

the song of the earth

Tabacalera Promoción del Arte
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Eva Lootz

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Exhibition

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FROM ECO— LOGY TO ECO— SOPHY

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Chantal Maillard

There is no need to mention justice where injustice doesn't exist, nor tolerance where there is mutual respect. Nor would it be necessary to speak of ecology if it weren't for the need to defend an eco-system in peril. Yet, is ecology the answer to the problem? Whether we like it or not, the term «ecology» defines us. It is the result of an anthropocentric concept that distinguishes between human beings and sets us apart from the rest of the planet. Kitarô Nishida's critical reflection on the ethics of human rights could be extrapolated to ecology: such ethics, he said, are incapable of definitively solving the problems of the world because they form part of a dichotomic understanding whereas the problems between human beings must be resolved through vacuity, that makes it possible to understand each other from the same.

The protection of nature, children and animals is the paternalistic expression of a tradition rooted in the control and domination of the environment, based on the Biblical idea that the earth is at the service of «man». Taking a leaf out of Raimundo Panikkar's book we should speak not of eco-logy but of eco-sophy. Rather than dominating and protecting, we should return to feeling, hearing, smelling and even understanding by smelling, knowing by feeling. Smell the grass and walk on it the way a temple is walked on in the East: barefoot. Return to *oikos*: the house, the most common. *Oikosophy*: wisdom about the house, the habitat, which is not what we possess but what we form part of. *Sofia* instead of *logos*: wisdom rather than learning, integration rather than discourse. Intuitive wisdom from the common root, in which others, the other, is understood in likeness.

Conscious wisdom, not understanding; from the moist depths, not from the dryness of the mind. Wisdom of *oikos*: ecosophy.

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**the
song
of the
earth**

***The Song of the Earth* is a glance at the current state of the planet; recounted through copper, salt, water and electricity.**

The echo of a music composed slightly over a century ago reverberates in the title, the symphony of the same name by Gustav Mahler, for which the composer was inspired by a series of works by Chinese poets such as Li Tai-Po or Wang Wei, all masters of what current-day, young sociologists would term “luxurious poverty”.

This exhibition is intrinsically linked to an early intuition, that more or less coincides with my early years in Spain in which a first trip to Riotinto played a central role as it reaffirmed my suspicion that the earth’s elements and their properties precede ideas as the orchestrators of human destinies, that is, it is the materials that “make up the world” and prefigure the history of mankind, as the earth always comes first and humans second; we are a late species that needs to adapt and indeed does adapt to what it finds on earth.

Over time I’ve come to understand that the world view, as conveyed by history is plagued with blind spots and the fact that some parts are never seen as they lack words has always caught my attention.

I believe that the female artists of my generation, by rejecting the models society had prepared for us to identify with, have been pushed towards atypical and marginal territories, like for instance

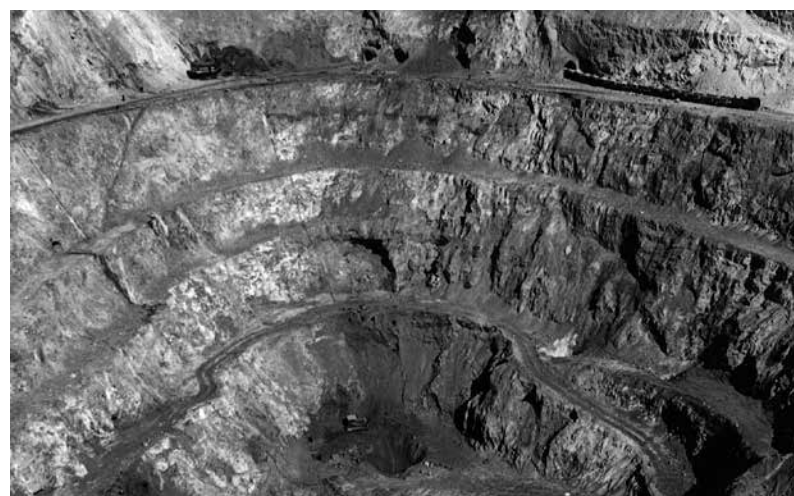
Hannah Darboven, whom herself confessed that instead of reading novels, she developed a penchant for maths books, Elena Asins for algorithms before anyone else and Esther Ferrer for the freedom of poking fun at the traditional art offered to her by Zaj.

In my case, it was those “other” cultures studied in anthropology that have fascinated me since adolescence. Ever since that conference on pygmies that my mother took me to, my enthusiastic reaction to which led her to register me with the Friends of Ethnology Society; I was thirteen or fourteen back then...

From that moment on I never missed a single one of the conferences given by ethnologists returning from their exploration trips in the splendid hall of the Imperial Palace given over to the Museum of Ethnology where, by the way, Moctezuma’s headdress is kept, resting discreetly in one of the display cases back then, whereas nowadays it has its very own sort of chapel, a place of pilgrimage for all Mexicans passing through Vienna.

It could be said that anthropology (and the ethnology museums bear witness to this) was invented to create a dividing line between the civilised, what is “ours” and the “other”, the “primitive”, to thus highlight the fact that it is “us” who handle the discourse, relegating the others to passive objects; but for the women who were, to put it one way,

«... wasn’t it rather an escape route that was being created to get away in “our” own way to undertake a line of complicity with the “other”?»



Mines of Riotinto, Corta Atalaya, partial view (undated). Photographic collection Compañía Río Tinto

Corta Atalaya, undated. Archivo Histórico Provincial de Huelva

> Detail of Corta Atalaya, Riotinto (Huelva). May 2014. © Foto E.L.



“second-class citizens” and only marginally formed part of that “us” wasn’t it rather an escape route that was being created to get away in “our” own way and undertake a route of complicity with the “other”?

Cases like that of Margaret Mead the great anthropologist who married a tribal chief provide food for thought.

In any case, as an adolescent I was more interested in fox hunting in the Mongolian grassland, in how Eskimo canoes were built or the songs of the Nambikwara than the adult conversations that surrounded me or the society dances I was obliged to attend.

So why didn’t I go on to become an anthropologist? Because of an innate wish to make.

But to make in a way that had nothing to do with the demands *to produce*.

And above all: I didn’t want to acquire academic knowledge or become an expert in the classifications of the so-called “savages”, but rather I wanted *to make* in a “savage” way and there was a certain element of violence and rejection of tradition in it.

To make each thing’s potential blossom, which required meticulous observation, exactly as the so-called “primitives” did, so at a given point I must have decided that I was my very own “savage”...

In my case, given how dubious and tangled the subjectivity of the day was and how problematic the governing metaphysics, I grabbed onto the properties of matter: that salt attracts water, that heat melts wax, that mercury amalgamates gold are unquestionable facts independent of any interpretation.

Hence, my first work reflects an attention to the processes, the works are the result of rudimentary manipulations, a catalogue of verbs that denote “making” prevails: to cut, to fold, to stick, to wet, to tie, to crease, to pull, to melt, to assemble.

Naturally, this converged with a certain art trend at the end of the sixties, that of recording the traces left, the indexing of art, along with the glorious liberation thanks to John Cage, Mauricio Kagel or Marcel Duchamp of being able to make art out of anything, of not having to be able to draw apples or nudes.

But that was in the early seventies and a long time has gone by since then.

In this exhibition, three decisive matters and one invention that is the consequence of them are at play:

Copper, salt, water and electricity

Nobody currently questions the fact that fossil fuels are the strategic resource par excellence, and that the purpose of modern-day wars is to ensure access to and ownership of oil as a limited resource that is running out ...

But water and copper are hot on its heels in terms of future strategic importance.

And salt, the beauty of its crystals aside, reveals relevant aspects of the past, showing up certain pillars of what continues to constitute us as a society even today.



Detail of copper cables

> *Mundo, Seco, Benamor, Amarga, Sala Verónicas, Murcia, 2009.*
© Foto Javier Salinas



Salt, that fire in the wound

Salt not only provides the origin of the word salary, the beginnings of remunerated employment, the creation of monopolies, the payment of taxes, but also changes as radical as those caused by the French Revolution or Indian Independence process, in which protests against the salt tax were a triggering and fundamental factor.

Additionally, the invention of the *salary* had a considerable effect on women's lives.

As Silvia Federici indicates in her book *Caliban and the witch*¹, the introduction of paid work gave rise to the sexual division of employment while at the same time, to a certain extent, laying the foundations for the development of capitalism.

From that point on, those men not in possession of lands sold their physical strength to work and women were dedicated to procreation.

Thus work was distributed between production and re-production. There was the salary and the no-salary. Women were left on the side of no-remuneration and later on, with capitalism at its peak, apart from the profits generated by slavery in the colonies, wives worked for free and the rest of the women, whether as servants or prostitutes, were forced to remain in the cheap labour sector, thus increasing the employer's, the boss's profit, as he was the owner of the means of production.

In subsistence economies this division of labour categories does not exist.

Might this be why the pressure currently brought to bear on the few native communities, also known as indigenous, governed by a subsistence economy in harmony with the earth is so brutal and implacable?

But let's have a look at a different aspect.

At one point or another, we have almost all enjoyed the splendour of the Venetian palaces, the Titians, the Tintoretos, the Tiepolos and we have paused to admire the mysterious patina of their mirrors, but few know the origin of the power and wealth of the Most Serene Republic of Venice, Queen of the Adriatic.

Salt is the origin.

At the end of the day, it came down to a handful of terrified people who took refuge from the Barbarian invasion in a lagoon and a string of islands along the coast. Surrounded by seawater on all sides, they decided to take advantage of the salt. They used to trade it with their neighbours on dry land and over time it became a prosperous business, they eliminated any possible rivals and took over the Veneto region and the entire Po Valley. They soon realised that to put a stop to the competition and maintain their monopoly they would need a militant branch.

And so little by little they became a military power, going so far as to control the entire spice trade and dominate the Eastern Mediterranean.

**with that taste
it should be red
with that colour
it should be dull**

**yet
white and ardent
is salt**

**the one
as much as the other
is salt**

**that is:
pure
contradiction
pure
contravention
and always
pure**

**delirious synaesthesia
defiance of the predictable**

**that is:
reality**

**The salt poem
José María Parreño**

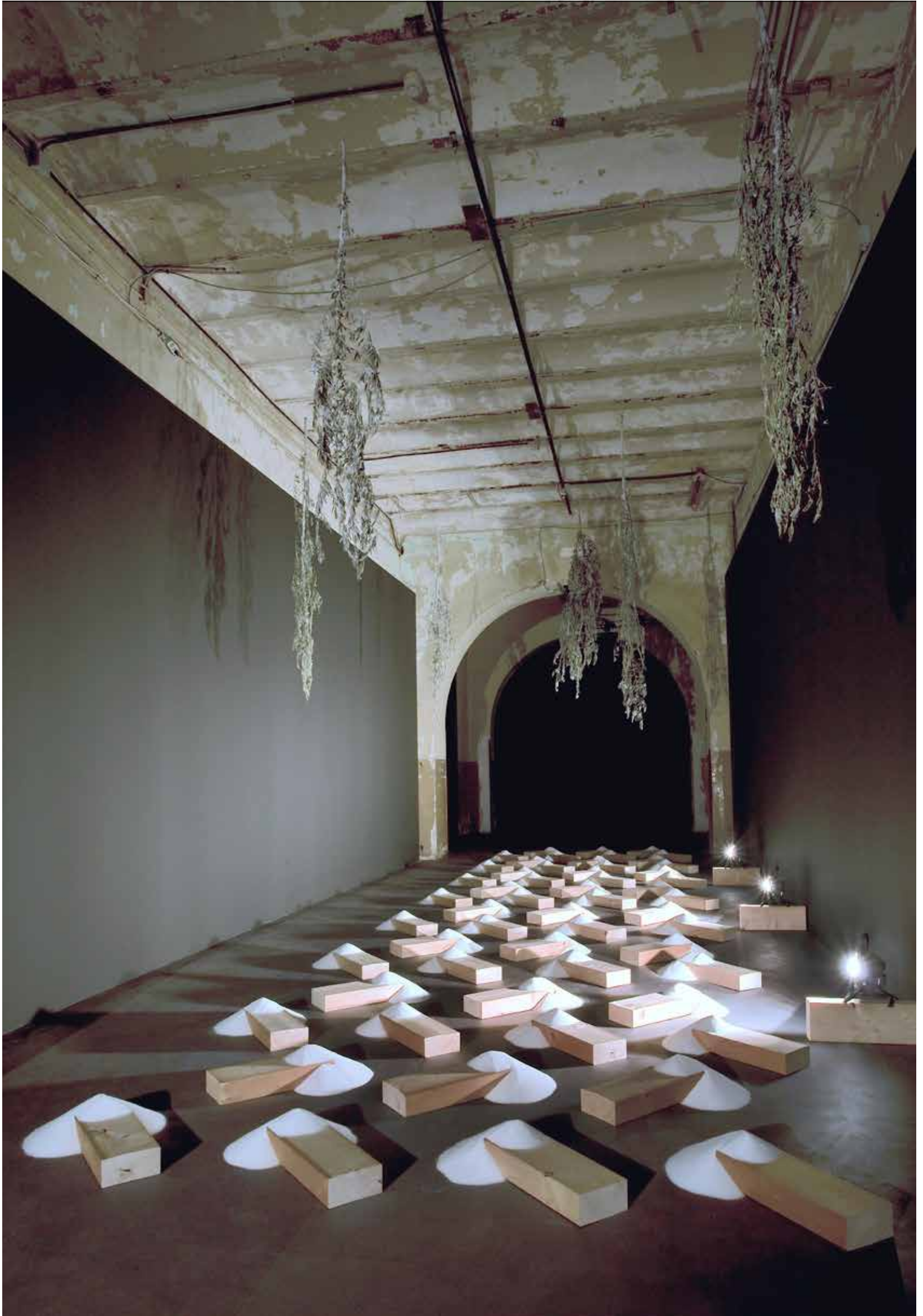


¹— Silvia Federici: *Calibán y las brujas. Mujeres, cuerpos y acumulación originaria*. Traficantes de sueños. 2004

Salario, installation in Sa Nostra, Formentera, 2004.
© Foto Pins Formentera

> *Salario*, installation in Tabacalera, 2016.
© Foto M.B.

