributed to its presence because:

It shines in Paradise. It burns in Hell. It is gentleness and torture. It is cookery and it is apocalypse. It is pleasure for the good child sitting prudently by the hearth; yet it punishes any disobedience when the child wishes to play too close to its flames. It is well-being and it is respect. It is a tutelary and a terrible divinity, both good and bad. It can contradict itself; thus it is one the principles of universal explanation.

This ambiguity of emotions and attitudes that accompanies fire is what Bachelard calls the *Empedocles complex*, named after the Greek pre-Socratic philosopher who believed that the four eternal and unalterable
elements that constitute the world—fire, air, water and earth—are peacefully united through the opposing, divine powers of Love and Strife.

Fire is self-generating. Through heat generated by combustion, flammable materials within the vicinity will ignite as long as there is enough oxygen. Based on this property, early civilisations made distinctive efforts to proliferate fire as soon as it came under their control. The early men discovered a medium that provided warmth and light, brought them together and also kept predatory animals away, helped them to clear lands and consequently develop agriculture, and also produced more edible and tasty food better suited to human consumption. Thinking of the first people acquainted with fire, Bachelard senses that this element must have been the first object of reverie and a perfect reason for repose. He suggests that a philosophy of repose, or else a philosophy of instants of creation, is inconceivable unless there is a reverie in front of flames. He believes that a child sitting and contemplating in front of a fireplace in our time is an attitude that originates from the past. The child of an earlier civilisation also sat and contemplated in front of flames. This contemplation in both cases is a reverie and not a dream. For Bachelard, the dream develops in a linear way and gradually fades away. The reverie, on the other hand, focuses and reflects on a specific object, it ‘works in a star pattern. It returns to its centre to shoot out new beams.’

**Fire in mythology**

It is often speculated that fire burnt for the first time on Earth roughly 400 million years ago, during the early Devonian period. Before that, the planet did not carry any land plants and was thus incapable of being the site of combustion. Our knowledge of the period in which humans became acquainted with methods of kindling fire is rather unclear. The only evidence that we have of this moment in history are the much later stories narrated by various civilisations. These stories contain no recollection of the actual event but are rather speculations on the origins of human society. Krell claims that the earliest stories of fire relate to the life of Indigenous Australians, which stretch back to roughly 50,000 years ago and are linked with the Dreaming. The Australian curator Wally Caruana explains that the Dreaming is

the period from the genesis of the universe to a time beyond living memory … [and] focuses on the activities and epic deeds of the supernatural beings and creator ancestors … who, in both human
and non-human form, travelled across the unshaped world, creating everything in it and laying down the laws of social and religious behaviour.

For James George Frazer (1854–1941), a social anthropologist who conducted extensive research on mythology and religion, the stories about fire were myths that should be studied,

for, while myths never explain the facts which they attempt to elucidate, they incidentally throw light on the mental condition of the men who invented them; and, after all, the mind of man is not less worthy of investigation than the phenomena of nature, from which, indeed, it cannot be ultimately discriminated.

In the *Myths of the Origin of Fire*, Frazer, who undertook the first substantial anthropological research on this topic, collected a broad yet detailed record of myths from all over the world and classified them into three categories. The first refers to the period when mankind was not aware of fire. According to the myths of that age, primitive men suffered from cold weather and their food was eaten uncooked. For instance, the Masingara tribe in New Guinea fed exclusively on bananas and sun-dried fish. Similarly, the Shilluk people in what is now South Sudan also dried their food in the sun. The males of the tribe consumed the upper part of the food – which was somehow cooked – whereas the raw part was given to the females.

The second category refers to the myths of the period when mankind acquired fire but when kindling methods had yet to be invented. These narrations consider lightning to be the initial source of fire, which was sometimes regarded as a divine gift. Myths from this period also refer to the fire created by the branches of trees that are rubbed against each other by the wind. These myths coincide with the description of the origin of fire given by the Roman poet Lucretius. Other myths describe fire being acquired from the sun, the moon and the stars, hence the Greek myth of Prometheus, who stole fire from the sun with a torch to pass it onto the mortals on earth. A few references are made to volcanic eruptions, but there are a vast number of myths that refer to the first fire given to humans as a result of an animal’s effort or through the cooperation of many animals.

