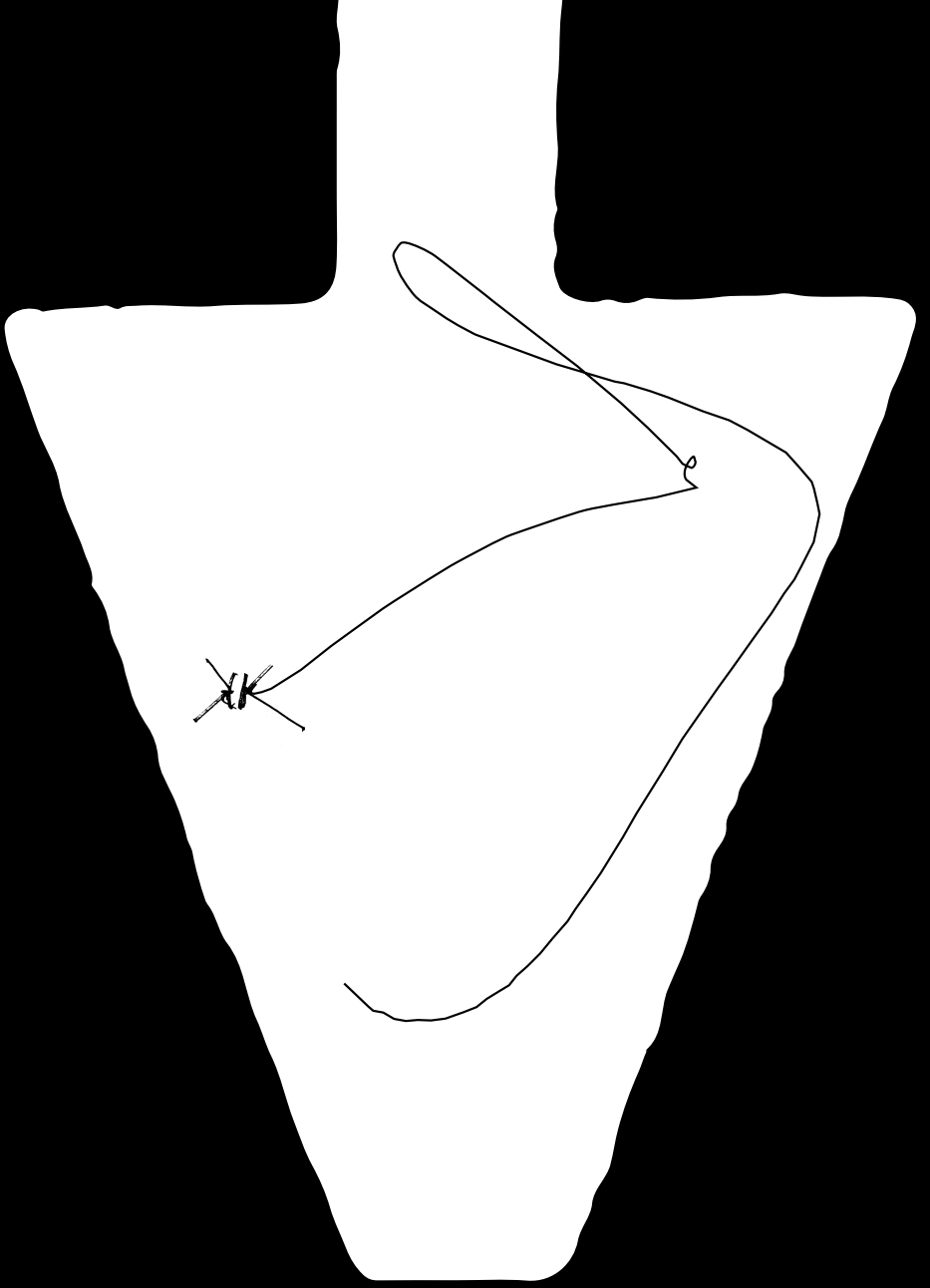
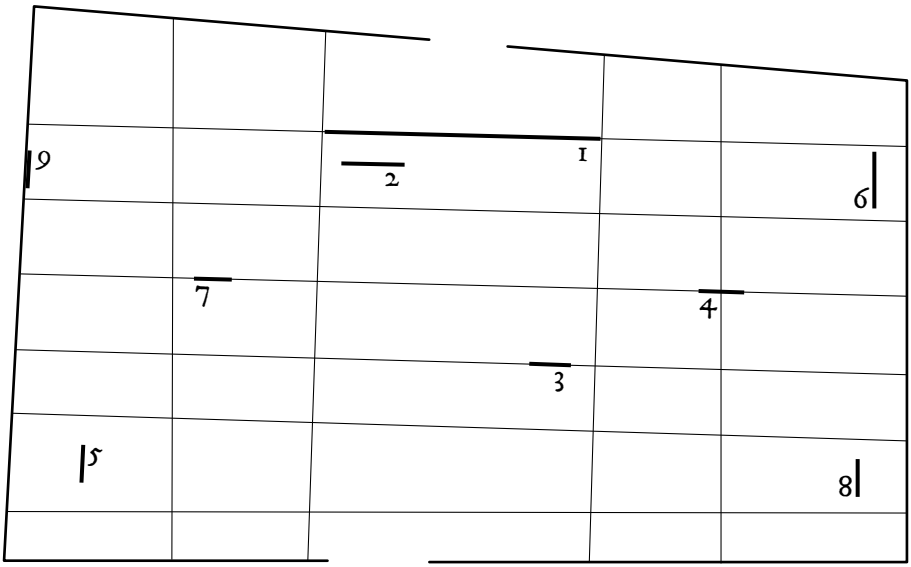




1. RedSkyFalls (scenic backdrop) 2. Greenspeaker 3–8. Réplicas 9. Barómetro

RedSkyFalls
(an artificial ecosystem with animal sensibility)

The stillness of a computer desktop environment is disrupted by unpredictable seismic events from the natural world. A network of luminous chimeric beings, the *Réplicas*, announces intrusions from underground terrestrial movements through animal-like behaviours. When an earthquake erupts, the ecosystem responds synchronously, becoming agitated and freezing in fear, granting silence another meaning.

Suspended in the seemingly sterile landscape, six *Réplicas* nestle in the grooves of aluminium plates. Each maintains its own internal cycles, influenced by animal behavioural data. All units are bound by a flow of seismic data, to which they respond in real time whenever it exceeds a certain threshold on the Richter scale. The *Réplicas* tune in to small shifts in rhythm, tendency, and stability before the shock itself arrives through *Greenspeaker*.

RedSkyFalls, Alexandre Estrela, 2019–2026
Computer-generated multichannel audiovisual installation triggered by global seismic activity. *Backdrop*: video projection of a default macOS High Sierra desktop screenshot, colour. *Greenspeaker*: video projection over paper-covered loudspeaker, colour, mono sound. *Réplicas*: video animation modulated by animal behavioural data, projected on engraved aluminium plates, variable dimensions (DIN system), colour, mono sound.

Animation, generative systems and sound: Ian Duclos; animated sequences: Rui Almeida; earthquake sound: Miguel Abreu.

1. RedSkyFalls, 2019
(scenic backdrop)
A life-size mountainous landscape of a computer desktop

A default desktop landscape becomes the background for an artificial ecosystem shaken by the echo of near and distant earthquakes. Every time a quake strikes, seasons change abruptly from autumnal reds to spring greens.

Single-channel video projection, triggered by global seismic activity. Screenshot of macOS High Sierra default desktop image (version 10.13, © Apple Inc., 2017), colour, mono sound, endless

Seismic response system: Borja Caro (2019), Ian Duclos (2025)

2. Greenspeaker, 2019
(earthquake loudspeaker)
A thin membrane transduces subterranean energy into sound

Overgrown algae cover the grid of a filter, revealing invisible water currents. This image coats a paper membrane, glued onto a loudspeaker. Each seismic event triggers a loud sound that tears the membrane. This ferocious green cry reaches everything at once in the form of a tritone, a musical interval known since medieval times as *diabolus in musica*. With every impulse, the image flips arbitrarily, questioning gravity.

Single-channel video projection triggered by global seismic activity. Paper-covered KCS S-1500 loudspeaker, 63 × 98 × 26 cm, colour, mono sound, endless

Earthquake sound: Miguel Abreu

3. Réplica (zebrafish larva), 2025
A larva that has forgotten its body but remembers the way it used to move

The animation replicates the tail kinematics of a zebrafish larva across three discrete units of motion: rest, turn, burst. Other movements are layered on top: eyes that blink and shift position, a *moiré* field rotating inside a transparent head, a frame-by-frame animation of a bait drifting counter-current. The system's internal processes are modulated by the direction of the *moiré* patterns. As the larva senses an approaching earthquake, its internal rhythms accelerate; when it occurs, its popping eyes drop to the centre of its body, and it freezes into its shell.