>> *Salario*, installation in Sa Nostra, Formentera, 2004.
© Foto Pins Formentera







The Venetians were the ones to make salt exploitation and trade an economic model, and with the invention of the salt tax or duty, they created an adopted model for the rest of the European countries, where it became a Royal monopoly, from the XIII century on. As Pierre Lázsló² says: the salt trade was the model on which the economic history of Europe would be built over the next three or four centuries. Hence, the salt duty provides the predecessor for both our direct and indirect taxes.

And, as I have already mentioned, the corruption and inequalities of the tax collection system in the former French regime, this hated levy, was one of the triggers of the French Revolution and was the first to be abolished on its triumph.

It is equally important to remember in this place the famous “salt march” undertaken by Gandhi, when surrounded by his followers and undertaking a 400 km march on foot, he walked up to the sea’s edge to pick up a handful of salt, product of the seawater evaporation, thus breaching the prohibition imposed by the English that condemned the population to buy salt from them at an exorbitant price, finally leading, after much give and take, to the declaration of India’s independence in 1947.

Salt is present in the exhibition in a series of photos taken in 1984 in the salt lakes of Torrevieja and through the piece “Salario”.



«... the salt trade was the model on which the economic history of Europe would be built over the next three or four centuries »

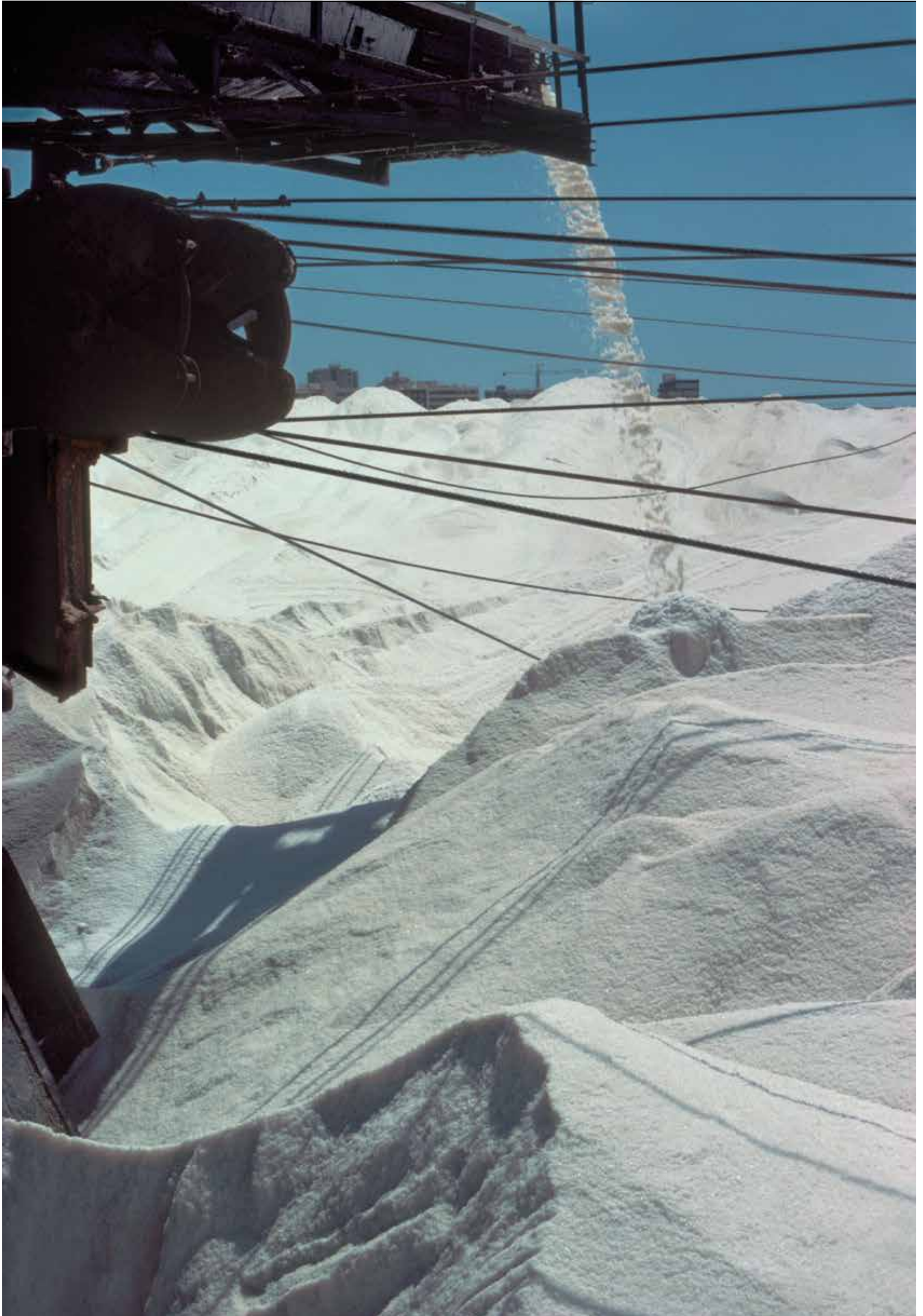
salt

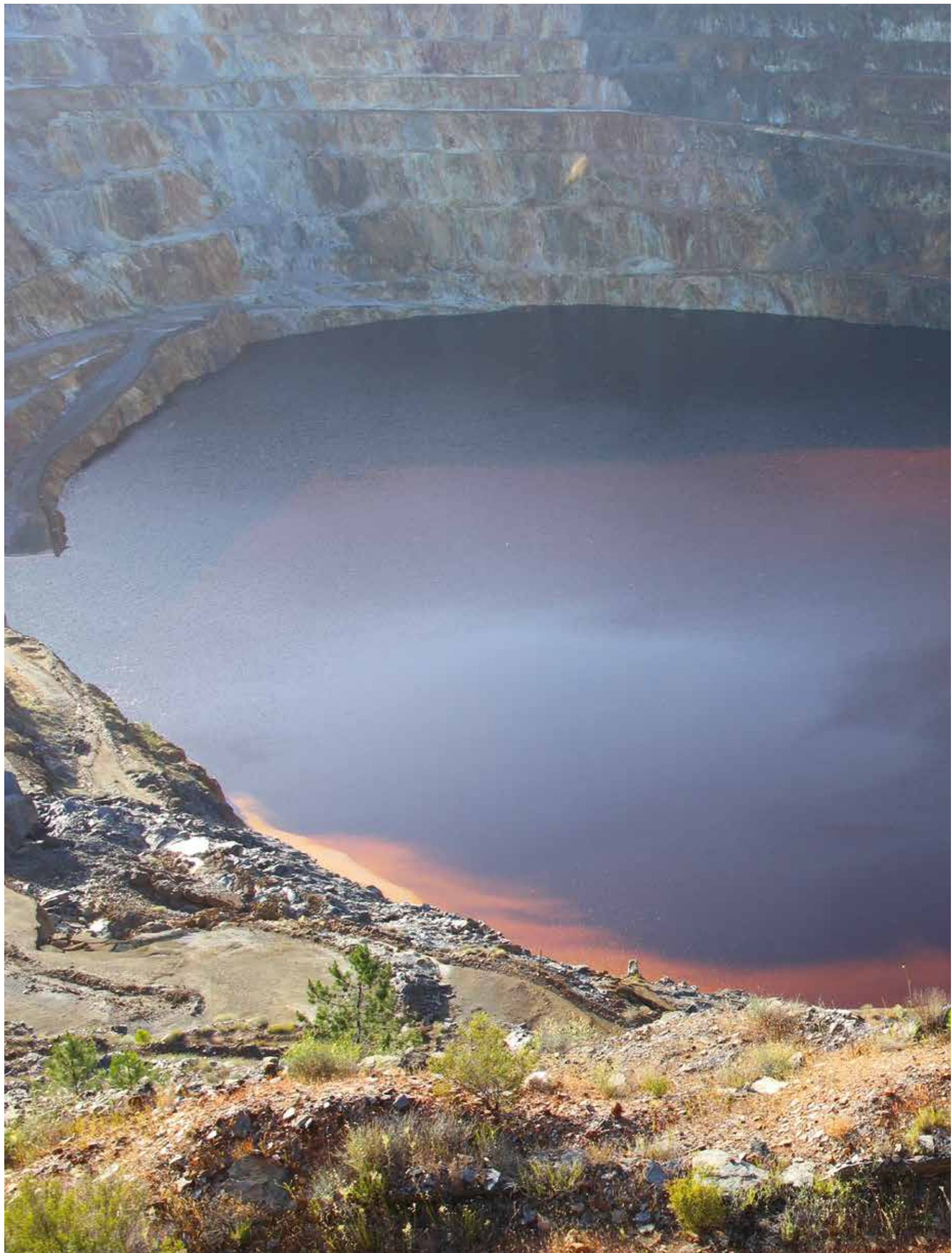
²—Pierre Lázsló: *Salt: grain of life*. 2002

Salt lakes of Torrevieja, Alicante, 1984.
© Foto E.L.

> Mechanism for removing piled up salt, salt lakes of Torrevieja, Alicante, 1984.
© Foto E.L.

>> Corta Atalaya, Riotinto (Huelva). May 2014.
© Foto E.L.







Riotinto, the mute Cyclops?

One of the most important sites of copper mineral is located on the Iberian Peninsula: the Iberian Pyrite Belt in the SW of the province of Huelva that also extends far into Portugal.

Mineral has been extracted and metal smelted around Riotinto since the times of the Tartessians and the Phoenicians. It is a place in which archaeometallurgy has succeeded in studying the development of mining from pre-history to the present day. This extraordinary site has not only provided copper but also silver, gold and even platinum in its different exploitation phases. They say that it was from here that King Salomon took full loads of precious metals in vessels that, to take full advantage of the trip, had anchors of silver.

In Roman times, metal extraction was remarkable as the numerous waste dumps found show, the mines were worked by the slaves and better techniques were introduced, such as the use of the Archimedes screw and the construction of waterwheels to evacuate the subterranean waters.

Following a long stop during the years of Muslim dominion, in which these lands were used only for the manufacture of dyes, the mines were “rediscovered” during the reign of Philip II, but did not actually become operative again until after the War of Independence, largely due to the difficulty of transporting the mineral to the sea.

In the XIX century, exploitation became more intense with the creation of an international consortium, the Rio Tinto Company Ltd., a British initiative financed with largely

German capital, and reached its peak at the start of the XX century.

In 1876, a train line was opened to transport the mineral to the port of Huelva and around 1889 Río Tinto became the biggest open air mine in the world and the biggest mineral exporter in Europe. Corta Atalaya was created, a vast crater with a maximum diameter of 1200 metres and a depth of 350 metres. An overwhelming hole that is nowadays partially inundated, bearing visible witness to the initial magnitude of the Second Industrial Revolution, a “negative monument” par excellence³.

Towards 1908, it employed around 16,465 workers from all over the country, but owing to the dire working conditions and the health risk in Riotinto, strikes were common though harshly repressed by the English directors with the help of the Guardia Civil, the bloodiest of which was in 1888, the famous “year of the shots”, though those of 1907 and 1913, the year that marked the start of the union struggles, and 1920 were no less important.

With this history, Huelva deserves a place of honour in the history of social struggles, it was the first site of a massive protest that we would currently term “ecological”, because at the root of those strikes were the “teleras”, the open-air calcination of the copper mineral which is so highly contaminating and harmful for health.

Nonetheless, we would be wrong to think that almost 100 years after these strikes the social issues and protests against pollution have been definitively resolved in the Huelva region. The fact is

copper



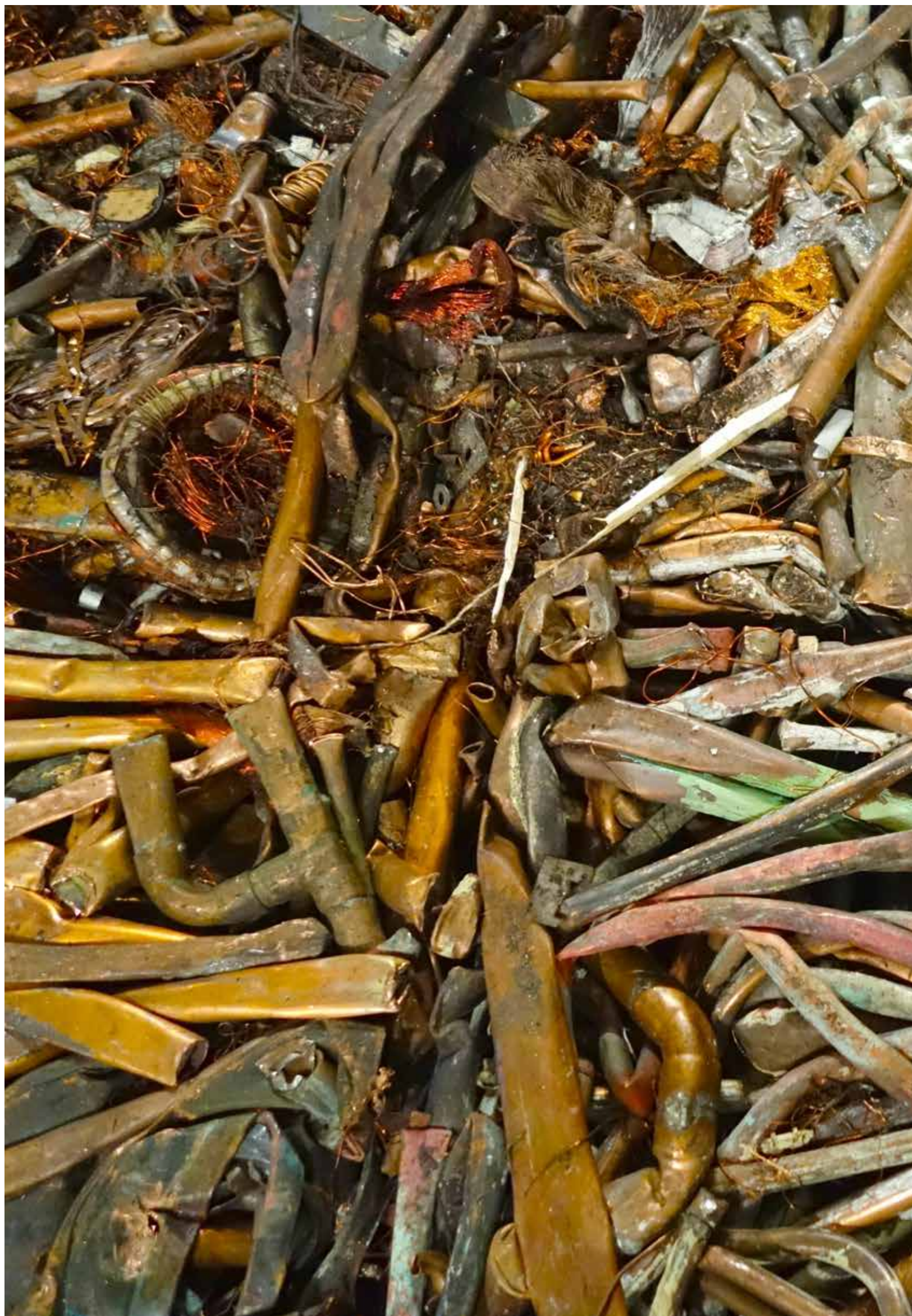
3—Eva Lootz. *Escultura negativa*. La Oficina de Arte y Ediciones y Fundación Arte y Mecenazgo, Madrid, 2014

Discovery of the remains of a Roman waterwheel. Photo: Wikipedia

Corta Atalaya, partial view, undated. Colección fotográfica Compañía Río Tinto

> *El valor del cobre* (detail), Tabacalera, 2016. © Foto: A.A.

