

MARIE REBECCHI / “The Beginning of Life”. The Birth of the Cinema, the Birth of a Flower

Cette nuit-là, la machinerie de Orfanik, qui était toujours prête à fonctionner, produisit une série de phénomènes purement physiques, de nature à jeter l'épouvante sur le pays environnant : cloche tintant au campanile de la chapelle, projection d'intenses flammes, mélangées de sel marin, qui donnaient à tous les objets une apparence spectrale, formidables sirènes d'où l'air comprimé s'échappait en mugissements épouvantables, silhouettes photographiques de monstres projetées au moyen de puissants réflecteurs, 298 plaques disposées entre les herbes du fossé de l'enceinte et mises en communication avec des piles dont le courant avait saisi le docteur par ses bottes ferrées, enfin décharge électrique, lancée des batteries du laboratoire, et qui avait renversé le forestier, au moment où sa main se posait sur la ferrure du pont-levis.

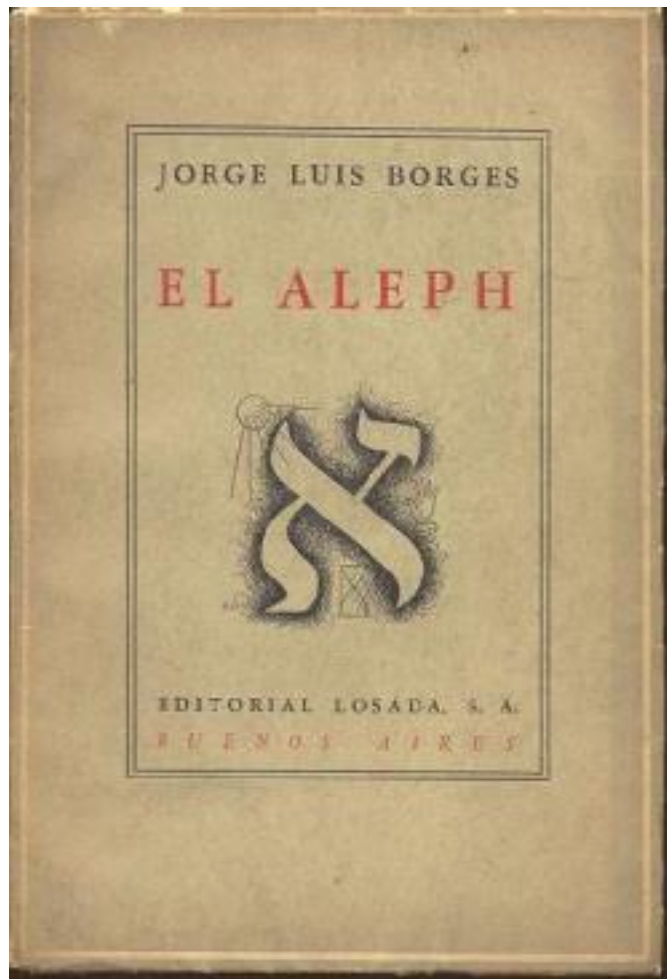
Jules Verne, *Le Château des Carpathes* (1892)

European fantastic literature and science fiction from the second half of the 19th century (from *Journey to the Center of the Earth* by Jules Verne, 1864 to *Erewhon: or, Over the Range* by Samuel Butler, 1872, and *The Carpathian Castle*, 1892), fueled and set the stage for Herbert Georges Wells' science fiction *Time Machine*[\[1\]](#), an imaginary which in turn helped to heighten the mythical status of the year 1895 as the beginning of the film history calendar.[\[2\]](#)



On the other hand, it was only when the new laws of physics encountered the technology of new media that we began to glimpse another time: an elastic time in a restricted space. Cinematographic time.

Pioneering media theorist Friedrich Kittler theorizes that it was the invention of three fundamental technical media – gramophone, film and typewriter[3] – and their expansion over the last thirty years of the 19th century that marked the dawn of the founding age of technological media (*Mediengründerzeit*). All of this is well known in current-day media theories. It remains to be connected with another parameter, however, one that at first glance might seem somewhat distant from technological concerns about time manipulation. The second half of the 1800s also set the stage for a surprising anachronic coincidence, the rediscovery of a prehistoric world surviving alongside a dehumanized future. A vision of “original nature” as a garden of the underworld brimming with dinosaurs overlapped with the imaginary of a “second nature” populated by machines grown independent of their creators. A distant time that could be defined as the Aleph[4] of history, to borrow Jorge Borges’ space-time system; an infinite space in which “all the places of the earth” appear at once; a time at the origins of the earth and of humanity demanding to be put on display in a very near present as an omen of a forthcoming apocalyptic future.