Dimensions: 50 × 35.4 × 1 cm (DIN A3+)

Dataset: Tail kinematics and position recordings of zebrafish larvae (*giant danio* and *danionella*), courtesy of Orger Lab, Champalimaud Research

4. Réplica (fruit-fly), 2026
A fly leaves a trace along a city skyline, in a harmonic tremor

A *Drosophila melanogaster* alternates between algorithmic trajectories and real-life flight against a mutable horizon: a staircase reconfiguring to the sound of a harmonic drone. It moves decisively, exploring the limited space it inhabits, shifting between different behavioural states: drifting, saccadic movement, resting, and eventually freezing when the earthquake strikes.

Dimensions: 29.7 × 42 × 1 cm (DIN A3)

Dataset: Hellekes K, Villalba S, Stowers J, Graf A, Panser K, Campione E, Straw A, *A dataset of 3D flight trajectories of flies* (*Drosophila melanogaster*) *to study the role of neuropeptide degradation in visuo-motor behaviours,* 2015

5. Réplica (dragonfly), 2026
Two male fruit-flies caught in a courtship dance

The dance of the figures is informed by the temporal distribution of pulses and sines derived from a study of the courtship songs of male *Drosophila melanogaster*. Their mating ritual involves resting, synchronization, and a chase sometimes resolved into fusion. Earthquakes interrupt this routine, causing the flies to drop their wings.

Dimensions: 59.4 × 42 × 1 cm (DIN A2)

Dataset: Stern DL, Clemens J, Coen P, *et al.*, *Experimental and statistical reevaluation provides no evidence for Drosophila courtship song rhythms*, 2017

6. Réplica (griddled worm), 2026
A tortuous line, trapped in electric wires, squirms like a worm

A line is animated using hand-traced footage of a worm trailing on an electric circuit, reverse-mapped via computer vision. The figure is placed within an electrified grid from which it tries to free itself. Upon the arrival of an earthquake, the entire grid fires up, and the worm attempts to find shelter in the nearest groove.

Dimensions: 85 × 60.1 × 1 cm (DIN A1)

Source video: Ashford Daisyak, *Worms Making Music*, YouTube, 2006

7. Réplica (compass), 2026
A particle stuck in unpredictable gravitas

A rogue particle orbits around the alternating axes of a compass, veering its path according to invisible parameters. The prescience of an earthquake accelerates the compass hands, locking the roaming particle into a singular orbit and provoking pendular shifts on the previously fixed chassis; all before a sudden freeze. When the seismic event ceases, movement resumes with a different set of speeds and directions.

Dimensions: 59.4 × 42 × 1 cm (DIN A2)

8. Réplica (weathervane / [Hans] Richter scale), 2026
A weathervane in a cycle of perpetual motion accumulates energy in accordance with an indeterminate logic

Between a light mill and a weathervane, this device registers an unknown source of dark energy on a scale inspired by the geometric-animistic principles of animation developed by German artist Hans Richter in the 1920s. Energy accumulates until reaching a tipping point, reinstating the cycle in a Sisyphean manner. Its laws of movement break as an earthquake is felt approaching. The vanes' movement shifts into a slow circular mode, followed by a snap that locks them back into their initial position.

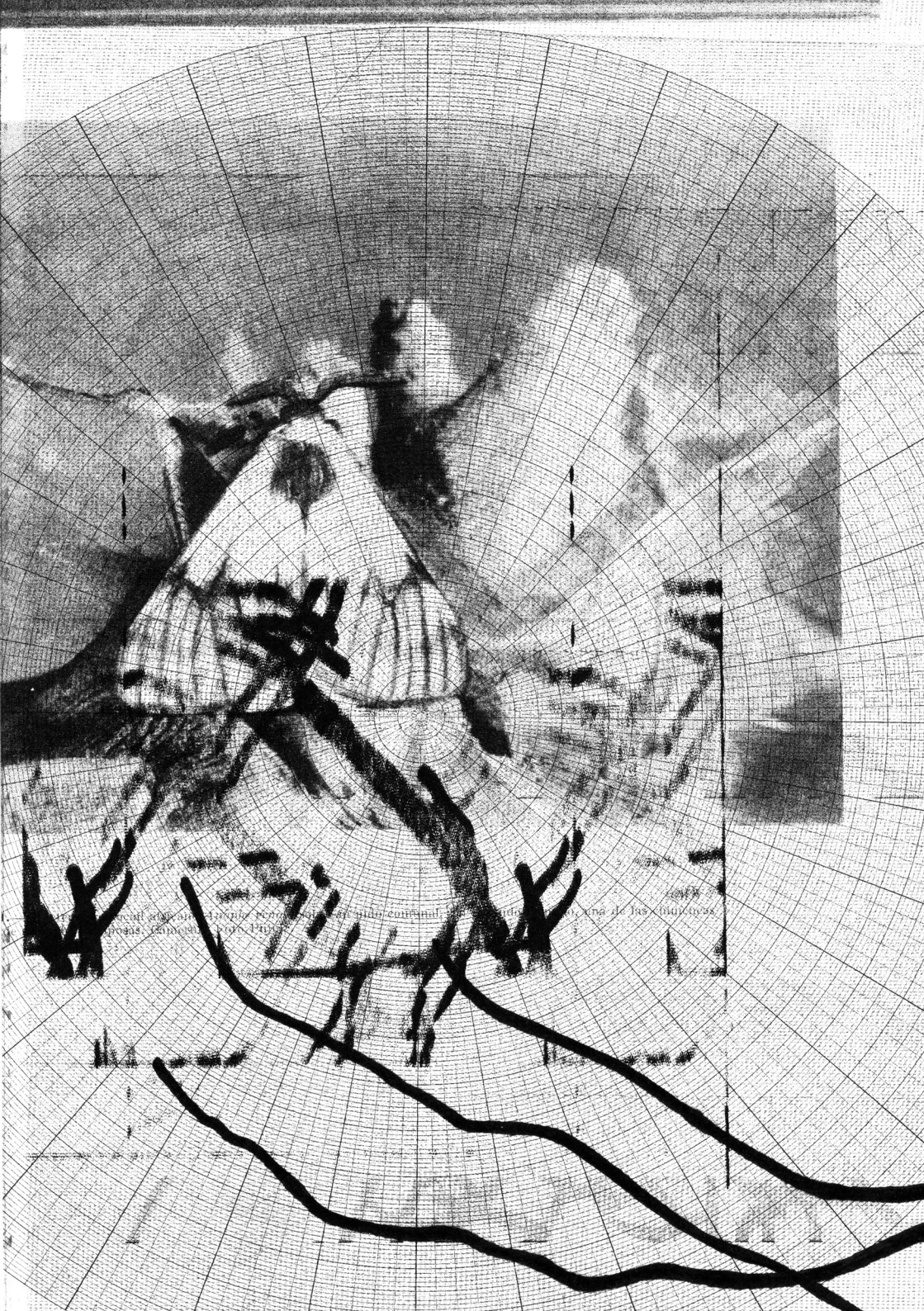
Dimensions: 42 × 59.4 × 1 cm (DIN A2)

9. Barómetro, 2024
(lateral interference)
A light leak held hostage by an absurd scale

A radial grid, with an arbitrary numbering system, frames and measures a lens flare, an unwanted artifact, a bug in an idealized natural landscape caught on video. Seismic events provoke a sudden freezing of time and subject the image to a blur that unbinds the scale from the glare it is meant to contain.

Single-channel video projection on printed paper screen, 82.5 × 48.5 cm, colour, silent, loop

Recording instrument: Apple iPhone XS rear camera module (12 MP, six-element sapphire crystal lens; telephoto 6 mm at *f*/2.4; optical image stabilisation)



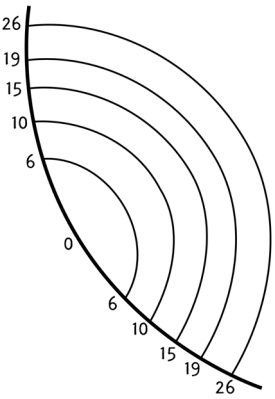
WHEN THE RED SKY FALLS and the earth trembles, fissures open —in the ground, as in thought—and paradigm shifts inscribe fracture lines into the Earth's crust (see ONE/ELEVEN p. 11). Long before being registered by seismographs, terrestrial instability is often sensed by the natural environment. In seismic zones, signs abound. Sulphurous odours, red mists, purple rains, flashes in cloudless skies and an eerie quietness in the air (see SKYING p. 15) are read as omens of disaster by those who look up searching. Frogs abandoning ponds, snakes and worms fleeing their holes, hives scattering in disarray, the sudden silence of cicadas make up a prescient, chimeric bestiary.

In Cultural Revolution China and Cold War America and Japan, animals in between states of becoming—such as tiger parrots, kangaroo rats, and catfish—were mobilised as bio-sentinels for monitoring tectonic activity. Some of these creatures were employed, without payroll, for their predictable circadian rhythm, from which oddities stand out, or for their acute sensitivity to the electrical fluctuations that precede earthquakes[1]. All too reliant on the interpretation of exceptions, this line of research lost momentum in the mid-1990s[2] and, with it, the holistic view of earthquakes as a set of geophysical, socio-environmental and sensory phenomena.