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that on top of the unconfessed toxic dumps in the old mines, unexploited since 2001, there is also the pollution caused by the chemical pole of Huelva, installed in 1964 close to the Odiel estuary with a view to “developing” an economically depressed area. Yet it has been strongly opposed, particularly in recent years, by a population that has experienced a significant increase in the number of cancer cases in the area as well as a generalised decline in health due to the environmental pollution.

Recently, the company Emed Tartessos has re-started the mining exploitation of the Cerro Colorado, Atlantic Copper continues with its large-scale copper refining production, and in the Nerva area a project to increase the capacity of the toxic waste dump operated by Befesa has been approved, while Fertiberia, responsible for the phosphogypsum stack beside the Odiel estuary, has been sentenced to stop the spillage and clean up the area by the Spanish High Court.

This is a sadly classic issue: the power of capital against life.

Those operating in the area are the major multinational corporations which strictly follow the rules of advanced capitalism, that is, their priority is to increase profits however much they might finance research projects, use images of flying pink flamingos on their websites and publish a Yearly Environmental Declaration.

All of the power is concentrated in their hands, they are pampered by the Administration managers as their economic results affect the national statistics and comparatively the only defence the inhabitants of the place

have is their bodies, their anger and will to live protected from the radioactivity, the nitrates, the lead, the cobalt, the mercury and who knows how many other harmful substances in the air that they inhale and the water they drink⁴.

Copper, a warm-looking metal, can be infinitely recycled.

It is the best known electricity conductor and 65% of its production is used for electricity.

20 million tonnes are produced worldwide per year. Chile is the world’s biggest copper producer.

In the Huelva region, in the metallurgic complex on the banks of the Odiel estuary, one million tonnes of concentrated mineral are transformed into 300,000 tonnes of refined copper; this means around 700,000 tonnes of slag giving rise to the problem of waste storage.

But copper is not the only thing produced here. On its website, Freeport-Mc MoRan, the American shareholder of Atlantic Copper claims to be the second producer of copper in the world, the number one producer of molybdenum and an important cobalt producer, yet it also produces gold, oil and natural gas.

In the exhibition, copper is present both in the shape of large copper bales compressed into blocks while waiting to be smelted again, through the current photos of Corta Atalaya, Cerro Colorado and the waste grounds of Befesa, the installation *La Mina* and the power point on the history of the Riotinto mines.



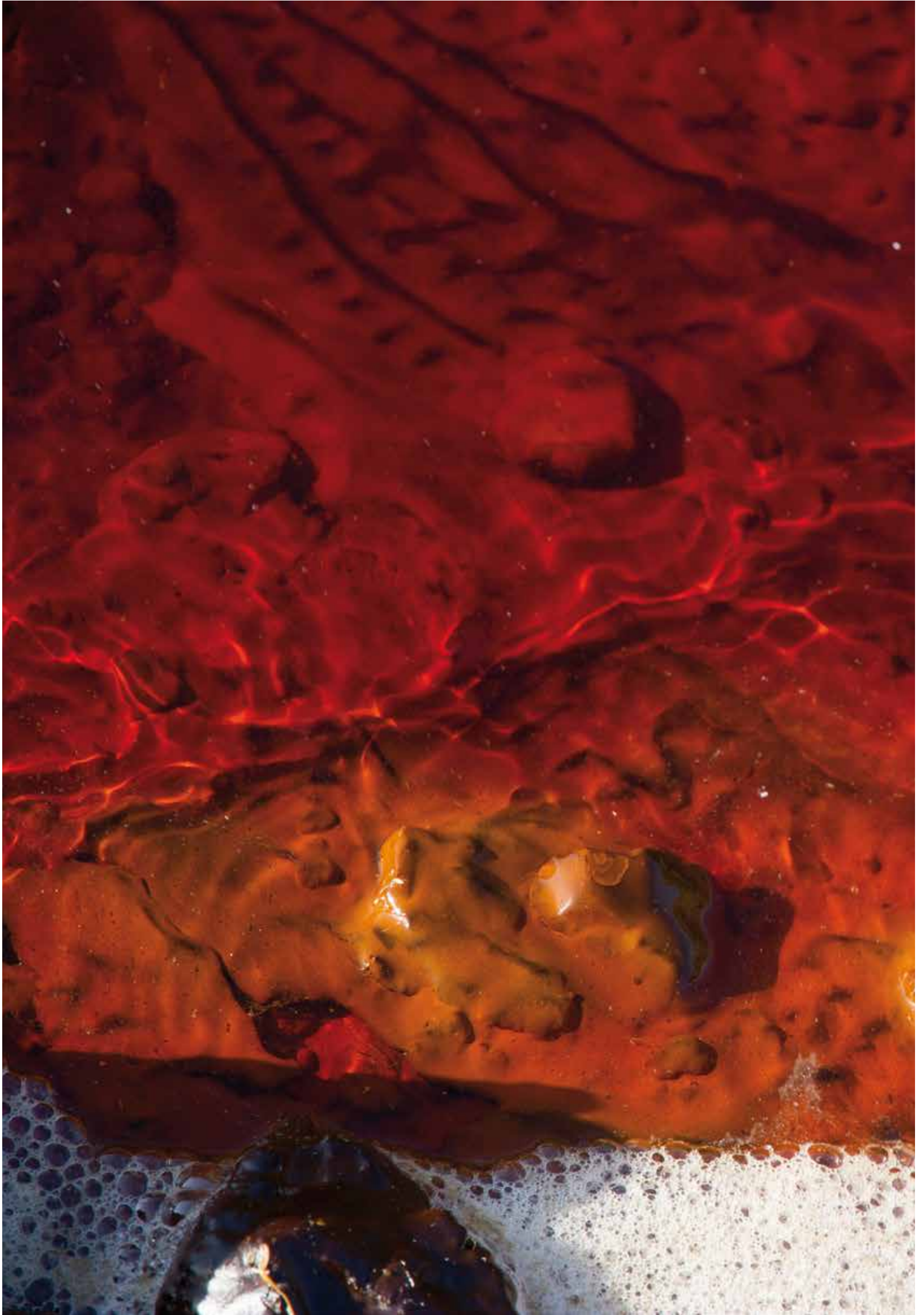
4—The fight for decontamination is represented by different groups, among which the Mesa de la ría de Huelva is one of the most active, its members have been fighting against the current state of things, have repeatedly reported the multinationals, from Atlantic Cooper to Fertiberia to the EC, with little or no results and hardly any repercussion in the country’s general conscience.

El valor del cobre, Tabacalera, 2016.
© Foto M.B.

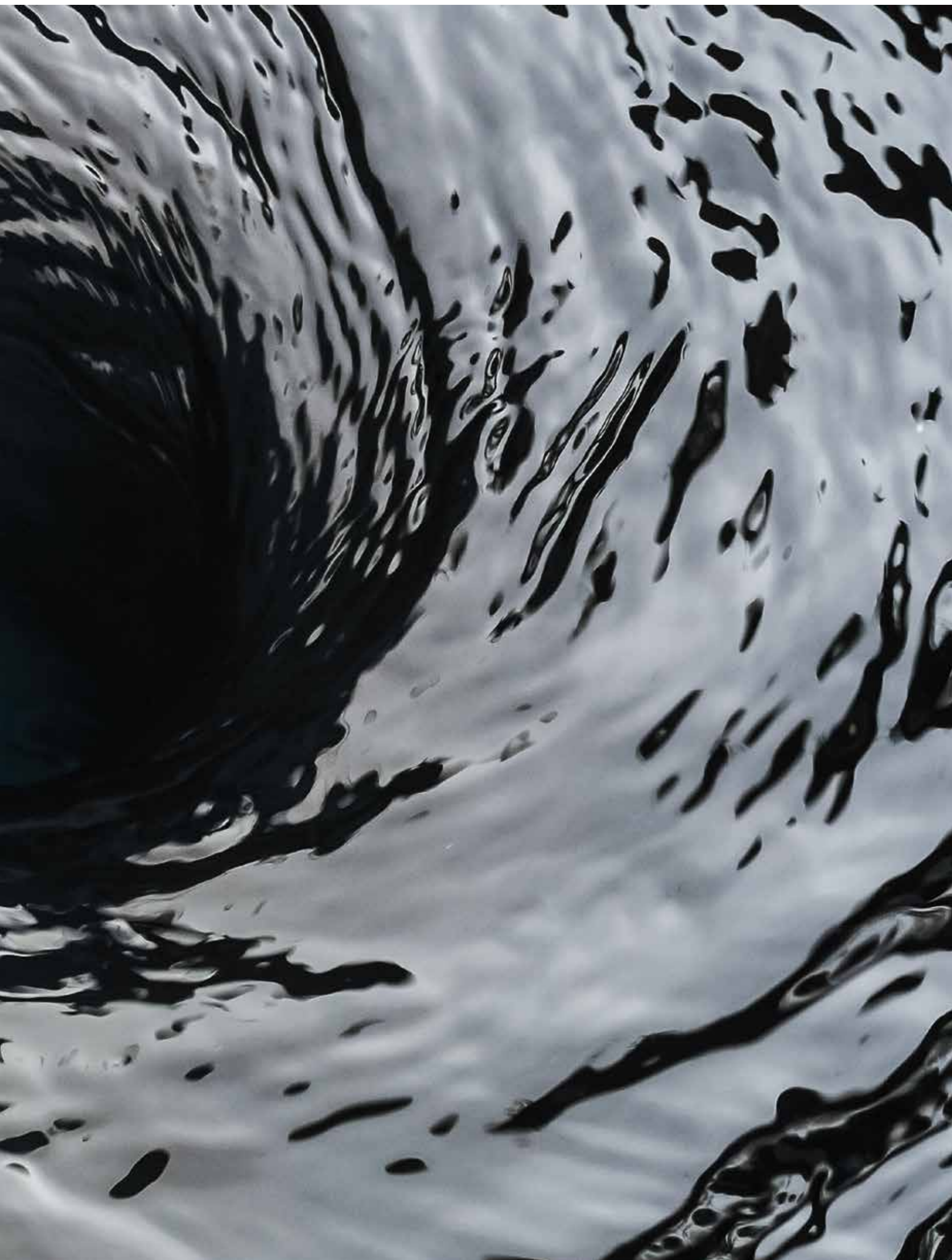
Cerro Colorado, Riotinto (Huelva). May 2014.
© Foto E.L.

> Detail of Cerro Colorado, Riotinto (Huelva). May 2014. © Foto E.L.

>> Still from the video of the piece *Tajo, Tajuña, Alagón*, Jarama, 2016







The “apprentice” river

Madrid’s river, the modest and occasionally scorned Manzanares, forms part of the Tagus River basin, the longest river on the Iberian Peninsula. It is part of an extensive system with a thousand tributaries in both Spain and Portugal. It forms a gigantic basin and its waters quench the thirst of both Madrid and Lisbon’s inhabitants.

Those of us who live in the Madrid region, have the sad privilege of coexisting with the two most polluted rivers in the country: the Manzanares and the Jarama, followed by the Henares and the Guadarrama⁵.

Water is present in the exhibition through the names of the most significant tributaries of the Tagus in the piece “Tajo, Tajuña, Alagón, Jarama”, using a map of the hydrographic basin, a waterfall filmed in the area where the rivers Cifuentes and Tagus meet, but also in the names of the over two-hundred dams in the basin and the years of their construction, reservoirs that use the water for irrigation, to generate electricity and to cool nuclear plants, rendering a series of data normally beyond the reach of the majority visible.

My work has revolved around the rivers and water roughly since the year 2005, translating this data into sculpture, honing in on a new visibility made possible thanks to the use of computer technology.

In this time, I’ve discovered that the hydraulic policy data is often contradictory, unreliable and difficult to gain access to.

Something that should be as “transparent as water” actually isn’t when it comes to water itself.

Obviously, the underlying question behind all of this is the debate on the privatisation of water. In cities such as Paris, Lyon, Potsdam first and then Berlin, like in so many other cities, the citizen movement has succeeded in re-municipalising the use of water and returning competence over the same to public control.