Jorge Luis Borges, *El Aleph*, 2nd ed., Losada, 1952

Like cinema and the time machine – and cinema as a time machine – “prehistory is an invention of the 19th century,” one of modernity’s most enigmatic and powerful ones. It is this assertion that Maria Stavrinaki, in her book *Saisis par la préhistoire. Enquête sur l’art and le temps des modernes*,^[5] uses to launch a meandering investigation into the lengthy period of mankind, the earth and art conducted in the age of the “Moderns.” Not only has this population “never been modern,”^[6] it also looks to prehistory as the chimeric wellspring of modern and contemporary culture. That is the nature of prehistory; comparable to the time manipulated by cinema. It is elastic time, and the age of the earth an impenetrable temporal arc. As early as the 1700s, cosmologists and naturalists such as Buffon had understood that 18th century natural history must begin transforming the fluctuating and incalculable time of the earth into a metaphor if it hoped to construct a narrative about the world’s

origin appealing enough to take over the empty space once occupied by the sacred Scriptures. What was needed was a flexible time, a temporality exaggeratedly extended to resemble as closely as possible the reality of time carved in the natural world and yet simultaneously shortened to a human scale to accommodate the limits of the human intellect. It was in this period that Charles Darwin published *On the Origin of Species* (1859), that Charles Lyell, one of the founders of modern geology together with James Hutton, gave his speech “On the Occurrence of Works of Human Art in Post-Pliocène Deposits” before the British Society for the Advancement of Science, arguing that geology itself attests to the deep roots of mankind, and that anthropologist John Lubbock introduced the idea of subdividing prehistory into the “Paleolithic” and “Neolithic” in his 1865 London publication *Pre-historic Times, as Illustrated by Ancient Remains and Manners and Customs of Modern Savages*. Prehistory and cinema are two modern “inventions” that have taken a deep and invisible, thick and manipulatable temporality and rendered it conceivable and visible.

A time machine designed not only to travel to another era but also to shape and manipulate time must be able, for example, to display the highly drawn-out prehistoric age in a narrow string of time. The first examples of such time travel can be found in the visual culture of evolutionism at the turn of the 20th century and, in particular, in a series of early films made by British naturalist and microcinematography pioneer F. Martin Duncan. These films sought to use the language of images, especially moving images, to translate Darwinian theories about the origin of species and natural selection into a visual form[7].



Charles Urban Trading Company, offices 48 Rupert Street, London, 1905 ca.

In Duncan's films, this journey through time – this “migration of images” – in its two-fold meaning of “time travel” and “spatiotemporal trip” proceeds in two different directions. One is evolution, in the sense of scientific time travel into the deep well of beginning-time: think of the 1905 movie *The Amoeba*, the beginning of life. The other is the direction of time manipulation techniques, in the sense of a photo-cinematographic “time trip” made possible by high-speed photography and time-lapse techniques.

Percy Smith, a forerunner of naturalist documentary makers, likewise joined in this tradition of seeking to wrest the biological sciences from hands of the elite so as to make them accessible to the popular classes, thereby helping to ensure the success of the “popular-science film” genre.^[8] In the catalogue of Duncan's films, this journey through time in its two-fold meaning of “time travel” and “spatiotemporal trip” proceeds in two different directions. One is evolution, in the sense of scientific time travel into the deep well of beginning-time: think of the 1905 movie *The Amoeba, the beginning of life*.^[9] The other is the direction

of time manipulation techniques, in the sense of a photo-cinematographic “time trip” made possible by high-speed photography and time-lapse techniques.

As early as the end of the 19th century, physicist and philosopher Ernst Mach was already imagining how cinema might be applied to the principles underlying long-lasting phenomena. As Oliver Gaycken has observed, Mach hypothesized in 1888 that time-lapse could be applied to chronophotography, thus offering one of the first formulations of cinematographic time-lapse: “Should not the principle of *temporal diminution* be of value as well? In point of fact, let us consider photographically fixing the growth stages of a plant, the stages of an embryo’s development, the limbs of the Darwinian genealogical tree of animals, and exhibiting them in a quick series of ‘magic lantern slides.’”[\[10\]](#)

There seemed to be a need to break movement down in order to view the individual moments of its progression over time, a need to take both ultra-fast phenomena (from the “splash”[\[11\]](#) of a drop falling into the mirrored surface of a basin of water and milk to the imperceptible trajectory of a bullet piercing a soap bubble)[\[12\]](#) and ultra-slow ones (from a flower’s blooming and wilting to the developmental stages of an embryo) and make them available to the human eye and, especially, the perspicuous gaze of the scientist.

It was this need that drove the experimentation and technical inventions through which several preeminent figures of the late 19th century scientific universe – Jules Janssen, Étienne-Jules Marey, and his pupil Lucien Bull – developed the earliest techniques for manipulating time through photography and cinema: from the photographic revolver to chrono-photography, from high-speed photography capable of capturing lightning-paced phenomena to photographic and filmic devices capable of documenting ultra-slow movements (*time-lapse*).[\[13\]](#) And herein lies the “magic” of a cinema that had begun to reveal the unconscious world of the visible and the scientific precision of the invisible.