The third category of myths deals with narrations referring to the period when kindling methods were finally invented. Frazer distinguishes three methods of igniting fire: the fire-drill, the fire-saw, and the fire-plough (or stick-and-groove). The fire-drill is the method of producing
fire when one stick is held upright with its point resting against another that is laid on the ground, and is put in motion through the palms of the hands. The rotating motion of one stick gradually creates a hole in the resting one. After a prolonged effort, the heat created through this friction generates fire in the dry leaves that are placed around the stick.\footnote{46} The fire-saw is a similar method of igniting fire where one stick is rubbed against another in a saw-like motion, while the fire-plough refers to the method of rubbing one stick into the groove of another.\footnote{47} Considering these three methods of igniting fire, there is a general assumption that could potentially explain the peculiarity or abstraction of certain other myths, which refer to fire being produced by the sixth finger of a woman’s hand. Other myths draw parallels between the production of fire through the above-mentioned methods and sexual intercourse between two people. The stick in motion represents the phallus whereas the one at rest represents the female genitalia. This parallelism is embraced up until today and is performed in South Asian ritual practices between the Brahman fire-priest (Agnihorta) and his wife to ignite the sacred fire. This is a tradition initiated by the priests of the Vedic religion, an historical predecessor of Hinduism.\footnote{48}

In general, myths comprise a body of memories that has survived the passing of time. This body of memories is not the memory of the actual event but rather a reflection of it. A clear illustration of the relationship between myth and memory is found in ancient Greek mythology, specifically in the myth of Memory itself. In Archaic Greece, memory had a mythological dimension with two manifestations. These were remembering and forgetting, and memory was conceived as both, working hand in hand. It was a dualism of equal parts that united into a single one as a separable pair, the simultaneous working of the mythological deities of Mnemosyne and Lesmosyne. According to Plato, Mnemosyne, the mother of all Muses and the divinity of Memory, is the Goddess who first makes [poets] inspired, and then through these inspired ones others share in the enthusiasm, and a chain is formed; for the epic poets, all the good ones, have their excellence not from art, but are inspired, possessed, and thus they utter all these admirable poems. So is it also with the good lyric poets.\footnote{49}

Yet Mnemosyne is not merely a source of inspiration. She is also a source of knowledge, ‘in principle omniscient’,\footnote{50} as through her workings poets can access innate knowledge. On the other hand, Lesmosyne or Lethe (forgetfulness) originates from the race of the Night, whose mother is
Discord, and she is the dark element in her family. According to Greek mythology, Lethe is also the name of one of the rivers in the Underworld that brings forgetfulness to the dead. Depending on the version of the myth, dead souls either drink water from the Lethe or bathe in it upon their arrival to the Underworld. Through this process of purification of past memories, souls are prepared to re-emerge in new bodies. In this respect forgetfulness is associated with the image of water. Lesmosyne makes everything disappear that belongs to the dark side of human existence. It is only both the elements – giving illumination and letting disappear, Mnemosyne and her counter-pole, Lesmosyne – that make up the entire being of the Goddess, whose name comes solely from the positive side of her field of power. This [is a] union of the opposites under the dominion of the positive.

The image of Memory in Archaic Greece consists of two natures that are diametrically opposite. Their simultaneous pull in opposing directions makes up Memory’s complete dimension.

These mythological figures, Mnemosyne and Lesmosyne, are closely related to art, for together they encompass the totality of our cultural legacy. They are a merging of complex histories and cultures, which are presented in the form of an image or figure. In fact, these mythological figures can rightly be considered as works of art because of the effect they have upon language and thought. They are employed as a medium to achieve the disclosure of things, or, as the philosopher Martin Heidegger would describe it, they operate as techne. Following Heidegger, ‘[m]yths let things appear … they open to occurrences that are otherwise obscure or silent in the absence of words to say them. Myths present to us in “passing light” things that come before us in their own events and that call us to engage perceptively with their events.’ This intrinsic quality of myths is for Heidegger equal to poetry. Poetry is projective, it is ‘the saying of the world and earth, the saying of the arena of their conflict and thus of the place of all nearness and remoteness of the gods. Poetry is the saying of the unconcealedness of what it is.”

Regarding the image of these mythological figures, Mnemosyne’s intention is to first make the poets inspired. Poets in turn reflect on Mnemosyne through their songs and chants, and these reflections are her children, the Muses. Accordingly, the divine self-presentation of Mnemosyne seems to lose her image and she comes to be perceived indirectly through this loss. Lesmosyne on the other hand, the river that flows next to the waters of Mnemosyne in the Underworld, refers to human
forgetfulness, thus relating to the latter’s temporal dimension. In contrast with Mnemosyne, Lethe’s image remains visible, as her counter-pole disappears to reveal the entirety of Memory. In this sense, the (imagistic) memory of Mnemosyne suggests that there is always forgetfulness in the process of remembering. In the context of the current discussion, the memory of the event that myths narrate reaches us through the simultaneous workings of Mnemosyne and Lethe. What we receive is both a product inspired by Mnemosyne, which are the myths of the origin of fire, and the outcome of Lethe’s counteraction, which is the forgetfulness of the actual event.