**blood of the world
green mother
lying with the sun
in the alcoves of the trunks
and your son is the air that we breathe**

**midwife of the bones
of all fruit trees
transparent muscle
that raises up the wood
and softens the mountains
with age-old caresses**

**quivering reflection that turns to steam
steam that ultimately turns
to the marble of the clouds
carved by the light**

**to be spun together then
to weave the seasons and finally
be rocked wide awake in a hand
water that
quenches and cleanses all
forever seeking the deepest depths
water willing
to stop being water
to be something else**

**guide me give me
your detachment from shapes
your diligence your discretion your force
listen to me
when I pray to a drop**

**Water Sutra
José María Parreño**

water

5—The Spanish Hydrological Plan considers the waters of the Manzanares and the Jarama rivers “unsuitable for any use”, in spite of which they continue to be used for the irrigation of agricultural consumer products. For more details on the state of the waters in the Hydrographic Basin of the Tagus, please see the latest Hydrological Plan for the CHT, approved in January 2016, which allows

us to deduce the number of rivers that fail to meet the 2015 period required by the WFD (Water Framework Directive) of the EU for an acceptable river condition, as well as the reports on the waters of the Madrid Region written by Ecologistas en Acción.

Video recording of the piece *Tajo, Tajuña, Alagón, Jarama*, 2016. © Foto: Fernando López García

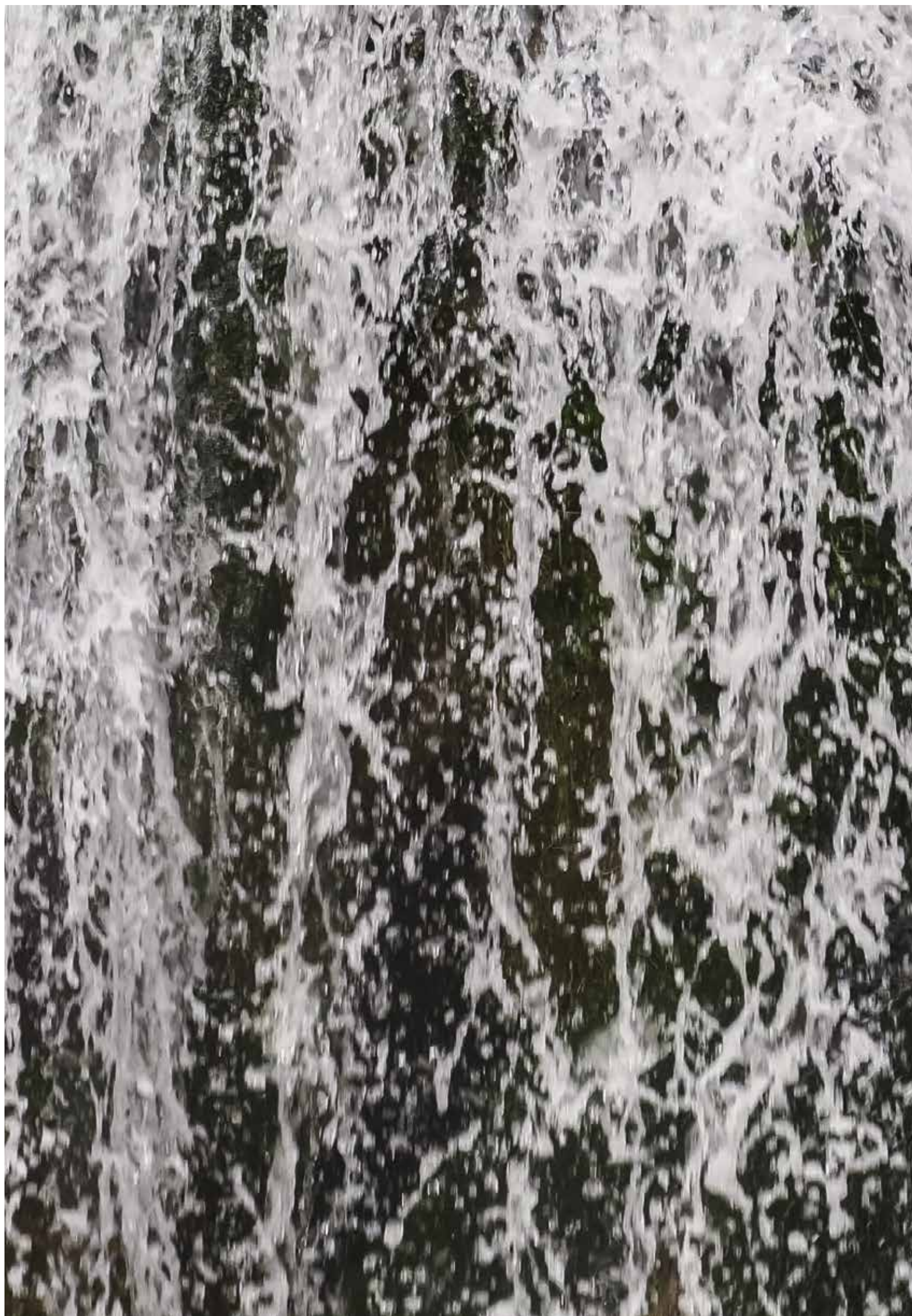
> Partial view of the installation *Mundo, Seco, Benamor, Amarga*, Sala Verónicas, Murcia, 2009. © Foto E.L.

>> Video still of the piece *Tajo, Tajuña, Alagón, Jarama*, 2016

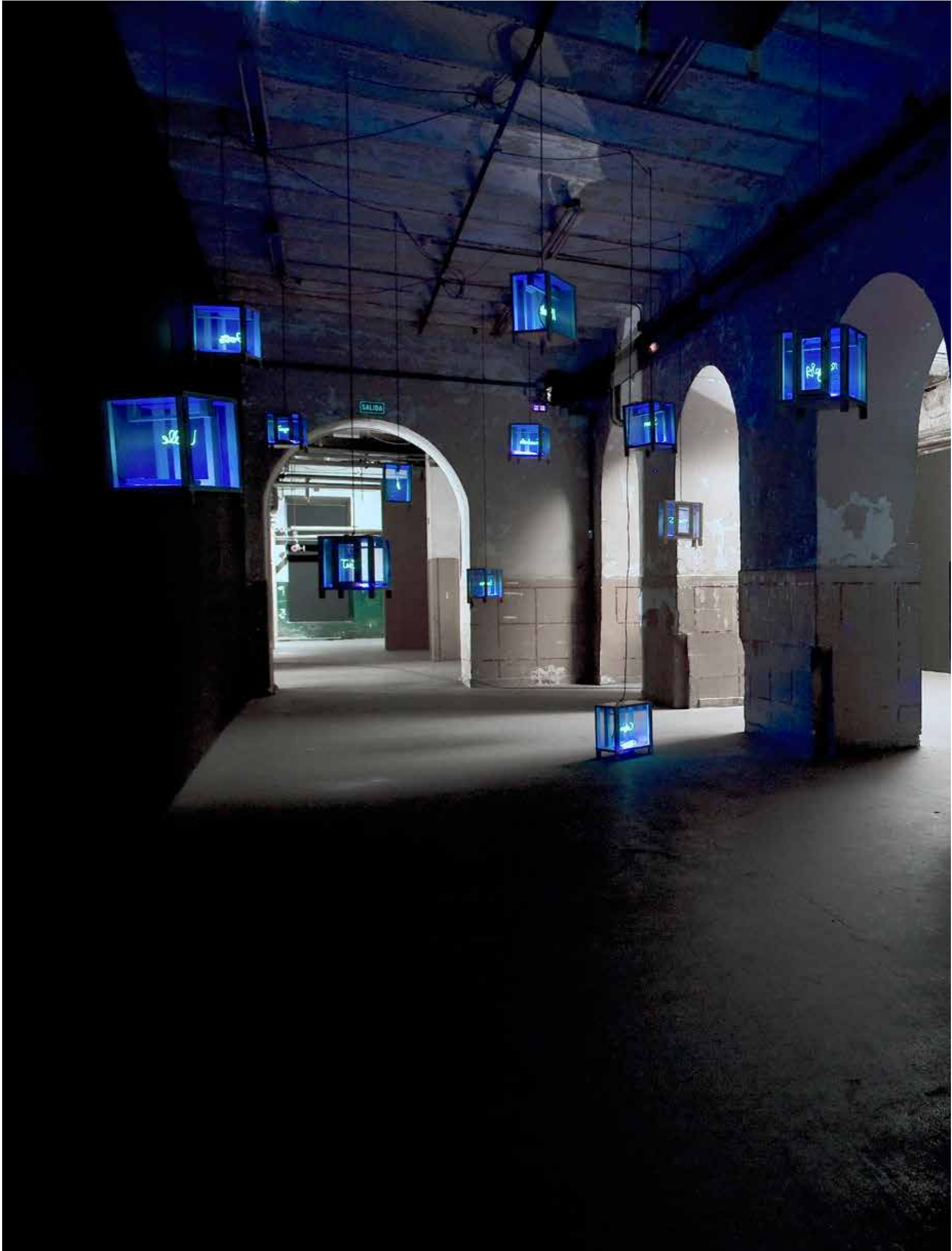
Partial views of the installation *Tajo, Tajuña, Alagón, Jarama*, 2016. © Foto M.B.

>>> Partial view of the installation *Tajo, Tajuña, Alagón, Jarama*, 2016. © Foto M.B.











HYDROELECTRIC ENERGY PRODUCED IN THE RESERVOIRS OF THE HYDROGRAPHIC BASIN OF THE RIVER TAGUS

From the point of view of the electric system, the Tagus basin forms a unit with Júcar and Segura, although the net production could be considered to be largely concentrated in the basin of the former. Measured in GWh (Gigawatt Hours) per year, it is a very variable figure that depends on the annual rainfall. The years 2013 and 2014 were good in this respect, but 2015 was bad due to the lack of rain. The 2015 data is not yet definitive, but the provisional figures indicate a HE production of around 3800 GWh, considerably lower than the 2014 production (5600 GWh). If we use the mean figure of the last decade as a point of reference, the figure would be around 4200 GWh.

By comparison, the mean annual production of the Almaraz Nuclear Plant, which is the most potent in this basin, is almost four times higher than the hydraulic production. In other words, hydroelectric production in the basin would be equivalent to approximately 25% of the nuclear electricity generation.

**4200
GWH.
PRODUCED
IN THE CHT**

AMOUNT OF WATER USED TO COOL THE NUCLEAR POWER PLANTS

The nuclear power plants of Almaraz and Trillo are located in the Tagus. The latter uses a closed cooling circuit, meaning the net water consumption is low. Almaraz, however, is cooled using an open circuit through the Arrocampo reservoir and has a resource specifically for this purpose of 40 million m³/year. It must be remembered that only a small fraction is lost through evaporation (approximately 3%), and the rest is reintegrated into the river (logically, at a higher temperature).

In short, the water used would be 40 million m³/year even though consumption (evaporation) is of 120 000 m³/year.

HECTARES OF ARABLE LAND RECOVERED THROUGH THE RESERVOIRS IN THE COURSE OF THE XX CENTURY

Around 240,000 Ha in the Tagus, the majority following the Civil War. Approximately 50% are public and the rest private. Apart from the above, it is important to remember that "11 million" people drink the waters of the Tagus basin: eight in Spain (seven in the basin itself and one in the southeast of the peninsula) and another three million in Portugal.

**8
MILLION
PEOPLE DRINK
FROM THE
TAGUS**

Data from the REE (Red Eléctrica Española, operator of the electric system and the Confederación Hidrográfica del Tagus.)

**40
MILLION M3
OF WATER
USED IN THE
NUCLEAR
PLANTS
OF ALMARAZ
AND TRILLO**

DAMS, RESERVOIRS AND DIKES IN THE HYDROGRAPHIC BASIN OF THE TAGUS AND THE YEARS IN WHICH THEY WERE COMPLETED

Acebo, **1997**
 Acehuche, **1977**
 La Aceña, **1989**
 Ahigal, **1986**
 Albufera San Jorge, **1577**
 Alcántara 1, **1946**
 Alcorlo, **1978**
 Alcuescar, **1977**
 Aldea del Cano, **1988**
 Aldeanueva, **1992**
 Aliseda, **1978**
 Almoguera, **1947**
 Alpotrel, **1991**
 Araya de Arriba, **1958**
 Araya de Arriba (Dique del Collado), **1958**
 Arce de Arriba, **1755**
 Arce de Abajo, **1755**
 Arenas de San Pedro, **1975**
 Armiñán, **1912**
 Arroyo de la Luz, **1992**
 Arroyo de la Puebla, **1999**
 Arroyo de la Venta, **1958**
 Los Arroyos, **1967**
 Atalaya, **1983**
 El Atance, **1997**
 El Atazar, **1972**
 Aulencia, **1945**
 Ayuela, **1980**
 Azután, **1969**
 Baños, **1992**
 El Batán, **1963**
 Becedas (Hoyo de Pinares), **1956**
 Becedas II (Hoyo de Pinares), **1974**
 Béjar (Navamundo), **1969**
 Beleña, **1982**
 Bolarque, **1910**
 El Boquerón, **1983**
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 Bremudo, **1974**
 Bremudo (Dique del Collado), **1974**
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 Buendía, **1958**
 La Bujeda, **1976**
 La Bujeda II (Dique del Collado), **1976**

El Burguillo, **1913**
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Casar de Cáceres, **1991**
Casares de las Hurdes, **1997**
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Castrejón / El Carpio, **1967**
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La Cerquilla, **1962**
Cerro Alarcón, **1970**
Charca Arroyo de la Luz, **1558**
Charca de la Generala, **1795**
Charca del Lugar, **1735**
Charco del Cura, **1931**
Ciudad Ducal, **1957**
El Corono, **1971**
Cueto, **1850**
La Cumbre, **1970**
Dique de Pareja, **s/d**
La Elipa, **1981**
El Embocador, **1530**
La Encinilla, **1964**
Entrepeñas, **1956**
La Ermita, **1985**
Estremera, **1950**
Finisterre, **1977**
Las Fraguas, **1988**
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Fresno 1/2/3, **1977**
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Garganta de Eliza, **1963**
Garguera, **1911**
Granjilla 1, **1660**
Granjilla 2, **1560**
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Guadiloba, **1971**
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Guijo de Granadilla, **1982**
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Hervás, **1991**
Hervás / Azud, **1969**
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Ibahernando, **1960**
Jaraíz de la Vera, **1996**
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Jarosa (Dique de Collado), **1968**
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Malpartida de Plasencia 2, **1977**
Malpartida de Plasencia 3, **1981**
Manufacturas Béjar, **1940**
Manzanares el Real, **1969**
Mascalinas, **1978**
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Mata de Alcántara, **1990**
Membrío 1/2, **1978**
Miraflores de la Sierra, **1975**
Molino de Cabra, **1850**
Molino de Chíncha, **1947**
Molino de la Hoz, **1973**
Montehermoso, **1970**
Los Morales, **1988**
Navacerrada, **1968**
Navalagamella, **1972**
Navalcan, **1977**
Navalmedio, **1968**
Navalmoral de la Mata, **1992**
Navalperal de Pinares, **1980**
Navarredondo, **1997**
Navas del Madroño, **1974**
Navas del Marqués, **s/d**
Las Navas, **1928**
Las Nieves, **1977**
Nuñomoral 1, **1981**
Nuñomoral 2, **1997**