The theory and practice of cinematic intelligence did not appear until a few decades later, between the beginning of the 1920s and the 1940s, in the writings and films of Jean Epstein. As a theorist of “animist cinema,”[\[14\]](#) Epstein understood the cinematographic camera as a machine capable not only of revealing the invisible but also of putting its intelligence to the test by animating all manner of things, causing apparently inert objects to move through its ability to manipulate the temporality of images and, in so doing, to carry out the kind

of temporal alterations necessary to make living forms visible. In a 1935 text *L'Intelligence d'une machine* published in *Inter-Ciné*[\[15\]](#) (not to be confused with another text bearing the same title published in 1946), Epstein attributes cinema with an intelligence all its own, an innate technical capacity to animate “the inert and the living” according to their own specific principles: “As soon as the first slow-motion and fast-motion projections were revealed, the barriers we had imagined between the inert and the living were swept away. In its performance, cinema shows that *nothing is immobile*. Crystals grow, move, multiply like cells. Plants have animal-like gestures. Insects meet, chattering with their antennas, similar to two cripples when one’s fingers tap on the other’s palm. Where can we now place the borders between the kingdoms of nature?”[\[16\]](#)

Coming to life: The growth of plants[\[17\]](#)

As noted by philosopher Michael Marder, despite the apparent immobility of plants, the vegetable soul displays three of the four types of movement listed by Aristotle in his treatise on the soul (*De anima*: 406a14-17)[\[18\]](#). A plant can move in this sense by changing its state, by growing and by decomposing, but it cannot change its position. Plants therefore “move” in a manner appropriate to their being, housing a type of soul that is suited to their way of life and existence. Plants are not capable of moving and changing their position in space, but they are capable of a self-shaping movement that manifests in growth.

In the very first pages of his early 1940 work, *Non-Indifferent Nature*, Sergei Eisenstein states that: “It is on the basis of a fundamental factor that distinguishes living organic nature from other phenomena that we might more easily identify and define these signs. This factor is growth, and it is this formula of growth, a fundamental sign of the organic phenomenon, around which we will concentrate our research.”[\[19\]](#) In a series of notes on Walt Disney, drawn up at the beginning of 1940, that were meant for inclusion in his monograph *Method*[\[20\]](#), Eisenstein sees the idea of cartoons as offering a chance to understand the “method of animism” at the basis of the internal movement of graphic lines and their power to “grant” a soul to apparently motionless things.

In a chapter of *Method* titled “The Leap to Biology”, Eisenstein reflects on the way natural history and human history blur and overlap, an idea based on the hypothesis that all living phenomena have an identical structure. This point allows him to delineate a heterodox evolutionary trajectory that consists in a sort of “jumping chronology”, that is, qualitative (rather than quantitative) jumps that connect the most elementary and primitive forms of life (such as plasma, a substance with a liquid and protean appearance) to the highest and most evolved forms (man). In the pages of *Method* dedicated to Walt Disney, Eisenstein develops this idea by arguing that: “Man in the image – the form of the animal. [...] The animal ‘form’ is a step backward in evolution with respect to ‘content’ – man! [...]”. In a section of the Walt Disney notes titled *The Animal Epic*, Eisenstein notes that: “A man in images – in the form of an animal. In an animal ‘form’ he is evolving, taking a step backwards with respect to his ‘content’ – man!”[\[21\]](#)

In another passage of his Notes on Disney, Eisenstein uses the term “attraction of the plasma,”[\[22\]](#) that is, the omnipotence of plasma which in its liquid state contains all possible forms and appearances in a potential state. Here, plasma is identified with a protean (alluding to the myth of Proteus) and disordered state of matter. Eisenstein therefore conceptualized protoplasm as a reservoir of bodily memory based on a particular logic, namely the concept of “sensitive thought” and the “law of participation” described by French philosopher and anthropologist Lucien Lévy-Bruhl in his writings on the *Primitive Mentality* (1922).[\[23\]](#) Most of the plasmatic elements found in the 1930s *Silly Symphonies* are presented by Eisenstein as one of the main features of Disney films. This list, he argues, reveals a process of gradual animation that moves across individuals and the species, ontogeny and phylogeny, the idea of organic transformation beginning from a “plasmatic-original” foundation. In a note from November 1941, Eisenstein writes:

- A. The drawings come to life
- B. Drawings sketched in a stroke
- C. Humanized animals
- D. That’s not all: they are animated (given human soul)

- E. Absolutely synesthetic (audio-visual)
- F. Metaphorical, and in two senses at that: both in plot and in form
- G Not only the animal, but also the vegetative world!