RedSkyFalls, an artificial ecosystem with an animal sensibility for underground terrestrial movements, revives the observation of phenomena whose signs elude instrumental quantification.

1. For centuries, fishermen in Japan have observed the unusual agitation of catfish before earthquakes—empirical knowledge that may have given rise to the popular beliefs about their cause. Beneath the archipelago, it is said that the great catfish *Namazu* lies pinned under two sacred stones, watched by the god *Takemikazuchi*. When the god neglects his watch, the fish tries to escape, thrashing its tail and making the earth tremble. In the 1950s, laboratory studies showed catfish to be nearly a million times more electrosensitive than carp or humans, attuned to the subtle electrical shifts that precede seismic events—confirming what fishermen knew all along. Between 1970 and 1990, the Tokyo Metropolitan Marine Experiment Station maintained catfish under observation for seismic monitoring.

2. Animal bio-sentinels proved difficult to stabilize as instruments. Their signals, too permeable to circumstance, were dependent on the attention of observers who had to decide which exception counted, often only in retrospect. This zone of uncertainty is what Charles Fort would have called 'damned data', too particular for science to accommodate. His *Book of the Damned* compiles reports spanning the late 19th and early 20th centuries: unexplained lights, atmospheric disturbances, strange falls—a quasi-encyclopaedic compendium of excluded signs.



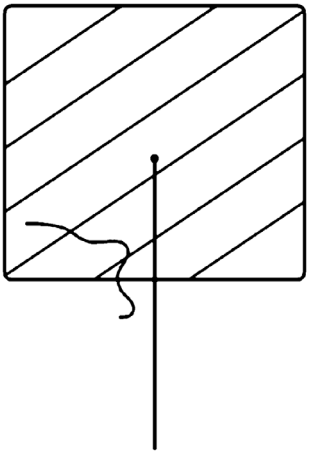
In the environment of a computer desktop, the mountainous landscape of the High Sierra shelters digital wilderness from the earthly world. Yet, this picture-perfect bliss does not hold. A fault in a paper membrane regulates the interference of nature's unruly forces, letting either sound or light pass through in alternate flows. Unpredictable tremors resonate through a *Greenspeaker* as seismic waves travel along the terrestrial crust, move through undulating water, cross the paper membrane vibrating loudly, and become airborne, unleashing the earth's energy[3] upon *RedSkyFalls*. The violent burst of sound[4] finds its gentle counterpart in a flicker of light from the natural world. Caught within the subjective scale of a lens, the beam idly chases its own iridescence and scatters parasitic reflections that contaminate the evenly lit scene.

Within a reflective zone of the landscape, between air and water[5], a shift in scale brings to the foreground six luminous organisms, flat on the surface of metal plates: the *Réplicas*. Grooves in the metal preserve, like a fossil technology, the movements of every creature a *Réplica* once was. Light races through the grooves, replaying their shadow imprint to continuously generate a hollow-graphic figure.

3. An earlier version of the work relied on seismic data obtained from the United States Geological Survey. During the Trump administration, budget cuts and shifts in federal data policy made access to these resources unstable, and the piece was rendered temporarily inoperative. Previously, *RedSkyFalls* had also been a fictitious company, used to filter unwanted postal mail, and a YouTube channel where Estrela gathered and re-posted videos —both being eventually discontinued following technological updates. *RedSkyFalls* is a record of its own history of near-extinction, repeatedly brought to the edge by shifts in the technical environments sustaining it.

4. The *Greenspeaker* emits a tritone, an interval historically associated with dissonance and once referred to in medieval theory as the 'devil's music'. Invoked by chance by Miguel Abreu, the tritone produces a sense of instability and harmonic suspense.

5. Inhabiting the marginal zone at the air–water interface, extremophile organisms known as *neuston* (Naumann, 1917) thrive precisely where human perception registers sterility. Until the late 19th century, the lack of visible life in the Dead Sea was taken for the absence of life itself. In biblical tradition, this place was linked to the rain of fire and sulphur over Sodom and Gomorrah: a foul-smelling, heavy, saline body of bituminous water, edged by mud and sulphuric crusts. Lavoisier, who argued that life existed even where it could not be seen, is said to have secretly cast Mediterranean shells into the waters of the Dead Sea, later retrieving them to prove his theory.



A few lines start to form animal look-alikes, not in shape, but in behaviour[6]. A fly stuck to a lamppost leaves a red trace along the city's skyline, humming in harmonic tremor. A fish makes a popping sound as it blinks its bulging eyes waving its own bait, countering the current with its tail. Two fruit-flies caught in a courtship dance echo the mating song of pigeons. A tortuous line, trapped in electric wires, squirms like a worm. Two *permasense* devices replicate the movement of an air current to sustain their idle animations. An eccentric particle orbits around a compass with an unpredictable gravitas. A weathervane captures the levels of atmospheric animation sensed on the (Hans) Richter scale[7].

At the edge of abstraction, movement produces a peculiar form of animism, a sense of life bearing little resemblance to life as we know it. Empathy is tested here, not as sentiment, but as bodily response to the intuitive perception of life: a strange familiarity, a kinship without identification (see EMPATHY p. 19).

The *Réplicas* borrow their vital pulse from a patchwork of moving animal parts: the heartbeat in the leg of a fly, the wave of a zebrafish larva tail, or the spasm of the rings of an earthworm. From this dark cauldron, they emerge as chimeric sentinels with an ancient animal, perhaps digital, intuition for tremors and aftershocks. Before an earthquake, just as catfish thrash their tail in Japan, the agitation of the *Réplicas* distorts time, faults slide in perception, and cause and effect slip.

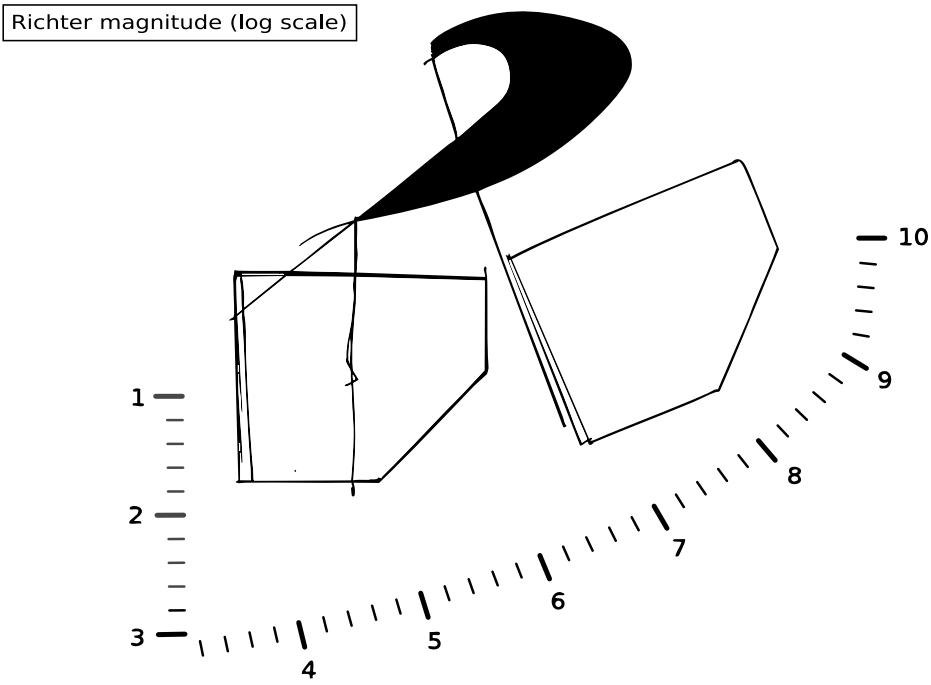
6. In *An Experimental Study of Apparent Behavior* (Heider and Simmel, 1944), participants watched an animation film where two triangles and a circle moved in and out of an enclosure. Most attributed intention and emotion to the shapes, while only a few described them as pure geometry. While the experiment was not designed to test empathy, it showed how easily movement alone generates a sense of agency—and with it, a tendency to *feel into* what is seen. Wilhelm Worringer suggested that abstraction may arise from a desire for distance from the organic world, whereas empathy draws perception into participation with living forms. *RedSkyFalls* accepts this tension: figures that remain abstract, yet are difficult *not to* feel into.

7. Subjective scale inspired by the geometric-animistic principles of animation developed by the German artist Hans Richter in the 1920s.