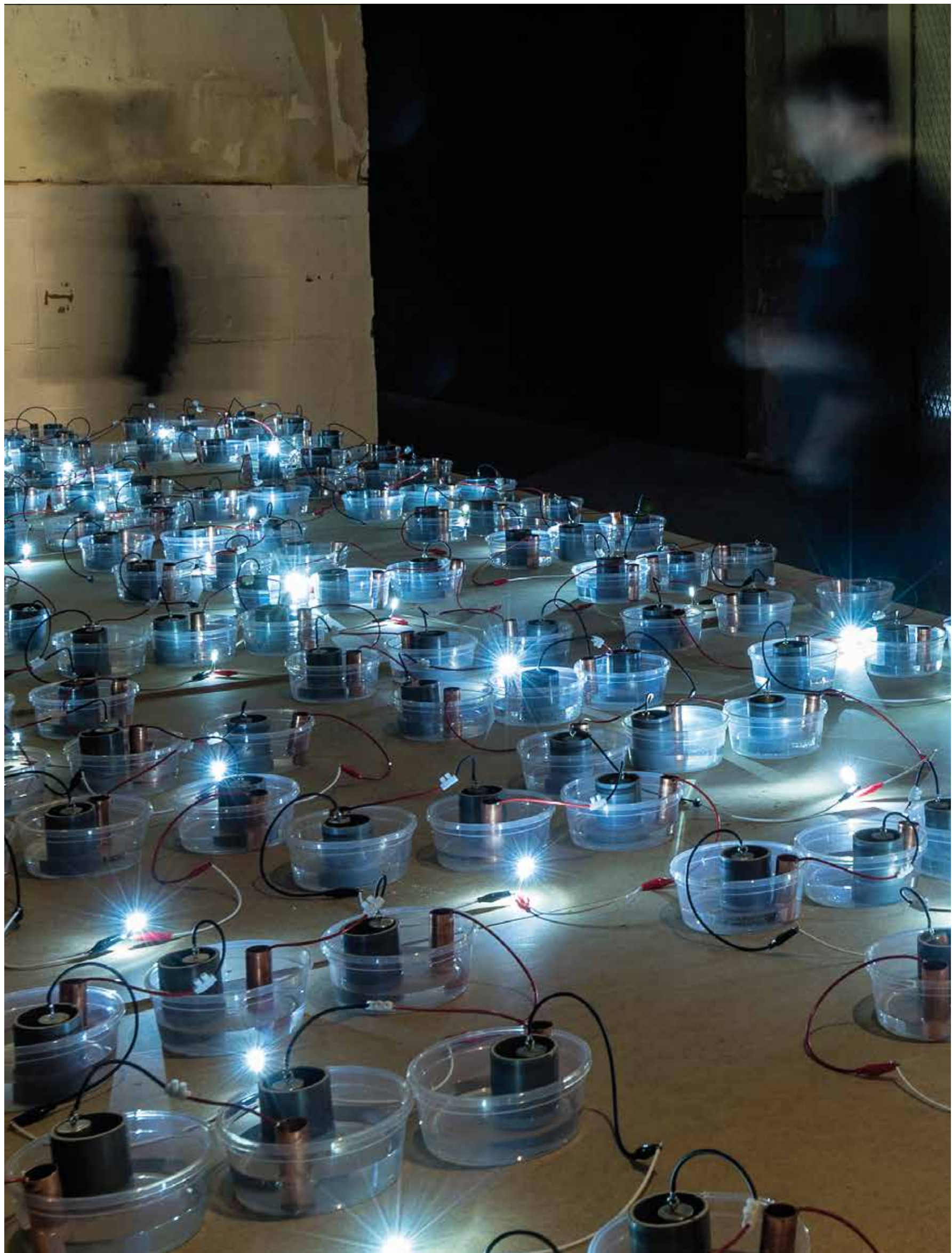
El Pajarero, **1989**
Los Palancares, **1981**
Palomero, **1977**
El Pardo, **1970**
Pedrezuela, **1967**
Peguerinos, **1991**
Los Peñascales, **1962**
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Rivera de Gata (Dique del Collado 2), **1990**
Rivera de Gata (Dique F2), **1990**
Rivera de Gata (Principal), **1990**
Robledo (Toma), **1983**
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Rosarito, **1958**
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San Juan, **1955**
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La Solana, **1955**
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El Torcón 2, **1991**
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Torreherrera, **1977**
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Torrejón Tiétar, **1967**
Torrejón de Ardo, **1992**
Torremenga, **1985**
Torremocha, **1979**
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Tozo, **1962**
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Trujillo, **1997**
El Vado, **1954**
El Vado (Dique del Collado), **1954**
Valdajos, **1530**
Valdecabras / Arroyo, **1965**
Valdecañas, **1964**
Valdefuentes, **1981**
Valdeobispo, **1965**
Valdesimón, **1979**
El Valle de los Caídos, **1972**
Valmayor, **1975**
Valtravies / Arroyo, **1972**
Vegas Altas, **1800**
La Vid 1, **1953**
La Vid 3, **1959**
Villanueva de la Vera, **1988**
Villar de Plasencia, **1988**
El Villar, **1882**
Zamores, **1850**
Zarra la Mayor, **1992**
Zorita, **1947**

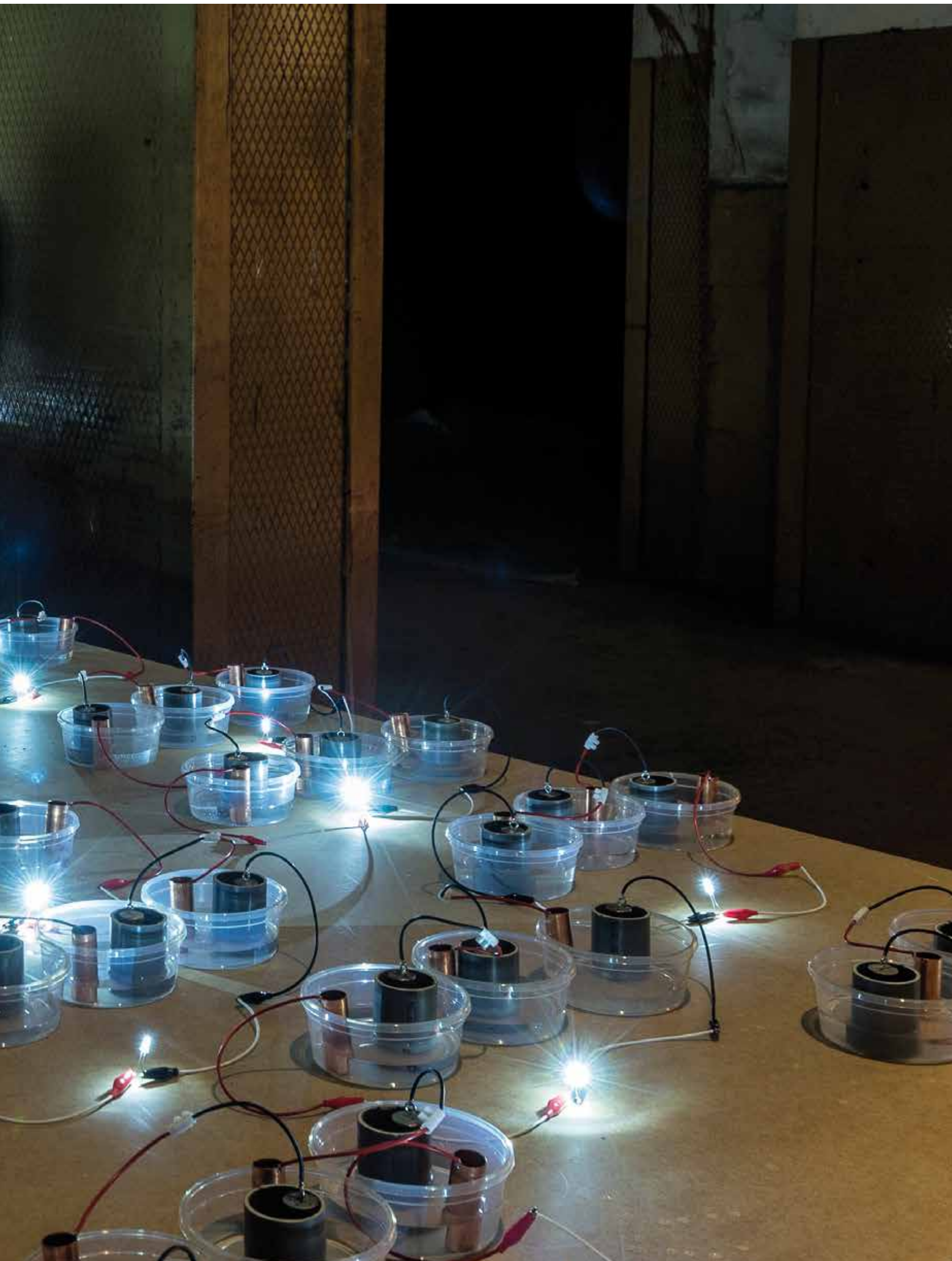
Referendum on the privatisation of the Canal Isabel II



«In cities such as Paris, Lyon, Potsdam first and then Berlin, like in so many other cities, the citizen movement has succeeded in re-municipalising water use and returning competence over the same to public control.»

■■■■■■■■■■





A field of (little) lights

We are constantly turning lights, heating, fridges and microwaves on and off, not to mention the mobile phones that have become our external brain, but how many people really know how electricity is generated? We make an unconscious use of electricity, we use energy as if we had endless resources, as if it weren't necessary to generate electricity, to get it from somewhere.

As Jeffrey Dukes⁶ makes very clear in his book *Burning Buried Sunshine*: human consumption of ancient solar energy: "every year of burnt oil is equivalent to 400 years of photosynthetic prehistoric plant production, including phytoplankton".

For my part, years ago I modestly alluded to the same fact in the title of an exhibition called "Our Best Machines are Made of Sunshine"...

A field of homemade batteries give a rudimentary and somewhat rough demonstration of the process and materials needed to produce electricity: copper, magnesium and an electrolyte, in this case, water with salt.

These batteries offer a metaphor that aims to make the visitor stop and notice the fact that the Earth is just one big biomass battery charged through photosynthesis over millions of years. It is our biological capital, which over the last 200 years we have been frantically unloading even though there is no replacement or reserve tank anywhere in sight.

This field of batteries is a warning signal, a wake-up call about the urgent need to rethink our way of life.

It strikes a nerve and equally denounces both the lie behind the "sustainable economy" and the reassuring voices that tell us we are emerging from the crisis, after which everything can return to "normal".

Nothing will ever be the same again.

Just consider for a moment that "8 fossil fuel calories are needed to produce each food calorie."

Consider that "inequality in the use of energy is horrifying: even back in 1900 in the city of New York they were already consuming as much electricity as the entire Sub-Saharan Africa, excluding South Africa"⁷.

At the present moment in time, which could be considered the end of the remunerated mechanical working world -machines and computers have replaced that workforce and we are witnessing a constant decline in the number of jobs-, which constitutes a major problem for a large segment of the population that has become "superfluous" for advanced capitalism, it is well worth subjecting the very concept of work, of value, of consumption and of merchandise to examination. Salario may provide the pretext for doing so.

**«Just consider
for a moment
“that 8 calories
of fossil fuels
are needed to
produce each
food calorie.”»**



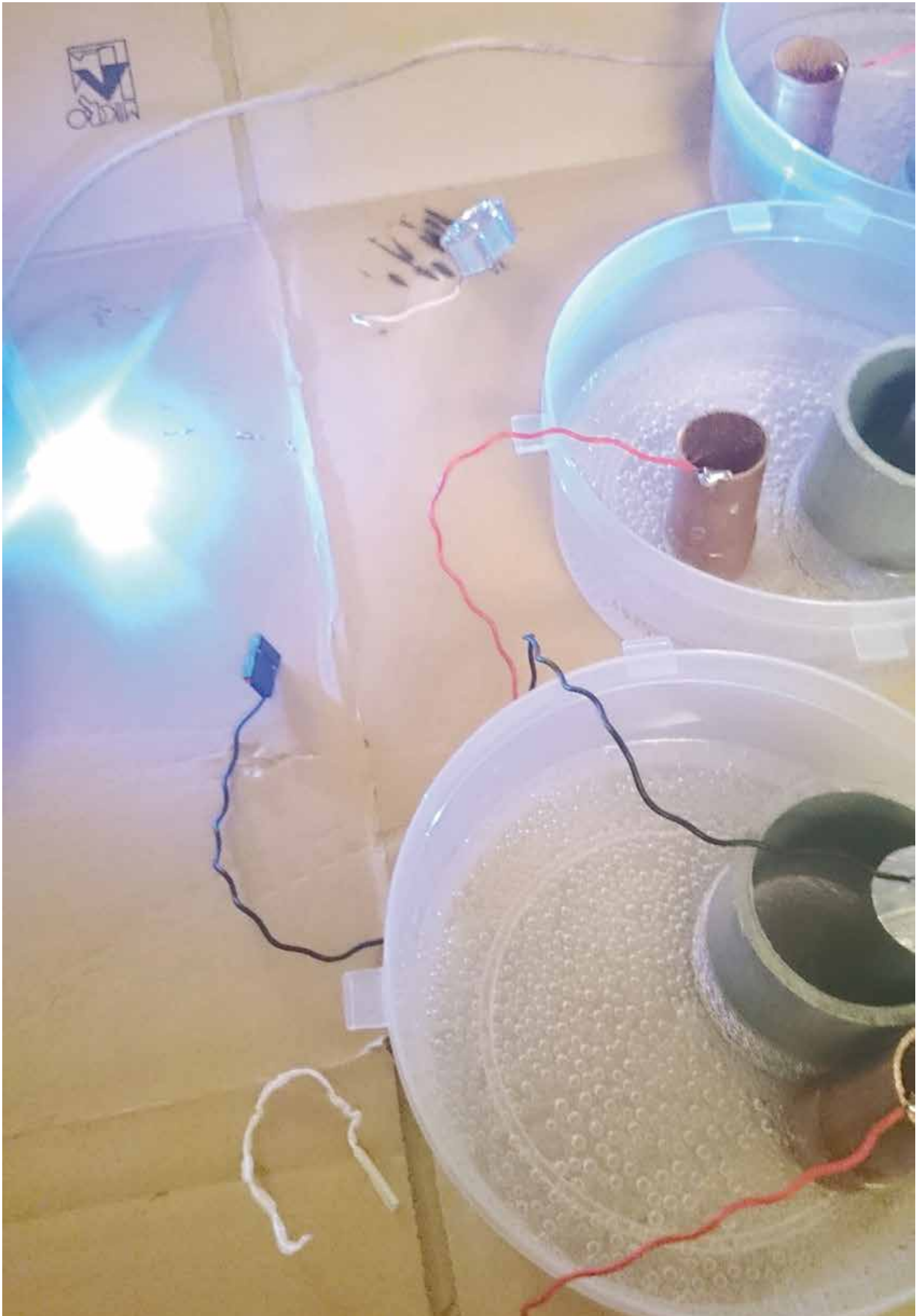
6—Jeffrey Dukes: *Burning Buried Sunshine*: human consumption of ancient solar energy. Climatic Change 61, 2003