The *Silly Symphony* “Flowers and Trees” (1932) is an excellent example of the plasmatic and ecstatic qualities of plant forms. In this case, the key idea is that of plant matter (trees and flowers) coming to life and, at the same time, becoming anthropomorphized. This depiction presents only unstable and variable forms in continuous evolution, forms capable of generating an inexorable process of metamorphosis and frenzied distortions.

In another note on Disney, Eisenstein insightfully speaks of metamorphosis in these terms: “Metamorphosis is not a *lapsus* – because, leafing through *Ovid*, <we see that> some of its pages seem to be the transcription of Disney cartoons.”[\[24\]](#)

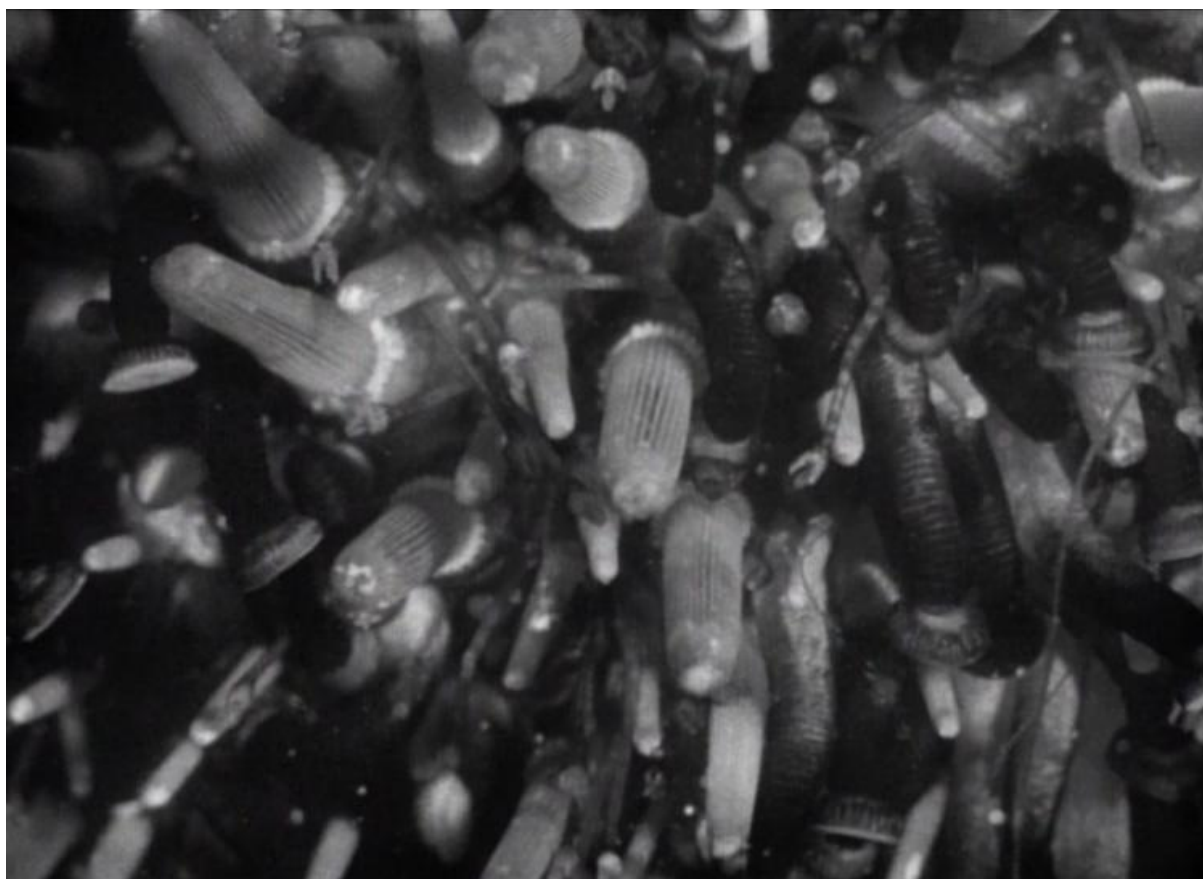
“Anarchitecture” and the porosity of the underwater environment

Starting from this eisensteinian idea of metamorphosis as “protoplasmatic”, that is, as the capacity of the most basic organisms to assume all forms, we can formulate the hypothesis that some research films by director and biologist Jean Painlevé influenced, or even inspired, Eisenstein’s specific notion of “protoplasmicity,” understood here as the constant transformation of all unicellular forms, plants and organisms leading up to humans.