**Fire in festivities**

The memory of fire is not only evident in myths but also manifests itself in rituals and festivities. Historical records indicate that these rituals draw on a tradition of fire festivals that took place in ancient times, long before the spread of Christianity. As described by Frazer in *The Golden Bough*, peasants all across Europe have kindled bonfires and danced around them since time immemorial. Most commonly, these bonfires were lit on certain dates: in the spring (on the first day of Lent, Easter Eve, May Day), midsummer, in the winter on Halloween, Christmas Day, and the Eve of the Twelfth Day (normally referred to as Epiphany). All these celebrations had the character of festivals, as they involved a lot of singing and dancing, and sometimes also drinking and dressing up. The ceremonies most often required the procession of fire around villages and fields, and the burning of wickerwork effigies, which on many occasions were associated with the fertility of the land and cattle, as well as the destruction of witches. Apart from the annual fire festivals, there are also records indicating similar celebrations at irregular intervals. All fire festivals share common characteristics. Their practices are reminiscent of each other and they serve a universal purpose:

> The fire is believed to promote the growth of the crops and the welfare of man and beast, either positively by stimulating them, or negatively by averting the dangers and calamities, which threaten them from such causes as thunder and lightning, conflagration, blight, mildew, vermin, sterility, disease, and not least of all witchcraft.

Frazer offers two explanations as reasons for celebrating these fire festivals. The first supports the argument that these festivals are imitative magic, where the production of fire on earth is intended
to recreate the heat and light of the sun in the sky, thus ensuring an endless supply of sunlight on earth. The other theory addresses questions of purification and perceives the production of fire on earth as a means to eliminate demons, witches and monsters, or to cleanse the air. This theory is also shared in the testimonies of people who celebrate the fire festivals. The solar theory has positive attributes, as it is concerned with creativity, whereas the purificatory theory is negative, as it aims at destruction.  

Looking at fire's manifestation in myths, rituals and festivities, the confused, ambiguous and uncommon nature of the element becomes apparent. My extensive reference to Frazer’s work is not accidental, as he conducted the first and most extensive study on this subject. Bachelard, however, disputes the validity of Frazer’s ethnological studies, as the latter’s sources are texts as opposed to field observations. In The Psychoanalysis of Fire, he openly criticises Frazer, claiming that the explanations he puts forward are utilitarian. Commenting on the Scottish fires of Beltane, for instance, Bachelard writes that Frazer’s explanation – where the ashes of the bonfires were used to fertilise the fields – ‘introduces a sort of unconscious rationalisation which misleads a modern reader who is easily convinced of the usefulness of carbonates and other chemical fertilisers’. Bachelard believes that it is wrong to read primitive practices from the perspective of the modern eye, as these interpretations are in most cases wrong. He is not fully satisfied with a rational and utilitarian interpretation of myths and festivities, and instead he proposes a psychoanalytic approach. Beyond Frazer’s practical interpretation, he detects an intimate dream, ‘the dream of fertility in its most sexual form. The ashes of the bonfires make fertile both animals and fields, because they make women fertile. It is the experience of the flame of love which forms the basis for the objective induction.’

Cristina Chimisso understands that Bachelard’s attack on Frazer centres on his view that the latter perceived primitive and modern mentalities as homogeneous. This view is opposed to Bachelard’s theory of knowledge production through an epistemological rupture according to which the scientific, which is modern, must be discontinuous with the pre-scientific, which is primitive. The practices of primitive societies are guided by desire and imagination, which are the epistemological obstacles that the scientific mind fights to overcome. For Bachelard, any knowledge acquired before the rise of modern science, and this also includes our knowledge of fire, is, effectively, primitive.
Fire in modern science