7—Emilio Santiago Muño: *No es una estafa, es una crisis de civilización*. Enclave de libros. Madrid 2015

<< Mesa de baterías, 2016.
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Essay for the piece Mesa de baterías, 2016.
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> Essay for the piece Mesa de baterías, 2016.
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Humanity is currently at the planet's biophysical limits and has been dealing with an unprecedentedly vast crisis that is not only economic but also a crisis of civilisation.

There is little doubt that the issue of an anthropological mutation is on the cards. And in this difficult situation, a renewed consideration of matter, the earth, living beings and the coexistence of mankind must be considered.

But I have called this section "a field of little lights".

When I was about to finish these notes, a friend to whom I had explained the field of homemade batteries that emit dots of lights exclaimed: Ah, the fireflies of Didi-Huberman! And that was how she suggested a text that is both beautiful and meaningful to me as it lays the ground for spaces of hope in the midst of this dark, dark night.

In her book *Survival of the Fireflies* Georges Di-di-Huberman⁸ compares the "little light" of the fireflies that occasionally lights up the summer nights to the "big light" of our everyday lives. The ferocious light of power, of merchandise, of control, of overexposure to the lights of screens, of stadiums, of television sets, of the giant show that, in short, we are constantly exposed to.

The fireflies again! I thought when I heard my friend, the ones I will never forget from that house I stayed in on Via Laura, just a stone's throw from the Duomo in Florence.

In the face of the despair expressed in the last Pasolini, who saw the death of desire and innocence in the disappearance of the fireflies, in the face of the completely justified pessimism of Giorgio Agamben, who reflected on the de-subjection of the contemporary individual and the destruction of experience, in the face of the disheartening panorama of a Europe that is becoming morally bankrupt, Didi-Huberman turns to the minimal, intermittent lights of resistance and underlines the value of the lesser lights of those of us who imagine, who write, who film, who dance, who make music and, appealing to the will of each, puts forward a theory of survival.

electricity

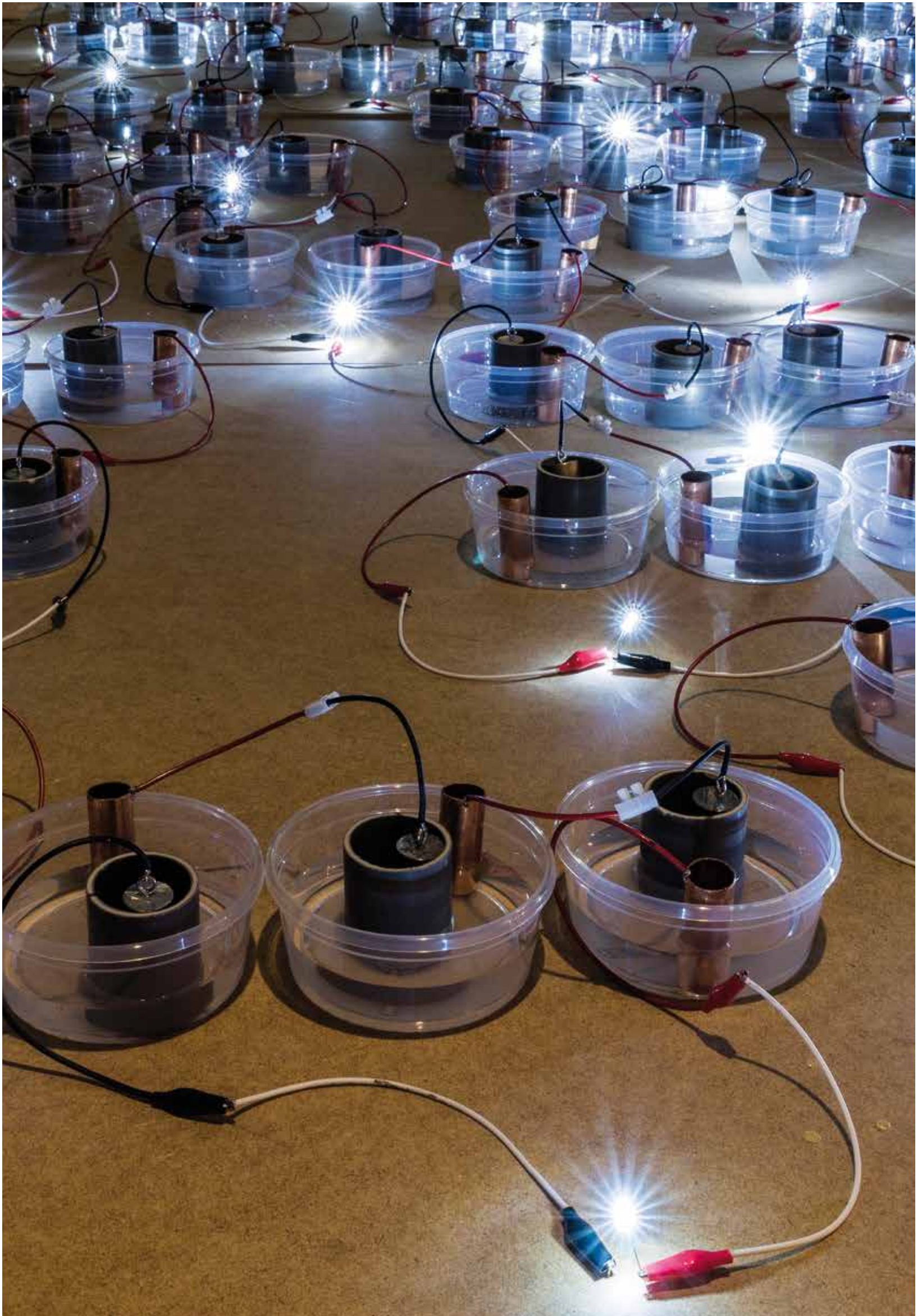
⁸—Georges Didi-Huberman: *Supervivencia de las luciérnagas*. Abada Editores, 2012

> Detail of *Campo de baterías*, 2016.
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>> *La mina*, 2016.
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>>> *La mina*, 2016.
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>>>> Details of *La mina*, 2016.
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Cancer

On one occasion, when visiting the phosphogypsum pond, I came across a piece of graffiti signposting the direction to cancer. The author of the graffiti had considered it important to leave his mark on the sign showing the way out of the new housing development, which had been built about 350 metres from the pond. It was also paradoxical that the new buildings stood on land called “Las Marismas del Polvorín” (Gunpowder Marshes). I had the sensation of being trapped between two words: cancer and gunpowder.

I remember the impression I had the first time that I saw the “Atlas de mortalidad en áreas pequeñas de España” (Atlas of mortality in small areas of Spain) and the words of its author, the professor/researcher Joan Benach:

The words of the CSIC study are very disturbing.

“At the end of last year, almost at the same time that the data from the CSIC report were made known, the Atlas de mortalidad en áreas pequeñas de España was published, graphically corroborating the problem of the high incidence of some serious diseases in the area of Huelva, Seville and Cadiz. The author of the work, Joan Benach, a specialist researcher in occupational health and professor at Barcelona’s Universidad Pompeu Fabra, studied the causes of death in 2,218 small areas which form a high-definition health map, in an attempt to establish possible links between these diseases and the social and environmental characteristics of the area.

Benach explains that only 8% of the Spanish population live in Huelva, Seville and Cadiz, yet the provinces contain 33% of the areas at greatest risk. Fifty percent of the areas in the province of Cadiz are high risk. In Huelva, there is a 40% risk for men. This data highlights the risk of suffering lung cancer, ischaemic heart disease, cerebrovascular disease, diabetes and cirrhosis in the three provinces.

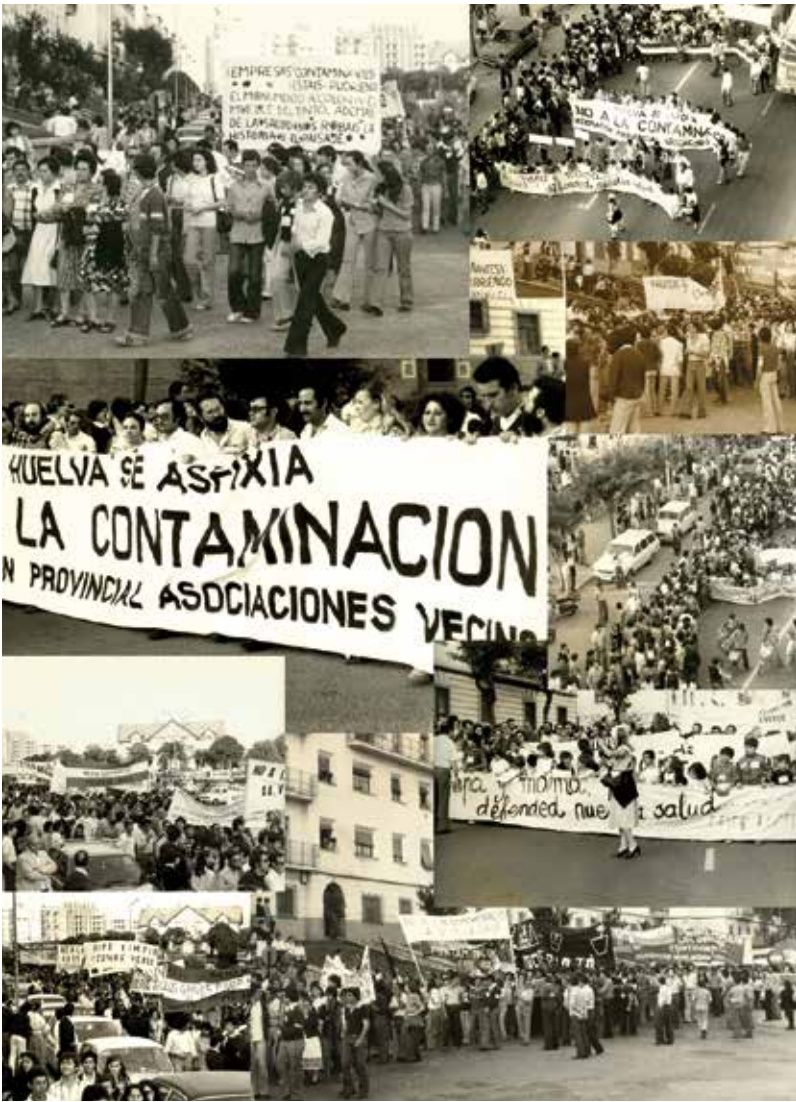
“Medical atlases are a useful tool for decision-making on public health policy based on hypotheses, even before all possible knowledge has been gained. However, there is no sign of any political initiatives being taken. More pressure needs to be brought to bear on politicians”, according to Joan Benach, and he notes that the same applies to the CSIC report – “the content of the report is extremely alarming”; Benach does not understand how all of this can be disregarded. He observes that “the politicians are going around in circles when it needs to be confirmed that a particular disease is caused by a particular pollutant, and when experience in epidemiology demonstrates that it is not appropriate to focus on the impact of one particular pollutant on health: the focus should be on the interaction of risk factors. Often the specific consequences are not known scientifically, yet we do know that they must occur. In Huelva, for example, the incidence of lung cancer cannot be explained by differences in the consumption of tobacco, there must be other risk factors.” (2)

When I think of the number of times that I have talked to my mother about cancer, I cannot help but remember her words, time and again:

“My boy, here on our street a lot of people die from cancer, from one day to the next, they get something bad, and shortly afterwards they die. Don’t you remember?”