Shortly after their meeting, Eisenstein and Painlevé developed a strong friendship, as evidenced by the correspondence they maintained during all of Eisenstein’s travels in the United States and Mexico (1930–32) up until his return to the Soviet Union[\[25\]](#). One could, in fact, hypothesize that some of Painlevé’s scientific films – like the one entitled Protoplasm Movement in *Elodea Canadensis* (*Mouvement du protoplasme d’Élodea canadensis*), 1927 – inspired Eisenstein’s ‘protoplasm’ theory, based on the idea that primordial

organisms, which have not yet achieved a stable form, are in a state that allows them to assume all possible forms through a continuous series of transformations and metamorphoses. In another film, *L'oursin* (1928), made at about the same time of *Mouvement du protoplasme d'Élodea Canadensis*, Painlevé evokes the morphological process and the architectural elements of this spiny, globular animal. In a description written rather late, just before his death, Painlevé speaks of this vegetable dimension inscribed in the very body of the sea urchin:

In sea urchins, the most surprising part is the shell. Looking over it distractedly, we see only an impenetrable forest; then we make out the spines that begin to move. But let us try to penetrate the forest with magnification. Around the spines, which have become Doric columns, we discover another smaller forest made up of shrubs. These are the pedicellariae, small organs belonging to the sea urchin. A limestone stalk that culminates in three jaws, where the muscles close and open constantly. Some pedicellariae have long, thin and perforated jaws. Others evoke the powerful, compact heads of serpents ... *L'oursin* for me was an architectural film, composed of an entire series of very beautiful structures and extraordinary colonnades. I would not like to speak ill of Buren's columns, but the columns of sea urchins are no less important.



Jean Painlevé, *L'oursin*, 1928© Jean Painlevé Archives, Paris



Ernst Haeckel, "Sea anemones", *Kunstformen der Natur* (1899-1904), *Art Forms in Nature*, ed. Olaf Breidbach and Irenaus Eibl-Eibesfeldt, Munich-New York, Prestel, 1998

This architecture of the sea urchin is not unlike the concept of vegetal “anarchitecture” Micheal Marder discusses in his book *Plant-Thinking*. Anarchitecture is a neologism coined in the 1970s thanks to a collaborative effort by artists including Laurie Anderson, Tina Girouard, Carol Goodden, Suzanne Harris, Jene Highstein, Bernard Kirschenbaun, and Gordon Matta-Clark[26]. In March 1974, a group project under the same title was exhibited at 112 Greene Street in New York City. A revolt against architectural foundationalism, anarchitecture not only negates the preceding set of practices and their “products” but also shatters into a multiplicity of semantically indeterminate word combinations.

Insofar as plants display something of a living architecture – or better, architectonics, a system of structures or an identifiable structural pattern – they are the prime exemplars of anarchitecture. In the first place, while the DNA of, say, a pine specifies the kind of tree that will germinate from a nut or a seed, it

does not predetermine the precise shape of the tree, its height, the arrangement of branches along its trunk, and so forth. All these factors depend on environmental conditions, that is to say, on what is exterior to the plant itself. An architectural – an anarchitectural – equivalent to this phenomenon would be a building that responds and adjusts to changes in its surroundings by changing its structural and functional aspects, by expanding or contracting, opening up or closing in on itself.

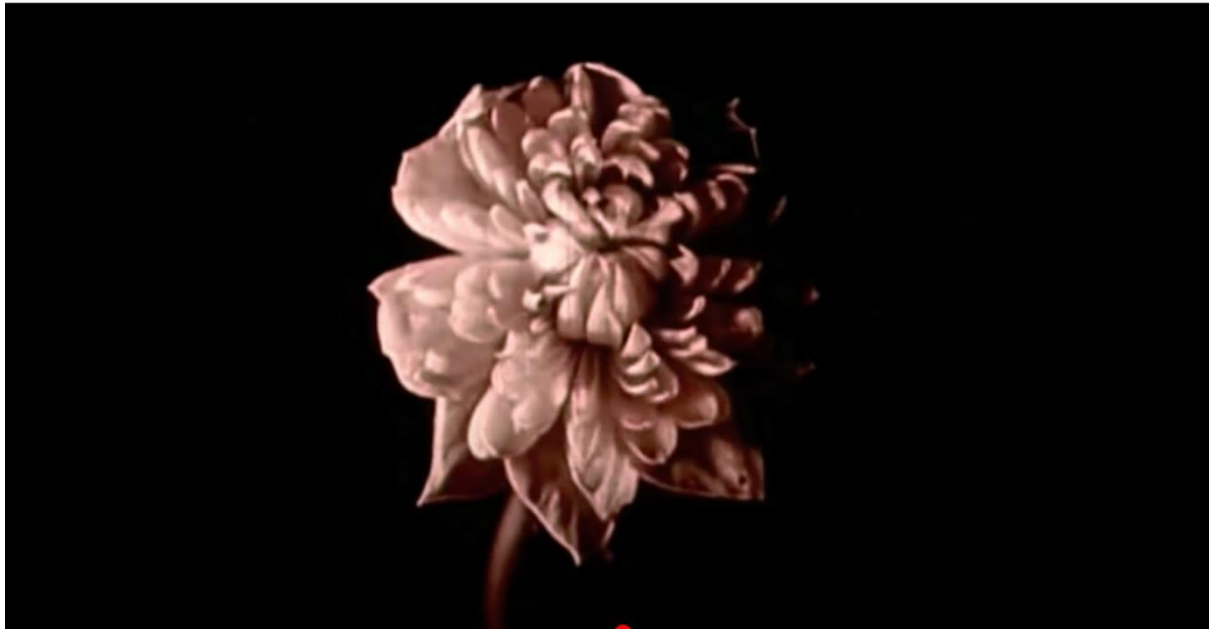
Time-lapse and the hetero-temporality of the vegetal world