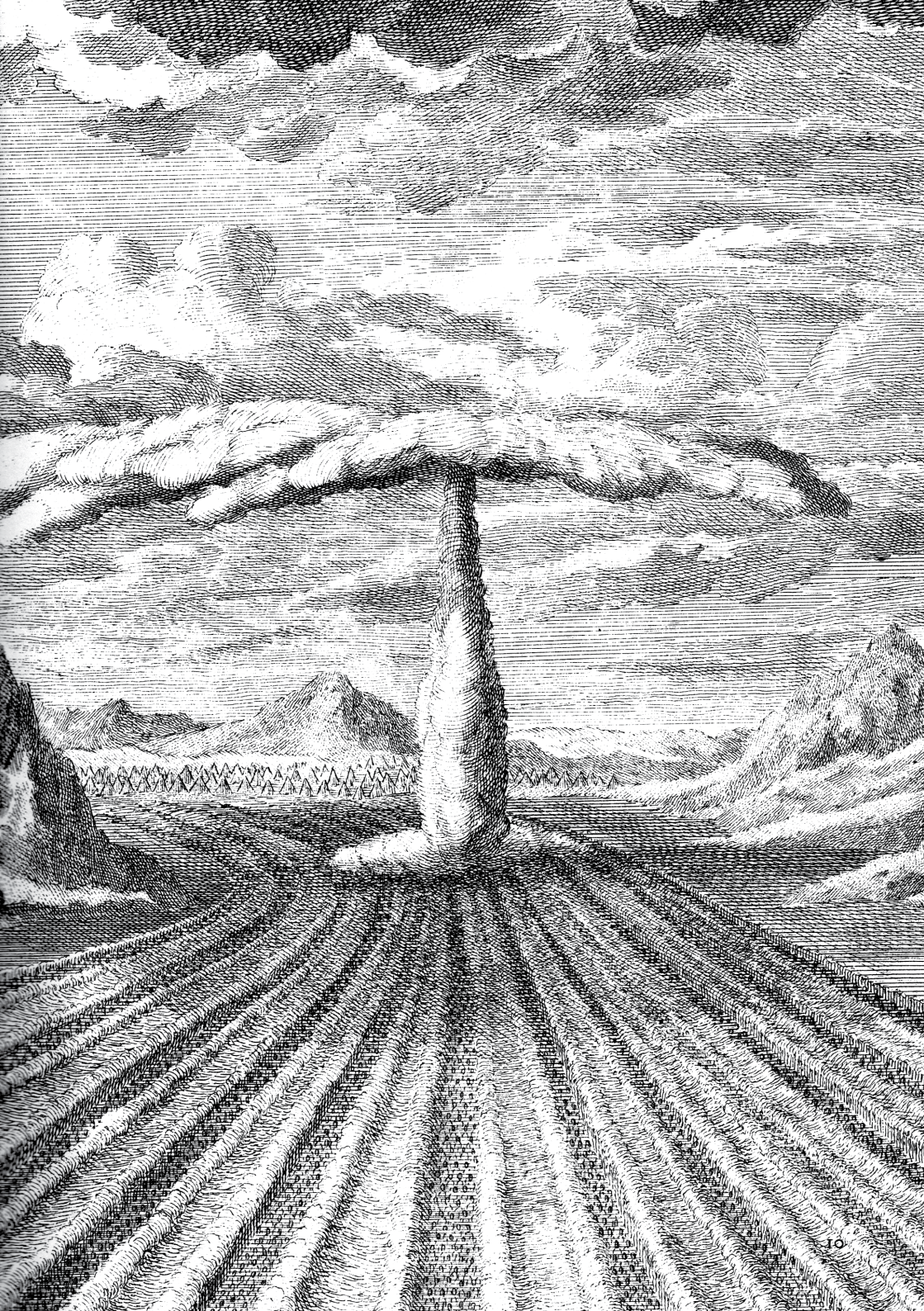
When the earth trembles, they hide in their shells, pretending to be inanimate, reacting like other animal species that, unable to flee or fight, simply freeze (see FREEZING p. 22). In the absence of terrestrial threats, they resume a quiet game of life to the tune of their own melodies.

In *RedSkyFalls*, the earthquake is an intrusion of the real world that makes the system come to a halt. The distinction between technical fault[8] and expressive reaction becomes unstable, and freezing reads ambiguously as either behavioural response or fatal error (see DEBUGGING p. 25). For however alive they might appear, the *Réplicas* are merely data-filled bodies, behavioural records, seismic feeds, and algorithmic temperaments, streams converging into hermetic conducts whose singular variability collapses under seismic tension.

Under close observation, we can learn to recognise, in the behaviour of these sentinels, the cues of underground disturbances that every so often erupt in their signifying world, just as on Earth, in the form of a green piercing call that forces everything into synchronicity. (Ana Baliza)



8. A fault in the system is often a bug's fault—a kind (of) digital life form, usually treated as noise, to be tracked down and excluded. Increasing accuracy implies the selective preservation of some information over another: for some, a process of extinction.



ONE/ELEVEN For decades, the American Telephone and Telegraph Company (AT&T) —familiarly known as 'Ma Bell'—championed a peculiar form of matriarchy. It controlled the entire chain of transmission that constituted the national communication system, from household phones and their wiring to a long-distance infrastructure of cables and switching centres. A small device, known as the *Hush-a-Phone*, was responsible for initiating the rupture of its network. Designed to allow for whispered conversations in crowded rooms, it fit over a telephone mouthpiece, challenging Ma Bell's ban on the attachment of parts from other companies. The resulting legal case eventually contributed to the end of the monopoly and the emergence of other network operators, which came to be known as 'Baby Bells'.

The existence of a centralized architecture led to the cooperation between AT&T and U.S. government agencies in 1968 and facilitated the implementation of 911, a national emergency number that would coincidentally become the moniker for the collapse of the World Trade Center, 33 years later. This number was the predecessor of later efforts across the Atlantic, such as the single European emergency number 112, developed in the early 90s and commemorated on the 11th of February as *European 112 Day*, or the UK National Health Service number 111, responding to urgent, yet non-emergent events.

Had it occurred some centuries later, the national emergency that took place in Portugal in 1755, on the 1st of November, would have probably been remembered as '1/11'. Often described as a truly global event—likely the first of its kind—the Lisbon earthquake is said to have marked *a before and after* in the explanation of natural phenomena, from religious beliefs and superstition to the embracing of rationality and science[1]. It should thus come as no surprise that the renowned tremor—its repercussions, both factual

1. The Lisbon tremor was not simply a catalyst of Enlightened Modernity. Rather, as Marie-Hélène Huet argues in *The Culture of Disaster*, it initiated an increasingly political conception of disasters, in a world that was as unresponsive to our administrative commands as it was to our prayers. The response to the earthquake included the deployment of an extensive *inquérito* (see SURVEY ON AN S WAVE pp. 16/17), a systematic questionnaire circulated across the kingdom to document damages, casualties, and local conditions. Often understood as a statistical device for administrative damage control, it also performed a subtler operation: redistributing responsibility. By translating it into an object of inquiry—through reports, measurements, and comparable accounts—the event was reframed as a natural disaster, rather than a direct expression of divine will. In doing so, it effectively distanced the king, who embodied both administrative authority and divinely sanctioned power, from any form of accountability.

and artefactual—was co-opted by Enlightenment advocates as a catalyst for this shift, and is indeed featured in their encyclopaedic project, published only a decade later.

The *Encyclopédie, ou Dictionnaire raisonné des sciences, des arts et des métiers* was a monumental work (with 35 volumes and 71 818 articles), 'put into order' by Denis Diderot and Jean le Rond d'Alembert between 1751 and 1772. Its ambitious aim, to organise and compile all human knowledge, required the recruitment of more than 150 contributors, among them philosophers, writers, artists, physicians and scientists. Proposing an indexical mode of reading based on the association of ideas, the encyclopedic undertaking bore the hopes of legitimising the ground of those who claimed to be in the know. Yet, as a forever incomplete and fragmented mix of equal parts rigour, precision and obsessive delirium, it demonstrated the impossibility of absolute knowledge—its founding contradiction.

Voltaire, a member of the *Encyclopédie*'s editorial team, is one of the authors whose work best conveys the impact of the earthquake on eighteenth-century arts and sciences. He told the tale of the seismic devastation of Lisbon only a year later in the *Poem on the Lisbon Disaster*, and in *Candide, or Optimism*, originally published in 1759. The arbitrariness of survival in major catastrophes led him to satirise the idea—defended by thinkers such as Leibniz and Pope—that natural disasters were a necessary force to upkeep what was already 'the best of all possible worlds'. Let us recall that Candide's story is a veritable procession of misfortunes that test the optimism instilled by his mentor Pangloss who, like Leibniz and Pope, believed that the greatest trials would correspond to a natural reordering of the universe where everything—including the red skies of Lisbon—would fall into place.

In *The Lisbon Disaster*, Voltaire opposed the optimist axiom 'all is well, and all is necessary' with the negative utopian apposition: 'God I respect, yet love the universe'. He argued against the religious interpretation of disastrous events as part of God's master plan, demonstrating that *not everything*—or indeed *nothing*—has to happen for a reason. In the light of the earthquake, God no longer signified hope or gave meaning to arbitrariness (a disenchantment Nietzsche would push to its limit in declaring Him dead in 1882).

Rousseau, also a contributor to the *Encyclopédie*, contested the doctrine of optimism, yet on different grounds. The suffering of Lisbon's inhabitants during the earthquake had nothing to do with God's will. For Rousseau, nature remained essentially good, or rather, inseparable from the divine itself. It was the urban environment created by man in His earthly realm that concentrated and amplified the disaster.