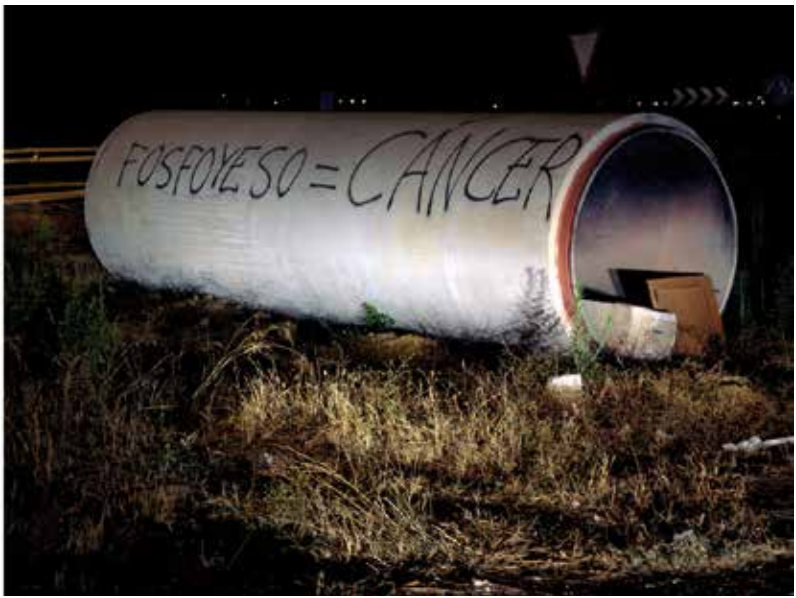
The list of people from my street and streets nearby, who have died, people my mother can name like a litany, is so long, that I cannot help but believe Joan Benach and, like him, I wonder: **how can all of this be disregarded?**

1—Francisco L Rueda, Julia M. Palomares, Ignacio V Rico “Atypical Thyroiditis in Huelva” Endocrine Practice, vol. 5 mayo/junio 1999
2—M Nuñez, C Navarra “Huelva bajo los efectos de la contaminación”: Integral No 267, marzo 2002.



Isaías Griñolo

Cancer is one of the chapters of Las fatigas de la muerte (la lógica cultural del capitalismo), a book published for the exhibition of the same name by Isaías Griñolo in Caja San Fernando (Cajasol), Seville, on 2 March 2006. Due to pressure from the AIQB (Association of Chemical and Basic Industries of Huelva), the exhibition was closed on its opening day and the book confiscated.



Pollutants vs thyroid

The case of atypical thyroiditis in Huelva:

725 cases of atypical thyroiditis were recorded in Huelva in 1995. Doctor Francisco López Rueda, one of the city’s leading endocrinologists, who studied this epidemic in depth and who ever since has continued to research and treat these patients, explains that the symptoms presented were an increase in thyroid antibodies, acute, painful inflammation of the gland and marked general fatigue. Furthermore, the disease only attacked women of child-bearing age. López Rueda reported the epidemic to the Andalusian Health Service Delegation and a few official investigations were made which did not reach any conclusion. Disagreement as to the causes and the appropriateness of continuing further research resulted in López Rueda being sidelined and discredited by the Government. Nevertheless, the doctor and some of his collaborators continued making enquiries and contacted international experts. Finally, an Israeli epidemiologist, John Goldsmith, came up with a clue that Dr López Rueda considered to be the answer: a similar syndrome had been described in Slovakia and had been caused by polychlorinated biphenyls (PCBs). The endocrinologist claimed that PCBs, other organochlorine pollutants, such as dioxins and some pesticides with the help of heavy metals, had to be responsible. According to López Rueda, the drought of 1995 might have increased the concentration of pollutants in drinking water and affected sensitive individuals. Although the disease received hardly any mention in the health media in Spain, Dr López Rueda was listened to by the prestigious scientific journal of the American College of Endocrinology, Endocrine Practice. After thorough monitoring, the journal published López Rueda and his collaborators’ description of the epidemic in 1999 under the title “Atypical Thyroiditis in Huelva”. (1)

“Ecologists claim that Huelva is a city surrounded by pollutants in the land, sea and air. To describe all of these pollutants would be an encyclopaedic task. In short, the most problematic have been included along with those that have been highlighted in the CSIC report. However, there are many more that even in small doses are significant if the combined effect is taken into account, these include organochlorine pesticides, dioxins and furans, mercaptans, PCBs and hexachlorobenzene...

Arsenic: A heavy metal 9ng/m3 in the air, with maximums of 96ng/m3, the future European regulation is 6ng/m3 (some countries have set a maximum level of 5ng/g). Cancer of the stomach, bronchus, trachea and lung, bladder, prostate, liver and kidney and it may cause reproductive alterations. Atlantic Copper, Fertiberia and Foret.

Uranium: Radioactive mineral. Found in river water and embankments and in phosphogypsum ponds. Cancer and malformations. Fertiberia and Foret

Radon: radioactive gas, emitted from phosphogypsum ponds. Lung cancer. Fertiberia and Foret.

Cadmium: Heavy metal, found in seafood such as clams (0.16 mcg/gl), in significant doses but lower than the legal limit. It is suspected to cause cancer of the stomach, liver, trachea, bronchus and lung, prostate, kidney, and to cause reproductive disorders. Fertiberia, Foret, Atlantic Copper

PM10: thoracic particles of a diameter less than 10mc. Found in the air. The average level (40mcg/m3) is double the limit set by the forthcoming directive on respiratory tract diseases. Cancer of the lung, bronchus and trachea. They are emitted to a greater or lesser extent by all of the “Chemical Pole” industries.

NOx and SO2: Nitrogen oxides and sulphur dioxide. These are formed when fossil fuels are burnt. They cause acid rain, point-source emissions have been detected at high levels. Respiratory diseases. They increase immediate all-cause mortality. Cepsa, Fertiberia and Foret.

DDT and DDE: Forbidden organochlorine pesticide, cumulative in the natural environment and the body. It has been detected in recent, extensive use in crop land next to the city. It has been found in soil, strawberries and seafood. Carcinogenic, neurological and reproductive effects. Used on open-air strawberry crops in the area of La Fábida.

Endosulfan: Permitted organochlorine pesticide. It has been found in samples, which indicates that marketing takes place before it degrades. Carcinogenic, neurological and reproductive effects. It is one of the most widespread endocrine disruptors. Crops in the area of the Huelva delta.

The incidence of diseases in Huelva according to the CSIC report. In women: 40% more stomach cancers, 27% kidney cancers, 16% trachea, bronchus and lung cancers and 20% lung cancer. In men: 27% more cancer of the kidney, 19% of the liver, 11% of the trachea, bronchus and lung, 2% of the bladder, 18% of the stomach and 14% of the prostate. The citizen movement, Colectivo Ciudadano por la Descontaminación de Huelva, reports a greater incidence of sterility, miscarriage, birth defects, asthma and other respiratory conditions and endocrine disorders” (2)

There is no mention in the CSIC report that further research studies should be undertaken on the phosphogypsum pond, which the members of the Mesa de la Ría Association (Delta roundtable) are not willing to accept. For this reason, they repeatedly demand new epidemiological studies - especially when the key word in this issue is:

CANCER

CULTURE AGAINST CONTAMINATION MANIFESTO

Good evening to those committed to life. Good evening to those hopeful for the future.

Creators from Huelva are people of the sea, of the mountains, of the country, of the mine... and we are people of peace. Our heritage has always been, still is and we fervently hope will continue to be, to work enthusiastically for a legacy with a profound history in a beautiful land, and we wish to do so respecting the past, conscious of the present and with hope for the future.

But the traders of our heritage, with their sanctimoniousness, are trying our patience, a word synonymous of sufferance and waiting.

Those of us who live for creation and love it refuse to be orphaned by the signs of our identity. We do not want to be disinherited of a unique nature and so, against those who wish to bury, we shall exhume? Once again we disinter the Word as a weapon loaded with future, and we say: No to Huelva as a sewer and dump for industrial waste. We say: No to the fetid air, that should reach us smelling of the sea. And we say: No to the fact of our Atlantic waters, on which so many dreams have floated, becoming a nightmare for life, sad dead waters.

Because we must not consent to our landscape losing its identity nor to the adulteration and perversion of its nature. Because our city must embrace its rivers and kiss the sea. Because this open land of light must not be a concentration camp of shadows. Nor the pollution a toxic belt that squeezes, suffocates and darkens our future.

We do not want a phosphoric agony, we do not want black or grey, the colours of Huelva are the clean white and blue of the horizon.

We do not want to be raggedly interred. Long live the living earth!

Juan Cobos Wilkins

Read by the author to the protesters in the Plaza de las Monjas (Huelva), on the night of December 3rd, 2015.

QUESTIONS

TO JOSÉ MA— NUEL NARE— DO

Eva Lootz

You are the author of two books that are fundamental to put the dogmas of the governing economic ideology into historic context and to overcome the divorce between economy and ecology:

La economía en evolución and *Raíces económicas del deterioro ecológico y social*, both reprinted in 2015. You were responsible for introducing Nicolás Georgescu-Roegen into Spain, publishing his key work *The Entropy Law and the Economic Process* in Spanish for the first time and writing the prologue in 1996 (in the collection “Economía y Naturaleza” by the former Fundación Argentaria, currently accessible in the publications section of the Fundación César Manrique: <http://www.fcmanrique.org/publicaciones/publicacion.php?idPublicacion=107>). You are, in short, a pioneer of ecological thinking whom I constantly hear quoted by the young people worried about the crisis of civilization and the change of model, and that’s why I’d like to ask you some questions.

In my exhibition *The Song of the Earth* in Tabacalera (Madrid), I will deal with the subject of certain essential materials such as copper, salt and water, which in the case of copper and water are also of enormous strategic value.

Salt will be present for its anthropological importance as proven by the word salary and the existence of cities that are formed and prosper thanks to the salt trade, such as Salzburg for instance. Copper, because one of the most extraordinary deposits is located in Spain, the pyrite belt in the Southwest of the peninsula, one of the first to be exploited with a huge effect on the landscape, outstanding witness to the Second Industrial Revolution and which since the eighties has particularly interested me. I won’t touch on the question of oil that currently represents the strategic material par excellence, but I will talk about water, which is possibly an even more important resource for the future of humanity.

As an advocate of an art that is not confined to formal enjoyment, but rather moves in an expanded field and can be seen as a multi-faceted practice that questions the limits of the disciplines, the traditional artistic and scientific genres, I’d like to ask you some questions about social and ecological deterioration, which on first glance might seem far removed from art.

In your books you show how the unfeasibility of our economic system in the light of the natural sciences -it persists regardless of the limits imposed by the earth’s resources- is covered up by the omnipresent talk of progress and development, accepted without protest by the bulk of society.

My questions are as follows, here’s the first:

Eva Lootz—What tools can be employed to raise people’s awareness and decrease the general blindness, bearing in mind that the *media* is largely made up of hostages of corporate interests?

José Manuel Naredo—I’d like to answer that question on two fronts, that show the magnitude of the problem. On the one hand, that “generalised blindness” you mention is largely voluntary meaning that it is pointless to come up with tools if nobody wants to see or accept them. And on the other, these tools need to either be, or depend on, ideas and words that go beyond the magma of the dominant ideology, which will attempt to digest or ignore them with a view to sustaining the *status quo* as something universal and inevitable, or even governed by (democratic political or mercantile economic) systems that are considered the least bad of all those possible.

Thus, apart from the “voluntary blindness” there are also “blind spots” that trigger these prevailing notions of a “system” when, for instance, the production metaphor covers up the destruction and deterioration implicit in the mere process of acquisition or extraction (use and deterioration) of wealth, which are those truly at stake. On the one hand, we are talking about an ideology that covers up or manipulates everything that goes against it, that generates numerous “blind spots”... and, on the other, a society that bows to patriarchal institutions, that is tamed by the dependent “work” and bread and circuses type “leisure” replete with inventions that eat up people’s time, abduct their minds and draw their attention and their passion towards entertainments compatible with the status

quo and, as a result, a society that prevents the majority from thinking freely and calmly about how to drive society towards healthier ecological, social and individual horizons.

E.L.—And what tools might be conceived of to fight this conformist situation?

J.M.N.—Ultimately, the system itself has generated a social context that is more open to criticism. The severe economic crisis caused by the speculation boom has given rise to a profound social, political and institutional crisis that has perturbed conformism, spurring on social mobilisation and critical thinking. But in order for these to be true instruments of change, they must question the current dogmas and institutions and truly turn the spotlight on the deteriorations and regressions avoided by the prevalent ideology, to alleviate or correct them in the future.

The biggest issue is that, to date, the majority of the theoretically emancipative movements ended up sheltering new despotisms and reproducing the status quo that they claimed to decry, embracing, with slight variations, the same ontologies and ideas on human nature, the political system, the economic system, etc., on which the current industrial civilisation is built. The novelty lies in that now, theoretically at least, there is more knowledge with which to question the intended universality of the reigning ideology in far more depth and to prevent a repetition of the bitter experiences of the past.

Let’s hope that the well-reasoned solvency of this knowledge ends up making its mark

on the current overdose of information pollution -which has proven to be more effective at drowning out new critical ideas than the obsolete censorship of the Franco era- while at the same time acting as a sound box for its established powers and their ideological spokespeople.

In the prologue of the 2015 updated edition of my book *La economía en evolución. Historia y perspectivas de las categorías básicas del pensamiento económico*, I gave examples of these concerns when I pointed out that the new edition made me feel conflicting emotions: on the one hand, I felt pleased that the resurgence of critical thinking caused it to gain contemporaneity, “but on the other I was saddened that a quarter of a century after the first edition of this book had reported the deceptions of the ruling economic ideology, this continues to enjoy good health and is still presented to us with the same scientific reasons that I raised questions about so many years ago, to freely justify institutions, policies and behaviours, not only through the powers that be, but also to a large extent through critical thinking”.

E.L.—Could you tell me a bit more about the peak of the fossil fuels -which is perhaps less generally well-known- and how you think the State should deal with it?

J.M.N.—Maybe I should first explain what is meant by “oil peak” or that of other fossil fuels. To do so, it’s necessary to explain the “Hubbert Peak” which is what the peak in question is referring to. This peak, formulated by King Hubbert in 1956¹, represents under its bell-shaped curve the reserves of a resource (e.g. oil) available

1—In its communication entitled «Nuclear energy and the fossil fuels» to the meeting of the Division of Production of the American Petroleum Industry, held on March 7th, 8th and 9th 1956 in San Antonio, Texas. Hubbert was a pioneer in his use of the peak that nowadays bears his name and has been so broadly used by the environmentalist movement, in a text in which paradoxically he advocated nuclear energy as a natural

substitute of fossil fuels, ignoring the renewable energies necessarily trigger a sudden collapse as it is possible to turn to other sources and production processes which, however, being more costly and polluting, will signal the end of the cheap oil era.

in a given area. This curve is drawn on an axis of abscissas, that records time and an axis of ordinates that records the tonnes of the resource in question extracted each year. The bell shape of the curve implies that extraction first grows exponentially, but that its growth rhythm drops as the stock is consumed, until it reaches the upper part of the bell, in which extraction starts to decrease from the moment in which over half the initially available stock has been extracted.