One compelling attempt to visualize the animation process of living forms which are apparently incapable of movement can be found in a film made with modelling clay (a form of 3-D animation carried out by “clay animation”) by Hans Elias, a physician who emigrated to the United States to work as a professor of anatomy in 1950s Chicago. This animated film, entitled *Développement de la fleur de Atropa Belladonna*, depicts a flower unfolding through the plastic power of the moving image. Here, movement and animation allow us to grasp a phenomenon invisible and imperceptible to the naked eye, namely the life of plants; at the same time, the film also reveals the plasticity of an inert material such as modeling clay. In so doing, it demonstrates the “vitality” of plants in terms of the timing and movement through which we consider them. The film shows a manifestation of life, the vitality of a plant, through the vital process of growth.

Hans Elias’ animated film can be read as an example of what Teresa Castro, writing on Jean Epstein’s “animist cinema,” defines as the “dual significance of animism”: the way it attributes “interiority to the things of the world” while simultaneously assigning cinema itself a vitality, a soul or intelligence.^[27] In *Le cinématographe vu de l’Etna* (1926), Epstein suggests that cinema is both a machine that brings things to life and a machine that is itself alive and intelligent: “Cinema grants the iciest apparitions of things and beings the greatest gift that can be given before death: life. And it confers this life beginning from its highest aspect: personality.”^[28] In this case, animism is understood as both the material presence of a vital substance and interiority, that is, personality and intentionality.^[29]

Epstein's theorizing also establishes a link between accelerated motion techniques and the discovery that certain life forms which might seem inert to the human eye actually do move: "the breadth of playing with space-time perspective, games that involve accelerated movement, slow motion and close-ups, reveal movement and life in what was considered immutable and inert. Through accelerated projection, the scale of the kingdoms is shifted – more or less, depending on its relationship with acceleration – towards a greater qualification of existence. Thus, crystals begin to vegetate in the manner of living cells; plants come alive, choose their sources of light and sustenance, express their vitality with movements."[\[30\]](#)

We have seen that "viewing the invisible" through cinematographic (and micro-cinematographic) techniques enables a form of mediation through which the vitality of things becomes visible. Imperceptibly ultra-slow movements can only be viewed thanks to certain specific techniques such as time-lapse, a highly accelerated effect created image by image. To obtain the acceleration effect, the frame rate cannot follow the standard projection speed of 24 (or 25) frames per second; it must instead be set to 12-8-6 frames per second, thus accelerating projection by 2-3-4 times. British naturalist Frank Percy Smith (1880-1945) was one of the pioneers of time-lapse in cinema with his 1910 Kinemacolor film *The Birth of a Flower*. The film contains nine scenes depicting the spectacular opening and transformation of nine different types of flowers, including hyacinths, lilies, anemones, daffodils, tulips, roses and anemones that curl and unfurl their petals like the lenses of a kaleidoscope.[\[31\]](#) The flowers open and close in a temporal space manipulated by the cinematographic technique to render it perceptible to the human eye.



Frank Percy Smith, *Birth of a Flower*, 1910

Jean Comandon's contribution was the invention of various devices for observing the invisible in the living world, including both ultra-fast and ultra-slow effects. "The vegetable world that he films at a very slow speed, for long periods of time, ceases to appear motionless; flowers bloom, present themselves in their fullness and then wither."[\[32\]](#) Like the first time-lapse films of plant life by German botanist Wilhelm Pfeffer and American photographer Arthur Pillsbury, Comandon's *La croissance des végétaux* (1929) was probably influenced by Charles Darwin's writings on the movement of plants – *The Power of Movement in Plants*, 1880 – and Ernst Mach's discoveries about supersonic speed from the second half of the 19th century.[\[33\]](#) As we have seen, this drive to visualize the movement of plants necessarily requires intervening in temporal coordinates. Indeed, the temporality of plants is a "hetero-temporality,"[\[34\]](#) a temporality which is quantitatively and qualitatively different from that which characterizes the existence of human beings. It is a "vegetal-time" that requires the use of cinema – as a technical medium with the power to develop and extend the innate capacities of an organism – to be transformed into a form of temporality with which the human eye can engage.