On 1 / 11 / 1755, an All Saints' Day that in Lisbon felt more like the Day of Judgement, as the first tremors struck, the kingdom's chief engineer, Manuel da Maia, rushed to Torre do Tombo to save the royal archives from destruction, sacrificing his personal library to the rubble. In the aftermath of the disaster, as chief adviser to the Marquis of Pombal, minister to the king, he ordered the construction of a temporary wooden structure to preserve Portugal's archival memory. He also helped define a project for the city's reconstruction based on his memory of the maps he had lost, drawing on the rational rebuild of London and Turin—a series of maps from memory.

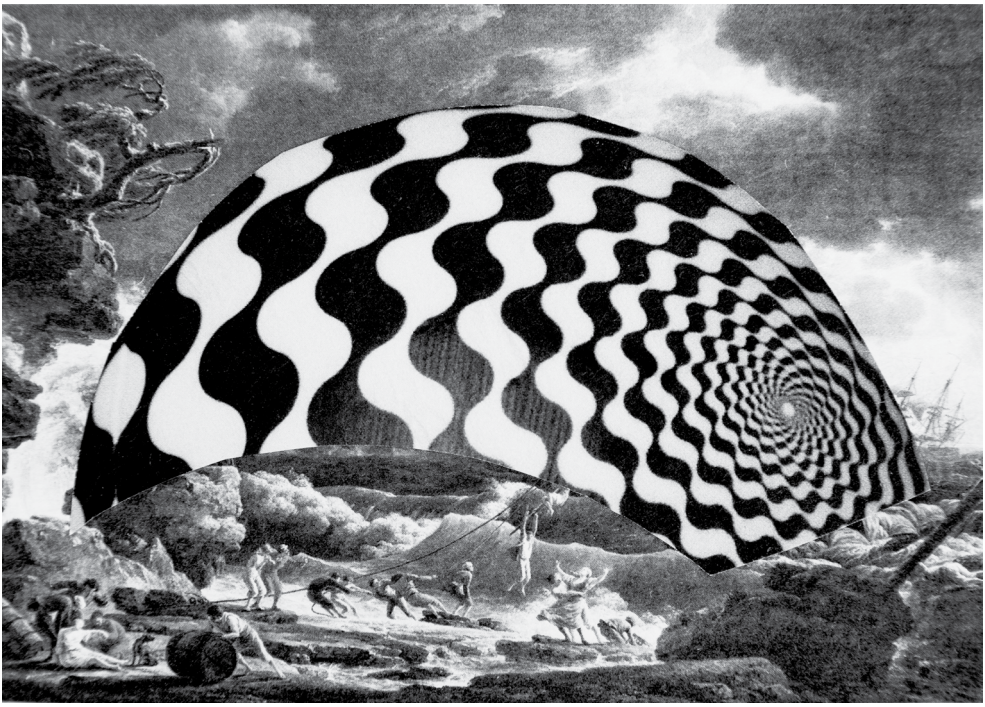
As Diderot writes in the entry for 'encyclopaedia', the *Encyclopédie* served the transmission and retention of memory, preserving the works that lend humanity its humanity. It functioned as a kind of insurance against time and future catastrophes, guaranteeing that the progress of the sciences and the arts would go on uninterrupted.

In more recent times, particularly within the field of Disaster Studies, the very existence of natural disasters has been contested as a problem of perception. In their 1976 essay, *Taking the Naturalness Out of Natural Disasters*, geographers Phil O'Keefe, Ken Westgate and Ben Wisner argued that what we call disasters are simply natural events that inflict significant humanitarian and financial damage: Without people, they write, 'there is no disaster.'

RedSkyFalls operates precisely within this space without people. Its relationship with seismic activity seems to be immediately associated with large-scale movements, such as that of 1755, that seem to establish *a before and after*. Yet, as a seismic reading system, it constructs a narrative of deliberate de-hierarchisation, shifting attention to the way in which terrestrial instability, largely imperceptible to us, is amplified by non-strident creatures acting as a medium for signal-material propagation.

In the *Encyclopédie*, the entry for 'tremblements de terre' both advances theories and gathers information—physical and chemical causes, almost alchemical in nature; effects and symptoms; memorable earthquakes, both real and mythical; and a detailed description of the Lisbon disaster. Written by Baron d'Holbach, for whom everything, including causality, could be reduced to the inevitable relations between matter in motion governed by the laws of nature, it suggests that the enigma of the earthquake lies in its transmission from one side of the globe to another. It was this force that animated the encyclopaedic enterprise of organising human knowledge: propagation—whether tacit, explicit, or tectonic. (Paloma Portela / Ricardo Nicolau)

Encyclopaedias concern themselves a great deal with words that have fallen into disuse, but never with words still unknown, which long to be spoken... Yet any encyclopaedia worthy of the name cannot concern itself with such realistic considerations. It has the duty to remedy so glaring a deficiency, and there is no doubt that its scientific value will be measured by the number of future words and expressions to which it devotes space. (excerpt from the entry 'encyclopédie', L' Encyclopédie *Da Costa*, 1947–49.)



SKYING In 1803, amateur pharmacist and meteorologist Luke Howard delivered a paper on clouds before one of London's many scientific societies. Until then, all clouds were considered singular and passing, but Howard saw them as a cloudy solution, waiting only to precipitate. Following the Hermetic axiom—*as above, so below*—he applied Linnaeus's botanical classification method to the skies, arranging clouds into three categories: *cirrus*, *cumulus*, and *stratus*. Cloud reading became, beyond a form of poetic interpretation, a means of weather forecasting.

Like Goethe, Constable was among the first to follow Howard's nomenclature, and in the summers of 1821 and 1822 he baptised the practice of looking skyward as 'skying' (not to be confused with 'skiing'). Armed with swift brushes and the finest oil pigments, he recorded celestial changes, making detailed notes on the date, time, wind direction, weather conditions, and cloud shapes on the back of the canvases.

A decade later, the young Frenchman Hercule Florence, artist and inventor, took to tropical *skying*. Arriving in Brazil in 1824, he joined a naturalist expedition as an illustrator. Over the 13 000 kilometres he travelled by river, he documented the flora and fauna of the Brazilian jungle, encountering on its riverbanks various indigenous peoples, such as the Bororo, the Munduruku, the Paresi, and the Apiaká, for whom *skying* was a routine practice, since out of cosmic responsibility they were accustomed to holding up the sky lest it fall. In 1829, as the expedition came to an end, Florence settled on the deforested horizon that would become Campinas and began the catalogue *Théâtre Pittoresque-Céleste*. He painted 34 meticulous watercolours, classifying each cloud according to its type, position in the sky, along with the place where it was seen, the date and hour. He wished to compile a sky catalogue, readily available for European city-dwelling landscape painters to copy, granting them access to the spectacular skies of the tropics. In this rigorous attempt to capture the clouds, he invented —based on chemistry advice from a teenage pharmacy apprentice—a pioneering process using silver and gold salts to print an image on paper, fixed in a urine bath.

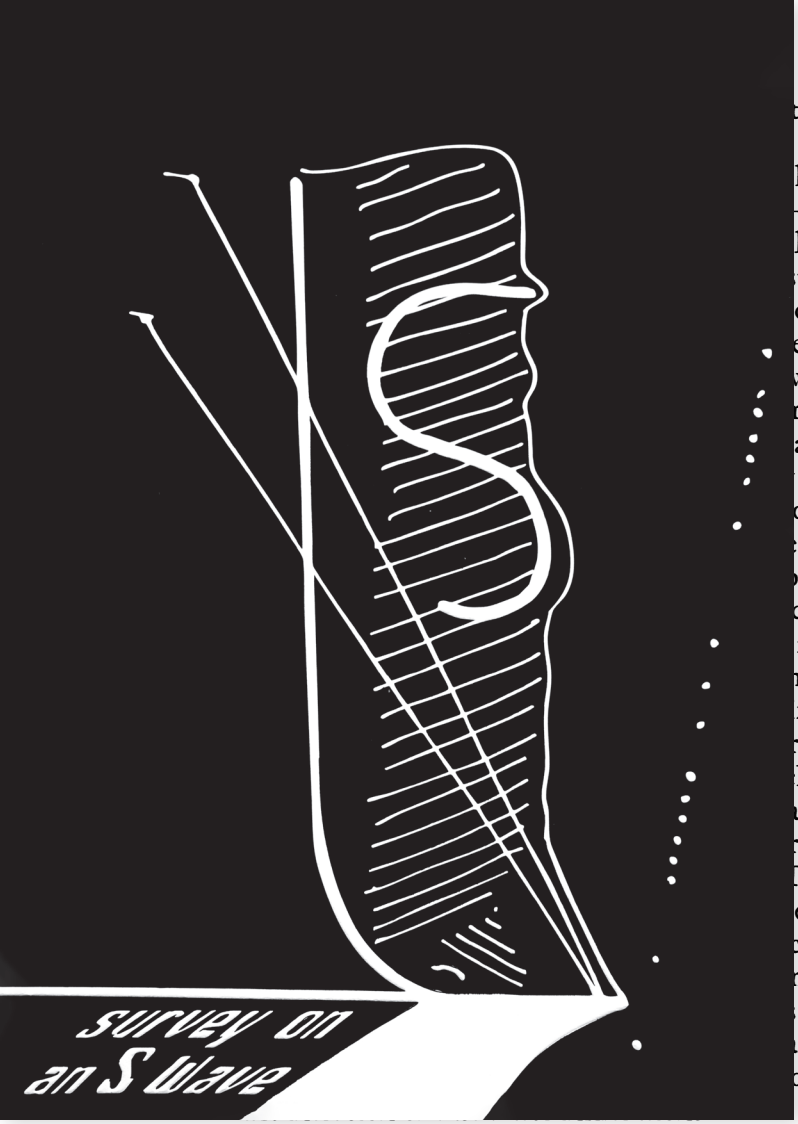
Although his *photographies* and notes predate Daguerre's first photographs, the fixing process did not stand the test of time.