Bachelard postulates that the epistemological rupture with regard to our primitive knowledge of fire occurred two centuries ago when pre-scientific theories were rejected by radical scientific advancements. Up until that point, there was a general belief, similar to ancient times, that heat was a substance. This prevailed until Antoine Laurent Lavoisier, a natural philosopher from the eighteenth century, conducted for the first time studies in combustion that contradicted the thinking of the era, according to which fire’s substance was called phlogiston. Phlogiston was considered to be a fundamental ingredient of burnable objects that was released in the air during combustion, with some objects containing more phlogiston than others. The theory of phlogiston was assembled by Georg Stahl towards the end of the seventeenth century as a result of a series of experiments with gases conducted by Robert Hooke, Otto von Guericke and Robert Boyle. The misconceptions regarding phlogiston’s validity were mainly shaped by imperfect laboratory conditions. Lavoisier, however, proved that the products of some chemical processes that occur through combustion, rather than being lighter due to the release of phlogiston in the air, are in fact heavier. His theory was further developed by isolating what up until then was called phlogiston and proving that it was simply oxygen. The oxygen involved in the burning process was thought to give weight to the end product. Through his experiments, Lavoisier was the first to draw attention to a new concept that considered heat weightless.

Later on, the physicist Benjamin Thompson, also known as Count Rumford, made a significant step in developing this concept. Through careful experimentation in a cannon factory at the Munich arsenal, he demonstrated that heat is a manifestation of motion. He conducted an experiment by measuring the amount of heat produced through the friction of a dull borer and a cannon barrel that were placed in water. After a period of time, he observed that the water reached boiling point. In a work published in 1797 he states that:

It’s hardly necessary to add that anything which any insulated body, or system of bodies, can continue to furnish without limitation, cannot possibly be a material substance; and it appears to me to be extremely difficult, if not quite impossible, to form any distinct idea of anything capable of being excited and communicated in the manner in which heat was excited and communicated in these experiments, except it be MOTION [emphasis in the original].
The experiments of Count Rumford and later those of James Joule, an English physicist who developed an accurate theory of the amount of heat produced in relation to the amount of work spent, were the starting point upon which the scientists of the nineteenth century constructed the basis for the theory of thermodynamics. These were initially Sadi Carnot’s theory of the macroscopic manifestations of heat in large masses of material and, later, Ludwig Boltzmann, James Clerk Maxwell and Josiah Willard Gibbs’ work, which associated the behaviour of large masses with the microscopic movement of atoms and molecules. At the beginning of the twentieth century, Max Planck and Albert Einstein’s quantum mechanics filled the gaps with their theories of the radiation of light and heat.66

**Entropy and thermodynamics**

One of the advancements in understanding brought about by the theory of thermodynamics concerns the notion of energy. According to the first law of thermodynamics, which agrees with the pre-existing classical idea, energy is conserved throughout its transformations. The second law of thermodynamics introduces a new concept called *entropy*, which creates a discontinuity with classical mechanics, and refers to the amount of thermal energy unavailable for work within a closed system. Entropy refers to the ability of energy to produce work, and as the latter tends gradually to become minimum, the entropy of a system tends gradually to a maximum. The concept of entropy applied on a cosmic scale implies that the entropy of the universe will tend to a maximum until its heat death. In a 1948 paper, ‘Mathematical Theory of Communication’, the American mathematician Claude Shannon introduced a new approach to the concept of entropy as he linked it to *missing information*.67 As soon as the concepts of energy and information were linked together, new directions in the development of information theory, computation and media technology were opened up. What is crucial, however, is that the conceptual merging of energy and information enabled science and technology to become part of the discourse in other disciplines, such as the humanities and the social sciences, as nature and culture were for the first time seen as interrelated. This merging is also crucial in my research, as memory in architecture can be examined in energetic terms.
The archive of fire

Following Bachelard’s model of knowledge production, an epistemological rupture occurred during the eighteenth century in studies of combustion, which brought about a radical advancement in our knowledge of the element of fire. Approaching this model through archival theory, one can associate the pre-scientific and scientific knowledge of fire with two separate bodies of knowledge, two distinct archives. As previously mentioned, although archives are repositories of memory, they are also sites of forgetfulness. This is because, according to Derrida, archives manifest violence, ‘the violence of power (Gewalt) which at once posits and conserves the law’. Therefore whatever is remembered in the archive determines also what must be forgotten. The epistemological rupture in the Bachelardian model of knowledge production occurs when an old archive is replaced by a new one, and when this happens the earlier gradually enters into the realm of oblivion. This justifies why ‘our intuitions of fire – more perhaps than of any other phenomenon – are heavily charged with fallacies from the past’. Fire appears to carry with it resonances of pastness that stretch back to ancient times, when it was first invented, but it also emerges as a farrago of scientific material and social inhibitions that are passed on from generation to generation, which together give fire an archival aura.