Through time-lapse films, cinema reveals that plants possess a complex sensory motility, that is, a sensitivity that allows them to move in response to their

environment, such as the ability to perceive different types of stimuli (light, temperature). As made visible by the spatiotemporal manipulations of cinema, recognizing the sensitivity and movement of plants is tantamount to attributing them two faculties generally considered exclusive to animals.

As revealed by photography and cinema, this common “soul” possessed by animal and plant life forms alike, this porosity between plants and animals speaks to the sort of “unity of life” that Jean Epstein asserts in a very concise passage from his essay *L’Intelligence d’une machine*: “The entire universe is an immense beast whose stones, flowers, and birds are organs, all exactly consistent by virtue of participating in a single, common soul. [...]. Underneath those mirages, the people of forms are essentially homogeneous and strangely anarchic.”^[35]

Marie Rebecchi

^[1]Herbert George Wells, *The Time Machine* (1895), Oxford University Press, Oxford 2017. See Antonio Somaini, Eline Grignard, Marie Rebecchi (ed.), *Time Machine. Cinematic Temporalities*, Skira, Milan 2020. See also Ian Christie, *Robert Paul and the Origins of British Cinema*, University of Chicago Press, Chicago 2019.

^[2]This date marks the first for-pay screening of the Cinématographe Lumière that took place December 28, 1895 at the Salon Indien of the Grand Café in Paris.

^[3] Friedrich A. Kittler, *Gramophone, Film, Typewriter*, Stanford University Press, Stanford 1999.

^[4]“...When I opened my eyes, I saw the Aleph. ‘The Aleph?’ I repeated. Yes, the place where, without admixture or confusion, all the places of the world, seen from every angle, coexist. [...] How can one transmit to others the infinite Aleph, which my timorous memory can scarcely contain?” (Jorge Luis Borges, “The Aleph,” *Collected Fictions*, Penguin, London 1998, p. 636-639).

^[5] Maria Stavrinaki, *Saisis par la préhistoire. Enquête sur l’art e le temps des modernes*, Les presses du réel, Dijon 2019.

[6] See Bruno Latour, *Nous n'avons jamais été modernes. Essai d'anthropologie symétrique*, eng. trans. Catherine Porter *We Have Never Been Modern*, Harvard University Press, Cambridge 1993.

[7] An example is the series of films made by F. Martin Duncan for the Charles Urban Trading Company, entitled “The Denizens of the Deep.” See Oliver Gaycken, “Early Cinema and Evolution,” in Bernard V. Lightman and Bennett Zon (ed.), *Evolution and Victorian Culture*, Cambridge University Press, Cambridge 2014, p. 104-107.

[8] See Oliver Gaycken, “Revealing Nature’s Closet Secret” and “Juggling Flies and Gravid Plants: F. Percy Smith’s Early Popular-Science Film,” in *Devices of Curiosity. Early Cinema and Popular Science*, Oxford University Press, Oxford 2015, p. 15-89.

[9] See Oliver Gaycken, “Early Cinema and Evolution,” *op. cit.*, p. 107.

[10] *Ibid.*, p. 108-109 and p. 119. The Gaycken quote is drawn from Ernst Mach, “Bemerkungen über wissenschaftliche Anwendungen der Photographie” (*Jahrbuch für Photographie und Reproduktionstechnik*, Vol.2, 1888).

[11] Arthur Mason Worthington, *A Study of Splashes*, Green, and Co, London/New York/Calcutta/Bombay/Longmans 1908.

[12] See the PhD dissertation, forthcoming, by Antoine Prévost-Balga on the techniques of high-speed photography and cinematography applied to the sciences (including the stereoscopic films made in 1904 by Lucien Bull, projected at a speed of 1500 fps).

[13] Colin Williamson, *Hidden in Plain Sight: An Archaeology of Magic and the Cinema*, Rutgers University Press, New Brunswick/London, 2015, p. 78-79.

[14] Teresa Castro, “Penser le ‘cinéma animiste’ avec Jean Epstein”, in Roxanne Hamery and Eric Thouvenel (ed.), *Jean Epstein. Actualités et postérités*, PUR, Rennes 2016, p. 248.

[15] Jean Epstein, *L’Intelligence d’une machine* (1946), in *Écrits sur le cinéma*, Vol. 1, Seghers, Paris 1974, p. 241-42.

[16] “ Dès les premières projections ralenties et accélérées, furent balayées les barrières que nous avons imaginées entre inerte et le vivant. Et se jouant, le cinématographe montre – qu’il n’y a rien d’immobile, pas de mort. Les cristaux grandissent, se déplacent, se multiplient comme des cellules. Les plantes ont des gestes animaux. Des insectes qui se rencontrent, palabrent à coups d’antennes,

pareils à certains infirmes quand les doigts de l'un pianotent sur la paume de l'autre. Où situer maintenant les frontières entre les règnes de la nature” (*ibid*, p. 243-244).