All that remains of these landscapes are faded monochrome scraps of paper, what might have been leaden skies, and a series of sketches for apothecary labels.

There is a long tradition of interpreting signs from the sky as auguries—the erratic flight of birds, irregular shapes of clouds and strange colours seen at dusk have long been considered harbingers of ill fortune. In the red of the *cumulonimbus flammagenitus* clouds painted by Florence, one could glimpse the fires set in the Atlantic Forest, heralding an ecological disaster that persists to this day. Yet, in clear skies nothing is foretold—as on the morning of All Saints' Day, 1755, when beneath a pious, crystalline sky the earth opened in an abyss. At 9:45 am, the people of Lisbon fled land, fire and sea for the fields and hills surrounding the city.

The fields of Campo Grande and Campo de Santa Clara became refuge zones from an earthquake that reached *rés-vés* (just short of) *Campo de Ourique*, a rural plateau that the King's Minister wished to hand over to industry. Townspeople set up camp in the square outside the unfinished Santa Isabel church and, in an involuntary act of *skying*, watched helplessly as *pyrocumulus* clouds, blood-red from the burning of the old town, filled the sky. Sixteen years after the laying of its cornerstone, the church remained roofless. The earthquake further delayed the completion of the building, designed by the architect of fountains and aqueducts Carlos Mardel, consisting only of an altar in the epicentre of an encampment.

Two decades later, when the ceiling was finally completed, it was painted dark blue—perhaps in memory of those harsh nights under the open sky. Over the two centuries that followed, the blue gradually faded as time took its toll. Covered by cracks, salt efflorescence, soot, lichens, and mosses, an entire ecosystem of living organisms claimed the ceiling as its own. During the 1960s, in the Vatican winds of change, the church was renovated, *aggiornata* according to the directives of the Second Council. Modern administrative offices, residences, mortuary chapels and a cinema—the darling of moral propaganda—were annexed to the perimeter of the church, leaning against its unshakeable walls. Carried away by the fervour of restoration, the parish painted the church's sky a solid leaden grey—Pantone 17-1118 TPX—certainly bearing no intentional relation to the lead ceiling



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Survey on an S Wave
An Unstable Manifesto

We declare—with a crack, a rattle,
and a resonant
BRRRRMMMM—that
the foundations of thought must tremble, and with thought, everything else. We proclaim that the ground beneath what's known has never been stable. Stability is the creed of the immobile, and such faith we reject. We don't believe in much anyhow—being, as we are, scarcely credible, that is, somehow incredible. Yet if we were to accept anything at all, it would be this: art began not with the first hand upon a cave wall but with a crack—a ready-made fracture in stone, whose accidental outline suggested the bison, the pig, the palm-shaped shadow. No origin nor authorship, only replicas. Inexact forgeries of seismic sediment. A tectonic jolt we followed then and follow still. And still, to certainty we respond, indignantly, with the restless substratum: a latent fault murmuring beneath sense, a noise that almost shapes the words *we don't know*. Even so, this much we do affirm—and affirm we must: the earth moves—and we move with it.

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We recall that after the 1755 earthquake that shattered Lisbon on All Saints' Day, the prime minister and Enlightened despot Sebastião José de Carvalho e Melo (later an entitled Marquis of Pombal) dispatched 13 questions to every bishop in the kingdom: the *Inquérito*. We note its audacity. This document invoked neither divine fury nor metaphysical sentencing. Amid ruin, this grand gesture appeared—quietly, almost heretically: the groundwork for seismology inscribed itself as the fault slid from crown to crust, from court to core. Yet, the ground refuses obedience—and so we refuse it too. For all the growing pains of an expanding Earth and centuries of instruments and equations, no one has managed to foretell the occurrence of an earthquake at a precise place and time. And so attention wanders toward ionospheric flickers, electromagnetic whispers, radon sighs, red skies, worms rising, dogs pacing, fish unsettled, vapours thick with sulphur... signs or symptoms? We dare not say; chicken and egg sliding past one another in slip-stick behaviour.

Two centuries later we return to those questions —not to quiet them, but to strain their shape, side to side: a surge, a Survey on an S Wave. A Portable Seismic Archive. The questionnaire quivers again. Another tremor stirs. At long last, the speculative field of *RedSkyFallsology* is here—an uncertain science, stripped of utility, an anti-invention attending to the subtle oscillations between image, matter, and

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perception. We reopen the cracks. Rumours return. Proverb turned con-verb. Doubt moves among data, divination among diagrams, expert guesswork among amateur attention—daunted by the feeling of losing one's footing: the fairest way of facing facts when facts themselves falter. For we follow not the first, but the second wave—an S wave: shear, sideways, transverse—propagating through a cascade of shocks. In this spirit, we call forth a lightened otherness: not enlightened—no—but shifted, nonetheless, a rupture, capable of unsettling the bedrock of our sense-making—or at least shaking the pillars of the Serenissima itself.

"*Comment ne pas trembler?*" posed Jacques Derrida in one of his very last lectures. We answer as he did: it is inevitable! The tremor precedes us. And so we conclude in the buginning: for in the buginning was the woid, and in the muddle the sounddance—a crack, a rattle, and a resonant BRRRRMMMM.

Survey on an S Wave is a five-part programme curated by Marco Bene, conceived to expand Alexandre Estrela's installation, *RedSkyFalls*, at Portugal Pavilion in Biennale Arte 2026.
Commissioned and organised by REPÚBLICA PORTUGUESA CULTURA, JUVENTUDE E DESPORTO dgARTES DIREÇÃO-GERAL DAS ARTES.

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of the Venetian prison where Casanova is said to have felt the echoes of the Lisbon earthquake.

The venerable Santa Isabel stood below this heavy lid until 2009, when the three Appleton siblings—Vera, Vasco and João—proposed removing it. Vasco, a civil engineer, was following in his father's footsteps as a specialist in the restoration of pre- and post-Pombaline buildings. Vera, a curator, knew a handful of artists who could lighten up the ceiling. João, an architect, coordinated the new restoration. It was agreed that the mural would be entrusted to Michael Biberstein, a Swiss artist, master of the Alandroal and painter of large-format skies. Biberstein accepted, but on 5 May 2013, ready to take to the scaffolding, he suffered a stroke and died without having touched the 800 square meters of dome. Only the project remained—studies, collaborators' accounts, the memory of an intention. With this phantom material, a Madrid-based company of authorised forgers specialising in reproducing masterpieces, Factum Arte, took on the task of replicating the action-painting technique that the artist used to execute in a circular dance.

Over roughly four months, a team of four painters with Spanish accents pitched camp inside the church and diligently covered the ceiling with aqueous aerosols, creating a blurred aurora in yellowish-blue tones—an atmosphere achieved through successive acrylic glazes that recalls Turner's 'blind' period. The vault of frozen clouds replaced the sky in a life-scale tautology, featuring a type of cloud yet to be catalogued: a translucent *altostratus*, somewhere between an Alpine fog and the Alentejo morning haze. As with Daguerre's great dioramas, the firmament of Santa Isabel became a colossal screen for *skying*, animated by the passage of time, the sweeping of sunlight, or even the intrusion of vast water infiltrations.

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California's Sonoma region. The beautiful hill hides a vineyard ravaged by a phylloxera plague and a cloud of grey dust rising from the fall of the Twin Towers on the East Coast. In 2013, Apple added the final touch to *landscape decor for every budget*, publishing a catalogue of picture-perfect natural settings as desktop backgrounds. Much like Florence's stock images, these horizons free from human interference catapulted the user to remote places, dispensing with the experience of the journey altogether.

Years later, 230 000 tonnes of Apple computers would project onto every desk in the world a digital image illuminated by an obscene amount of electrical energy. On the borders of the territory of the Kootzaduka'a peoples, eaters of fly larvae from a hypersaline lake, trapped in the light of the screen, one could see the blood-red peak of the High Sierra. (Alexandre Estrela)

NOTE Since the pandemic year of 2020, the cinema at Santa Isabel Church has been occupied by farO, projecting countless landscapes onto its ten-meter screen. The programme is sustained by a group of artists and moving image amateurs unbothered by the discomfort of a raised hip while watching a screen from a sloped floor, or by the chance appearance of the landscape on an old Mac desktop, glimpsed as windows open and close between videos.