The association of fire with the notion of the archive allows for a further conceptual leap. Fire can be examined psychoanalytically, for according to Derrida ‘[t]he theory of psychoanalysis … becomes a theory of the archive and not only a theory of memory’. This coincides with Bachelard, whose approach to fire is also psychoanalytic. In The Psychoanalysis of Fire Bachelard claims that the study of memory cannot be objectively approached as ‘the initial charm of the object is so strong that it still has the power to warp the minds of the clearest thinkers and to keep bringing them back to the poetic fold in which dreams replace thought and poems conceal theorems’. This reveals that the difficulty in understanding fire is psychological, which, further bolstered by the fact that this element is no longer a concern for science, justifies Bachelard’s move to study it through psychoanalysis. A psychoanalytic approach to the fire archive can therefore confirm certain aspects commonly associated with the element. The concurrent life and death drives with which archives are associated reflect fire’s conflicting and obscure qualities of life and death, purity and sin, and creation and destruction respectively.
Notes

3. Bachelard distinguishes two types of imagination, one that is inspired by novelty and deals with the unexpected and another that explores the depths of being's primitive and eternal aspects. Imagination can find its ultimate expression through poetry.
8. For Bachelard, science that does not engage with theory is pointless, whereas theory that does not engage with practice is metaphysical; thus he insisted on the dialogue of scientific philosophy.
10. The Bachelardian dialectic is reminiscent of Hegel's 'negation to negation' dialectic, yet Bachelard claims that the process that takes place within Hegel's dialectic is closed and determined.
15. Vernant, 'At Man's Table', 66.
16. Commenting on Pandora's use in the myth, the contemporary French philosopher Bernard Stiegler explains that this example is very important, as the condition of human mortality is associated with desire. This, Stiegler explains, allows one to study mortality psychoanalytically. See Marcel O'Gorman, 'Bernard Stiegler's Pharmacy: A Conversation', *Configurations*, 18: 3 (2010), 459–76.
17. Vernant, 'At Man's Table', 24.
18. Vernant, 'At Man's Table', 38.
19. Vernant, 'At Man's Table', 39.
22. For Heraclitus, the Logos is fire, an amazing source of energy that brings people together for warmth and light and 'it is the one that joins all, the being of all, the being of beings as a whole'. Kenneth Maly and Parvis Emad, *Heidegger on Heraclitus: A New Reading* (Lewiston, NY: E. Mellen Press, 1986), 38.
38. Pyne, Fire, 3.
42. Frazer, Myths of the Origin of Fire, 202.
44. Frazer, Myths of the Origin of Fire, 205.
45. Frazer, Myths of the Origin of Fire, 218.
46. Frazer, Myths of the Origin of Fire, 222–3.
47. Frazer, Myths of the Origin of Fire, 217.
48. Plato, Ion 533e quoted in Casey, Remembering, 12.
50. According to the ancient Greek geographer Pausanias, Lethe's spring is located in Boeotia and flows very close to Mnemosyne's spring.
53. The ritual of burning effigies during fire festivals, which derives from an earlier ritual that incorporated human sacrifice, aims to get rid of wicked people through imitative magic. The destruction of the effigy brings about the destruction of the targeted person. In The Golden Bough, Frazer discusses the Beltane fires in the Highlands of Scotland. According to him, Highland people were so remote that they were subject to no influence from other cultures, and up until the nineteenth century, they managed to maintain their old heathenism. Julius Caesar described human sacrifices performed by the Celts of Gaul. His observation on Celtic culture agreed also with the report provided by a Greek explorer called Posidonius, according to which, the sacrificial victims of the Celts were criminals or captives from wars. Their sacrifice was a festival occurring every five years, and the number of victims put into fire was analogous to the degree of fertility to be achieved. The ritual was performed by the Druids or priests, and the victims were burnt inside enormous wickerwork images. Apart from humans, the same ritual also included the sacrifice of animals, as they were thought to be disguised witches (familiars). Regardless of who the victims were, the reason for burning them alive was that this was the most efficient method of elimination and purification. On these grounds, the accounts of the Celtic human sacrifices suggest that the fire festivals may have their roots in those years. James George Frazer, The Golden Bough: A Study in Magic and Religion (Hertfordshire: Wordsworth Editions, 1993 [1890]), 653–4.
57. Enrico Fermi, Thermodynamics (New York: Dover, 1936), ix–x.