[17] A first version of this paragraph is published in French. See Teresa Castro, Perig Pitrou, Marie Rebecchi, *Puissance du végétal. La vie révélée par la technique*, Les Presses du réel, Dijon 2020, p. 247-71.

[18] Michael Marder, “Plant-Time (I): Vegetal Hetero-Temporality”, in *Plant-Thinking. A Philosophy of Vegetal Life*, Columbia University Press, New York 2013, p. 20.

[19] Sergei Eisenstein, *Non-indifferent Nature: Film and the Structures of Things*, translated by Herbert Marshall. introduction by Herbert Eagle, Cambridge University Press, Cambridge/New York/Melbourne/Sydney 1988.

[20] There are two different Russian editions of Sergei Eisenstein’s *Metod. Tajny masterov* volumes 1 and 2, ed. Naum Kleiman, Muzej kino, Moskow 2002); and Sergei Eisenstein, *Metod*, volumes 1-4, ed. Oksana Bulgakowa, Potemkin Press, Berlin 2008. An Italian translation of *Method I*, edited by Alessia Cervini for Marsilio, has also been published in 2020.

[21] The theoretical sources Eisenstein draws on in developing this idea of evolutionary biology include authors such as Charles Darwin and Ernst Haeckel as well as Max Hartmann’s book *Allgemeine Biologie* (1933). In a page of his diary from 1930, Eisenstein captures Haeckel’s idea of ontogeny, which summarizes phylogeny, in the synthetic phrase “From fish to man”.

[22] Sergei Eisenstein, *Notes on Disney* (8/VII/1946 – Kratovo).

[23] Lucien Lévy-Bruhl, *La Mentalité primitive*, Alcan, Paris 1922. English edition: *The Notebooks on Primitive Mentality*, Harper and Row, New York 1975.

[24] Sergei Eisenstein, *Disney*, *op. cit.*, p. 32.

[25] The correspondence between the two allows us to grasp, on the one hand, the influence of Painlevé’s films on Eisenstein’s anthropological thinking in the 1930s, and, on the other hand, to reconsider Eisenstein’s trip to Paris and his exchanges with prominent figures in ‘heterodox’ surrealism associated with Bataille (Painlevé himself included) as a decisive moment in the Soviet director’s intellectual and biographical life. See Marie Rebecchi, *Paris 1929. Eisenstein, Bataille, Buñuel*, Mimésis, Sesto San Giovanni 2018.

[26] Michael Marder, “Vegetal Anarchitectures” , in *The Philosophers’s Plant*, LARB, June 21, 2016, <https://philosoplant.lareviewofbooks.org/?p=164>. See

Michael Marder, “The Shape of Freedom, in *Plant-Thinking. A Philosophy of Vegetal Life*, *op. cit.* See also Antonio Sergio Bessa et Jessamyn Fiore (ed.), *Gordon Matta-Clark : Anarchitecte, Jeu de Paume*, Paris 2018.

[27] Teresa Castro, “Penser le ‘cinéma animiste’ avec Jean Epstein”, in Roxanne Hamery and Eric Thouvenel (ed), *Jean Epstein. Actualités et postérités*, *op. cit.*, p. 248.

[28] Jean Epstein, *Le Cinématographe vu de l’Etna* (1926), in *Écrits sur le cinéma*, *op. cit.*, p. 140. Translation mine.

[29] Philippe Descola, “Rapport à soi, rapport à l’autre”, in *Par-delà nature et culture*, Gallimard, Paris 2005, p. 168-69.

[30] *Ibid.*, p. 287.

[31] For a discussion of the analogy between kaleidoscopes and anemones in the sequence in Percy Smith’s film *The Birth of a Flower*, see Oliver Gaycken, *Devices of Curiosity. Early Cinema and Popular Science*, Oxford University Press, Oxford 2015, p. 74.

[32] Text introducing “Ballet botanique,” an afternoon of study on Jean Comandon’s film-making organized at the Bibliothèque nationale de France (BnF), February 16, 2012. See Laurent Mannoni, “Jean Comandon technicien”, in *Filmer la science comprendre la vie. Le cinéma de Jean Comandon*, CNC, Paris 2012, p. 59.

[33] See Oliver Gaycken, “Early Cinema and Evolution”, in Bernard V. Lightman and Bennett Zon (ed.), *Evolution and Victorian Culture*, *op. cit.*, p. 108-109.

[34] Michael Marder, “Plant-Time (I): Vegetal Hetero-Temporality, in *Plant-Thinking. A Philosophy of Vegetal Life*, *op. cit.*, p. 95-107.

[35] Jean Epstein, *L’Intelligence d’une machine* (1946), in *Écrits sur le cinéma*, *op. cit.*, p. 257. Translation mine.