At the very edge where the *1755* earthquake came to a halt, in a humid environment separated from Biberstein's sky by a wall, the *RedSkyFalls* ecosystem took shape. It was developed in an almost laboratory-like secrecy, along with its six small digital chimeras that sense the tremors of the earth.

On Wednesday, 18 March 2026, at 11 am, guests gathered in this space for the official announcement of *RedSkyFalls*, the work to be presented by Portugal at the 61st International Art Exhibition–La Biennale di Venezia.

At the state-mandated press conference, a sample of the red-sky diorama was shown, in half-light. The system had been recalibrated for greater seismic sensitivity, in order to capture even lower subterranean vibrations and to respond, loud and clear, to the tremors felt in territories under military attack, whenever the sky fell upon them. At 11:33 am, halfway through one of the speeches, the first tremor occurred with a blasting sound. The audience jumped in fright, but with lightness and grace, the speaker made a joke. At 12 pm, smiles faded as three aftershocks of magnitude *5.5*, along a fault near Mauritius Islands, released in the cinema another thunderous blow, rendering the remainder of the conference almost inaudible and impracticable. With the amplification of these tremors, originating in distant lands and seas, the mechanics of empathy were being tested, in a premonitory act of what would later unfold under the *Serenissima*'s sky.

EMPATHY The word 'empathy' derives from Ancient Greek 'εμπάθεια' (*empátheia*), which is composed of *en-*, 'inside', and *pathos*, 'suffering or feeling.' The term has its German genealogical root in *Einfühlung* attributed to Robert Vischer as the distinctive, difficult-to-capture sentiment experienced before an artwork.[1] The notion, however, was already present in the writing of his father, Friedrich Theodor Vischer, who introduced the verb *einfühlen* into his aesthetics of architecture, making its apparently inert structures become readable through a projection of lived bodily dynamics. *Einfühlung* was a technology of the body long before it was a concept of the mind. The 'feeling into' it describes, more than just a resonance, is an act of displacement: a migration of one's own bodily sense of self into another body, space, or thing. For Vischer, this movement is not a mere metaphor. 'Feeling into' is a bodily *Versetzung* (displacement): a self that moves into a foreign corporeal situation. In this operation, the viewer's body functions as a prototype that can be reconfigured. *Einfühlung* can extend to animals, plants, inanimate objects, and architectural structures. It undermines a strict division between sentient and non-sentient, suggesting instead a continuum of possible transmutations.

Einfühlung emerges when philosophical aesthetics and nascent psychology begin to contaminate one another and continues nowadays to bear the residue of this mixed genealogy*. It is neither purely a theory of art nor simply a mechanism of the psyche; it is a crossing point where speculation on form, feeling, and perception merges with inquiries into cognitive processes, the regulation of affect, and social interaction. Any attempt to track *Einfühlung* today must remain in this in-between space.

A century after its debut appearance, Harun Farocki reopened this genealogy from within moving-image culture. In a brief 2008 text titled 'Einfühlung', he writes that '*empathy* is too good a word to leave to the opponent', insisting that it cannot be reduced to the psychological notion of identification but must be linked to *alienation* and dis-identification. The German word *Einfühlen*, Farocki notes, 'has a transgressive overtone',

1. Robert Vischer, *et al.*, (translation from the original German), *On the Optical Sense of Form: A Contribution to Aesthetics, in Empathy, Form, and Space: Problems in German Aesthetics, 1873–1893* (Texts and Documents Series), Santa Monica, CA: Getty Center for the History of Art, 1993.

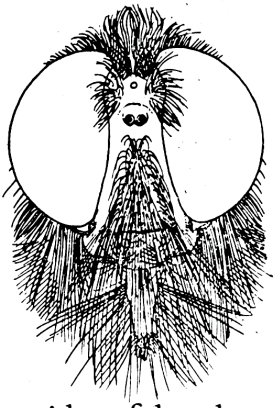
* Vischer's *Einfühlung* ('feeling into' shapes and objects) was reinterpreted by Theodor Lipps as a psychological projection of the subject's own feelings into objects, phenomena, and other people, reinforcing the framing of the concept within psychology as opposed to aesthetics. It was later translated by British psychologist Edward Titchener as 'empathy'.

because it is a 'compound of *Eindringen* (to penetrate) and *Mitfühlen* (to sympathize).' 'It should be possible', he concludes, 'to empathize in such a way that it produces the effect of alienation.'[2] This program rejects the contemporary tyranny of empathy as commiseration, clearly recalling the *Verfremdungseffekt* (the *distancing* or *alienation* effect) used in Bertolt Brecht's theatre, which aimed to break the link between the spectator and their identification with the hero of the play, shocking them out of their uncritical absorption in entertainment. Through alienation, spectators could participate in the construction of meaning, possibly even becoming able to distinguish between 'ideological' and 'actual' reality—the social relations that shape their lives. A pedagogy of shock would interrupt the montage of the present, in which events are apparently connected by a causal chain, to reveal that the chain is already broken, and the transmission is fragmented. Against the montage that concatenates facts and opinions, empathy here names a lacunary practice: a series of ordinary abysses into which we fall when we are touched by what we are not—by others.

There is, in fact, an interval at work in every empathic relation, an unbridgeable abyss that nevertheless makes one person or one image stand close to another, just like the space between two frames in film. Consider montage: when you make a film, if what places one image next to another—before, or after—is not a causal relation, what kind of relation is it? Magnetic? Sexual? Contractual? We can provisionally call this relation *empathic*, insofar as it transposes one into the other, and in transmission it does not fill the gap between the images; it becomes gap and interval itself, a zone of indeterminacy between past and future, a contested zone.

For centuries, we have lived in a universe of fixed stars: a collection of disparate elements connected within an experimental procedure that gathers and compares data, which, once statistically combined, yields results organised by causes and effects. However, empathy resembles an oracular formula more than a causal link, because an unknown question is followed by an incomprehensible answer. Here lies the difference in the alienating relationship we are trying to configure between the human and the thing, between the plant and the star: between them, unlike phenomena in a scientific experiment, one does not know what has happened. (Giovanbattista Tusa)

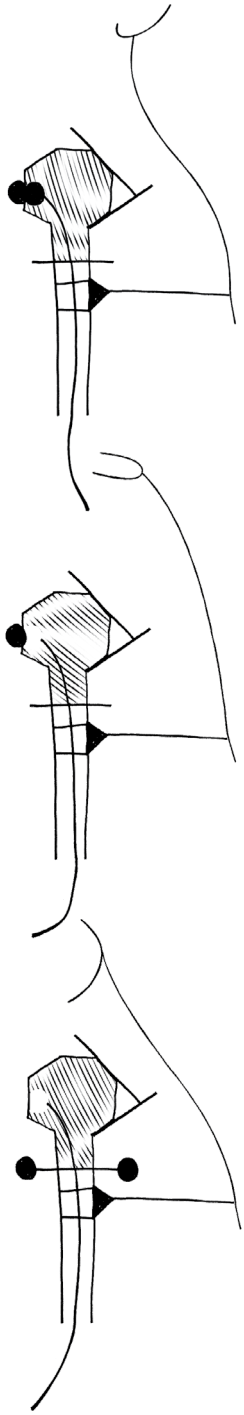
2. Harun Farocki, 'Einfühlen', *100 Jahre Hebbel-Theater: Angewandtes Theaterlexikon nach Gustav Freytag*, Berlin: Hebbel-theatre, 2008, pp. 21–22.



FREEZING Freezing is a defensive response that is defined by complete immobility in the face of a threat. Akin to a behavioural camouflage, it is thought to have evolved to avert detection by predators that often rely on motion cues to detect their prey. This behaviour is one of three broad categories of defensive strategies, the other two being escape, to increase the distance to the predator or to find shelter in a refuge; and fight, when neither of the other options succeed. From invertebrates, such as crabs and flies, to vertebrates, like fish and birds, all the way to mammals including humans, animals select between these strategies based on threat imminence[1], contextual affordances (such as the existence of a nearby shelter[2]) and their internal state (such as being hungry[3], in which case they may accept the risk of predation in order to get food).

Freezing is often described as a state of high alertness during complete stillness in which even the heart slows down, to spare energy and ready the animal for its next move. It is thus often seen as a passive defensive response associated with maladaptive stress coping, at the root of various forms of psychopathology. However, there is ample evidence that freezing is actively maintained[4]. During freezing, there is sustained activity in multiple brain regions—including higher order areas such as the prefrontal cortex—and increased excitability of motor outputs, attention to motion cues at the periphery of the visual fields, and energy consumption. It is a tightly regulated dynamic state during which animals gather environmental information regarding safety, with transitions into and out of freezing being regulated according to the distance to a threat, existence of shelter or presence of others. Such state of high alertness and sustained preparation for movement is at odds with an idea of passiveness.

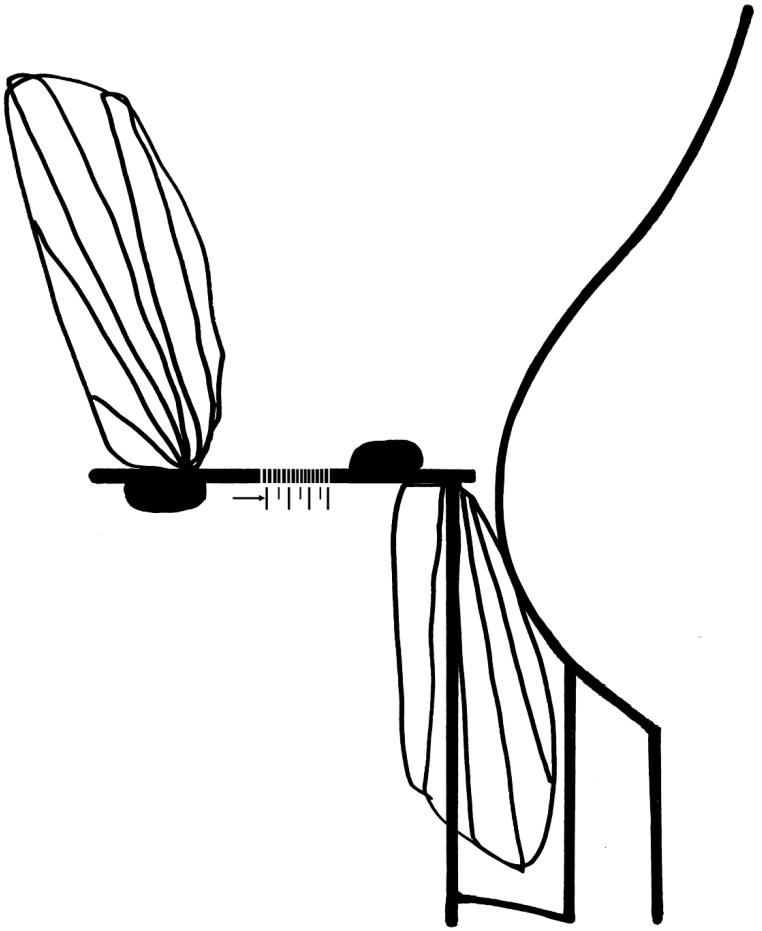
Now, often people describe an inability to move while freezing, a feeling of being blocked. One study reports that when rats are faced with a cued threat they can escape, most of them first freeze in response to the threat-predicting cue and later learn to suppress freezing, quickly fleeing upon cue presentation[5].



Although most rats efficiently avoided the threat, some remained frozen, unable to escape, as if blocked in place. Silencing the amygdala, a region of the brain involved in the expression of learned freezing, released these animals from the frozen state, allowing them to immediately escape the threat. These rats knew how to escape, but were prevented from doing so by activity in the amygdala. In this case, freezing is inflexible, a maladaptive strategy whereby animals fail to adequately adjust to a threatening environment. This seems to suggest that there are various forms of freezing, inflexible and maladaptive ones included. Much research will be required to characterise the various forms of defensive immobility, when they are adaptive and when they might become pathological.

Freezing, in its various forms, introduces a temporal gap in ongoing motion, a hopeful suspension of threat, during which animals assess and define their next, unpredictable, move. (Marta Moita)

1. Fanselow, 'Neural organization of the defensive behavior system responsible for fear', *Psychonomic Bulletin & Review*, 1, 1994, pp. 429–438.
2. Vale, Evans, Branco, 'Rapid spatial learning controls instinctive defensive behavior in mice', *Current Biology*, 27(9), 2017, pp. 1342–1349.
3. Comeras, Herzog, Tasan, 'Neuropeptides at the crossroad of fear and hunger: a special focus on neuropeptide Y', *Annals of the New York Academy of Sciences*, 1455, 2019, pp. 59–80.
4. Roelofs, Dayan, 'Freezing revisited: coordinated autonomic and central optimization of threat coping', *Nature Reviews Neuroscience*, 23, 2022, pp. 568–580.
5. Lázaro-Muñoz, LeDoux, Cain, 'Sidman instrumental avoidance initially depends on lateral and basal amygdala and is constrained by central amygdala-mediated Pavlovian processes', *Biological Psychiatry*, 67(12), 2010, pp. 1120–1127.



DEBUGGING In computer science, *debugging* is referred to as the process of finding and resolving defects that prevent the correct operation of a system. The term was popularized in 1947, after computer pioneer Grace Hopper removed a moth found stuck in Relay #70, Panel F of the *Mark II Aiken Calculator* at Harvard University, restoring its intended functionality.

In conventional software engineering, debugging aims to ensure that a system's functionality remains deterministic; for a given input, you obtain a corresponding, predictable output. In *RedSkyFalls*, this is not quite the case. Each of its units hosts a range of data sources, from the mating songs of flies to a live feed of earthquakes all over the world. The intent is not to draw conclusions from the relationships between these inputs, but to have them inhabit already complex systems that never quite react in the same way, influencing but not determining the way they behave. The process of engineering these units consisted largely in finding and removing 'bugs'. The bugs discarded were the ones preventing the system from acting in its most expressive way, so unexpected emergent behaviours could take over. As a mere coincidence, the majority of these units resemble bugs, and feed off the data of other real-life bugs in an attempt to instil in them a vital force or agency beyond calculated intention.

In computing, bugs occur because of faults within software code. Curiously enough, the underlying geological cause of earthquakes is also known as a 'fault'. This term comes from the Latin *fallere*, to deceive. We are deceived into thinking we stand on firm ground, while tension builds between geological faults, awaiting imminent release. Faults in software are also deceiving. In a program that appears to function normally, a potentially show-stopping error lies dormant.

In *RedSkyFalls*, when a fault releases its tension somewhere in the world, the internal processes of its bugs (the *Réplicas*) freeze, reminiscent of a sudden system crash. Actor-Network Theory, or 'ANT', a theoretical framework which refuses to distinguish between human and non-human actors, offers two relevant propositions. First: any sufficiently stable system becomes a black box, its complexity rendered invisible to those who interact with it. While a common observer may see moving drawings, a debugger sees the cemetery of errors necessary to make the movement possible. Second: no actor in a network holds ontological priority over another. In *RedSkyFalls* a fly's mating song and a continental rupture both enter the system as data; neither is treated as noise. (Ian Duclos)





RedSkyFalls
Alexandre Estrela

Portugal Pavilion
Fondaco Marcello, Venezia
09.05–22.11.2026

Curated by
Ana Baliza | Ricardo Nicolau

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09.05–22.11.2026

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Rui Almeida
Seismic response system
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Gaia Menegoni, Roberto Menegoni and family
Alexander Meurice
Marta Mestre
Microclima / Cinema Galleggiante
Marta Moita
Miguel Nabinho
Nadie Nunca Nada No
João Nunes
Mike Orger
Silvia Ortiz
Gonçalo Pena
José Miguel Pinto
Nuno Pinto
André Príncipe
Alexandre Rendeiro
Javier Ripoll
Ricardo Rodrigues
Paolo Rosso
Baldassarre Ruspoli
Saint Emygdius
João Simões
Paulo T. Silva
António Soares
Vasco Stocker Vilhena
Juli Susin
Giovanbattista Tusa
Maria Ventura
Philipe Vergne
Mercedes Vilardell
Caroline Widmer
Bruno Zhu
Christian Xatrec

The team, for making the impossible seem merely difficult

And the biosentinels
Pancho
Coco
Michkin
Diadorim
Lefty
Taco
Zine
Puma
Chita
Eco
Kikas

This publication accompanies *RedSkyFalls*, Alexandre Estrela's installation presented at Portugal Pavilion in Biennale Arte 2026

Editing and graphic design by Ana Baliza
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All the events in this programme respond in real time to the temporal pulse of global seismic activity, being triggered, interrupted or modulated over the course of their duration.

RedSkyFalls by Alexandre Estrela is the Portuguese representation at the 61st International Art Exhibition–La Biennale di Venezia, for which Ana Baliza and Ricardo Nicolau were both appointed as curators. The exhibition is on view at the Fondaco Marcello (from the Arabic *funduq*), a former warehouse on the Grand Canal historically associated with the trade of tobacco and silk.

Over seven months, the installation is further expanded through *Survey on an S Wave*, organised by Marco Bene, a programme of talks, concerts, happenings and screenings in resonant dialogue with the piece. With a Portable Seismic Archive, Bene introduces other works and artists through performative visits, opening and bridging gaps in *RedSkyFalls*.

Seismic energy connects the installation in Venice to a network of *Réplicas* installed in seismically active locations, where they tend to respond in synchrony in synchrony with the physical experience of a tremor. The Wattis Institute, San Francisco; REDCAT, Los Angeles; Museo de Arte de Lima; MUAC–UNAM, Mexico City; and Galeria Zé dos Bois, Lisbon, each host the presentation of a *Réplica* that reacts to the planet's seismic activity in real time.

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