Most estimates indicate that around the year 2008 half of the conventional oil on the earth's crust had already been extracted, reaching the upper part of the bell curve in the aforementioned representation -this is why we talk about the "oil peak" - from which point said representation indicates that extraction has entered into the decline phase.

Remember that last century, in the decade of the seventies, the problem of oil depletion was a general concern. The "oil crises" of 1973 and 1979, triggered by the increased costs of crude oil promoted by the OPEP countries, fostered this type of reflection that led to the conclusion that industrial civilisation would collapse due, above all, to the scarcity of resources. Nonetheless, thirty years on, when at the height of the economic boom global energy consumption had increased by 70% and there was far less extractable oil in the earth's crust than back then, its scarcity was less of a concern than the "climate change" resulting from the excess waste.

In this context, the "oil peak" has been brandished and popularised by the environmentalist movement as a reminder of the end of the oil era and to urge energy

saving and a reversion to renewable sources. To avoid confusion, it's important to bear in mind that this "peak" is still just theoretical, and will not necessarily cause any immediate scare, as half of the resource remains to be extracted. The problem is that the "peak" coincided with the start of the major economic crisis and from 2008 on, oil extraction (and consumption) dropped with the economic situation. But far from observing signs of scarcity, this led to a drop in oil prices driven by the slow demand and by the oil obtained via fracking from unconventional sources. Which once again demonstrates that the prices do not reflect the absolute scarcity of a resource in the earth's crust, but rather that they depend on circumstantial situations. Hence, there may be less oil in the earth's crust than ten or fifteen years ago and yet the price has plummeted. This already happened after the "oil crisis" in the seventies last century: when the Gulf emirates broke away from the OPEP cohesion, the price took a nosedive, even if like we said there was less oil in the earth's crust than before the hikes that triggered the "crises".

The apparent contradiction of a drop in the oil prices just when the "oil peak" is reminding us of its scarcity, induces me to underline two aspects. Firstly, that the absolute scarcity of a resource in the earth's crust and the geological times that mark its possible depletion, however peremptory they might be, bear little relationship to the times of the economic and political situation, marked by an extremely short-term vision. Secondly, that the "oil peak" reminds us of the obvious limitation of the same, as since it is one of the best known resources in

the earth's crust, there is no likelihood of major discoveries that will significantly alter the estimated reserves, as occurred in the middle of the last century with the detection of the major quality oil deposits in the Middle East.

However, it should be noted that conventional oil depletion in the earth's crust does not necessarily imply an oil shortage, as it can be obtained from other sources (e.g. slate or bituminous sands) and manufactured from coal, natural gas and biomass. And there's nothing new about this given that in the last World War, Germany and Japan were supplied largely with artificially manufactured oil from coal, through the direct (Pott-Broche process) or indirect liquefaction, first obtaining gas (Fischer- Tropsch process). It is to be expected that these processes will begin to function in order to supplement the shortage of conventional oil once it starts to run out, as they are more expensive and polluting than the mere extraction and refinement of the same. So, I believe the progressive depletion of the conventional oil deposits will not

This situation may also possibly force the transition to the use of renewable energies and hydrogen as a fuel. But the renewable energies, like the energy crops require soils that compete with other crops, uses and exploitations. This very demand for soil makes it impossible to continue to supply the vast energy consumption of the majority of rich countries with renewable energy sources alone. For instance, in its day I calculated that in Spain, even if the entire useful farming surface were dedicated to energy crops, it would still be insufficient to supply the current energy needs of the farming sector.

It is therefore clear that this heavenly kingdom of cheap and abundant energy provided by the fossil fuels era will fade, and the technological slip-up made by the industrial civilisation when it decided to base administration of the human race on extractions from the earth's crust rather than photosynthesis and other renewable by-products of solar energy, will have to be reviewed. The human race with its massive extractions currently mobilises a far higher tonnage than any geological force, leading to the conclusion that we have entered a new geological period or era: Anthropocene². This powerful extraction activity uses the minerals that the earth's crust had concentrated in the form of unique deposits which, after use, are dispersed, generally giving rise to problems of depletion and pollution.

Given that the earth is a closed minerals system, with the exception of the fortunately rare fall of meteorites, but open to the solar energy it receives daily, Georgescu-Roegen believed that ultimately the scarcity of resources would boil down to the materials, even if these can be obtained at the desired concentration and structural level by expending energy in the processes of improving and concentrating the same. The underlying problem lies in the lack of convergence observed between the geological and the political and economic times... or between what would be sustainable and desirable for the majority and the extraction interests of certain lobbies that put pressure on the States, making it difficult for these to plan an orderly transition towards renewable sources that would be desirable for the whole planet in general.

E.L.—Can we also apply the “peak” in these terms and the danger of depleting other mineral substances?

J.M.N.—Yes, but new clarifications need to be added as conventional oil is quite a well-defined substance found in specific deposits that are poorly distributed along the earth's crust. It is not possible to speak only of the depletion or “peak” of iron, as it is a very abundant and widespread substance on the earth's crust, associated with very diverse soils and minerals. Also because when iron is used and abandoned it does not change its state, like oil does when burned, but rather it usually rusts and deteriorates, but continues to exist as such, even if it does mutate towards more entropic compositions. Therefore, to speak of depletion we would have to refer, not to iron, but to certain minerals with certain iron content levels, the choice of which would be quite arbitrary as it would always be possible to continue to obtain iron from minerals or residues less rich in this substance.

E.L.—How can this problem be tackled?

J.M.N.—At present, this problem is resolved by the methodology I promoted together with Antonio Valero, the first version of which is described in the book entitled *Desarrollo económico y deterioro ecológico*, published in 1999 in the Col. Economía y Naturaleza by the former Fundación Argentaria³. Since then, following four doctoral theses and numerous publications on the subject, the research has culminated with the book by Alicia and Antonio Valero (2014) titled *Thanatia: The Destiny of the Earth's Mineral Resources: A Thermodynamic Cradle-to-Cradle Assessment*, published

by one of the most internationally prestigious publishing houses⁴. This approach begins by considering the mineral deposits under exploitation rarities of the earth's crust, in which certain substances are concentrated at far higher levels than the average of said crust, and which industrial civilization extracts, uses and degrades at a furious pace. And so if, as they say, life was born and evolved on Earth from a biological soup, the human race is now driving it towards a sort of posthumous consommé or state of maximum entropy that we've called Thanatia, the chemical composition of which is described in detail in the book of the same name that we have just spoken about.

The methodology proposed makes it possible to calculate, in energy units, what it would cost to replace the mineral concentration and structure of the deposits from that “dead state” that we call Thanatia. And, on the contrary, the methodology proposed also allows for a quantification of the quality energy, or exergy, concentrated in the Earth's mineral resources and which modern-day civilisation is now using up and dispersing at such a rapid pace. A more graphic example of this would be to compare the energy contained in the Earth to the water stock accumulated in a reservoir, and the change we could make by pumping the water faster or slower. Hence, we could overcome the heterogeneous nature of minerals and contents by representing the stock (measured in energy units) of iron or any of the other substances in the earth's crust on the Hubbert peak and calculating its corresponding “peaks”, as seen in the abovementioned book, Thanatia.

2—Bonneuil, C., y Fressoz, J. B. (2013): *L'événement anthropocène*, Paris, Eds. Du Seuil.

3—Naredo, J. M., y Valero, A. (dirs.) (1999): *Desarrollo económico y deterioro ecológico*, Fund. Argentaria&Visor Distrib., currently available in the publications section of the Fundación César Manrique: <http://www.fcmanrique.org/publiDetalle.php?idPublicacion=113>.

4—Valero, A. y A. (2014): *Thanatia. The Destiny of the Earth's Mineral Resources. A Thermodynamic Cradle-to-Cradle Assessment*, London, World Scientific.

In addition, to quantify the loss of energy potential suffered by the Earth's mineral resources as the human impact pushes it towards *Thanatia*, gives a clearly quantitative dimension to the current concerns about "(un)sustainability" that the banal environmentalism of the day is so accustomed to side-stepping. I would also emphasise the fact that this research has allowed us to build a broader and more integrating vision of the energy it covers, not only of the so-called "energy products" (oil, coal, gas, electricity, ...) but also the materials existing in the earth's crust, the hydrosphere and the atmosphere as a whole. For instance, Antonio Valero has calculated the cost of replacing the ice in the Antarctic at about nine thousand times the fossil fuel reserves, proving that the liquefaction of the same would constitute a major step of the Earth towards higher levels of entropy: the temperature gradient would decrease, the power of engines would drop, etc. Thus, we see that in the Anthropocene we can no longer even consider the climate a separate entity to the extractions and deteriorations of the earth's crust, and there is even less room for concerns about waste without taking into account the use made of resources.

E.L.—What is your opinion of Spain's energy policy over the last 40 years?

J.M.N.—In our country, the energy policy has been dictated by the lobbies of businesses with interests in the matter. This occurred during the Franco years and has continued to happen in the democracy. As an old friend who was a minister during the transition period said to me, the National Energy Plan draft reached the Ministry of Industry on paper bearing the letterhead of Unesa (the association of

electricity industries) blatantly showing that the "sector's" lobby was still in charge when it came to energy policy. The reason plans were drawn up in this way was to defend growing investments subsidised, supported or guaranteed by the State, the need for which was justified by projecting inflated predictions of demand hikes, mechanically associated with theoretical population and income increases. This has constituted the general framework in which the most powerful elites have been taking their cuts with more and more power and information within the "sector", as I extensively illustrated with examples in the case of nuclear energy. In fact, when the intention was to fill the country with nuclear plants "if we didn't want to return to candlelight", I made it very clear that the nuclear lobby's intention was not to obtain energy via a process proving to be both expensive and problematic, but rather to bill construction of said nuclear plants at astronomical figures, thus obtaining rich pickings in this phase of the process, and later the State, the users, or the dispersed shareholders of the electric companies, would all pay for these extra costs⁵. As a result, the beneficiaries of such a disproportional building craze ruined the electricity sector companies, particularly Fecsa, which having overextended itself in nuclear investments defaulted on payments as it was dragged down by its colossal debts. The State, as guarantor of the sector's mammoth nuclear debt had to salvage and refloat it with public money and, after ordering a stop to the construction of new nuclear plants, agreed to include an indemnification in the charges so that the companies could recover their inflated

nuclear investments, which we have been duly paying for on our bills up until last year. The irrefutable proof that the indirect business of building the nuclear plants was what truly drove the nuclear lobby, was that after discontinuation of the plant construction had been agreed, the nuclear plant of Valdecaballeros continued to be built and billed at inflated prices for almost a year, even though it was common knowledge that it wasn't ever going to be operational, leaving the town of Valdecaballeros a mute witness of such abuse: a sinister hulk of cement now awaiting a more reasonable use. In one interview I suggested that, as occurred with the Nazi concentration camps left standing as witnesses of a horror never to be repeated, the remains of this lucrative simulacrum of nuclear plant construction should be opened up to visitors, so that as a museum this space could illustrate and recount what should never have been done in the first place.

Once salvaged and rationalised by the State, the nuclear indigestion "sector" most recently returned to its old ways with an overdose of combined-cycle power plants construction, making money off an excess capacity that is hard to digest given the impetus gained by the renewable sources. All of this together with a liberalisation-privatisation-commodification process, has led to even more abuse of the users and the State. Following a market simulacrum, an institutional framework was created to make such gigantic rate hikes possible, the user repercussions of which the State attempted to alleviate by taking on the so-called "electricity debt". In this situation we find that Spain went from providing

5—I believe I categorically demonstrated this fact in the Cuaderno triple de Ruedo Ibérico, n.º 63-66, entitled, «Energía, política e información», from May-December 1979 (there is a facsimile edition of the Cuadernos de Ruedo Ibérico in Faximil Edicions Digitals: www.faximil.com).

ELECTRIC DEBT

cheap electricity to being one of the European countries in which electricity is most expensive, while at the same time the State was underwriting an astronomical “electricity debt” with the oligopoly of the sector. As there isn’t room for full details here, I would refer the reader to a recent book by José Luis Velasco on the “tragic history of the Spanish electricity sector”⁶.

E.L.—What is your opinion of the hydraulic policy of the last 20 years in Spain, seen from the current-day perspective? (10. 01. 2016)

J.M.N.—My assessment, as a critical researcher who has fought for a change from the current state of hydraulic works promotion to one in which the correct management of water as a resource is promoted, with its associated ecosystems and landscapes, is frankly disappointing. Both the PP and the PSOE political parties have only been critical of the wrongdoings of the hydraulic works promotion policy while in opposition. But as soon as they were elected to government they did the opposite: bowing to the wishes of the water power lobby to continue billing hydraulic works that proved to be more and more costly and inefficient. And in their zeal to erase any shadow of shortage through constant works, these new projects generated more water demands that overwhelmed the possibilities of supply, thus feeding a spiral of scarcity and waste.

Our country is a good example of that spiral in which the divorce, driven from above in the name of progress, between the uses and resources of the territories, along with the mismanagement of water, lead to ever-increasing environmental damage and water “deficits”, that serve to

The monetary reductionism of the current System of National Accounts means that its normal representation of the economic system does not reflect either the natural resources prior to evaluation and use, or the artificial waste products, which by definition also lack value, thus generating an «environment» unstudied by the system.

justify the growing operations aimed at water collection, pumping, conduction, purification and or/ desalination, thus feeding the business that these operations create. This context has given rise to critical voices coming out in an attempt to cut off the spiral of water extraction, production and waste, of private business and public deterioration, giving precedence to the water economy rather than the business of hydraulic supplies and works. Voices that our government continues to turn a deaf ear to, as it is comfortably trapped in the conglomerate of interests that protect the hydraulic works promotion policy that our country has been supporting for over a century now. Forever?

There’s no need to be so negative, you might say to me. At the end of the day, the Spanish National Hydrological Plan 2000 (PHN 2000) by Matas, was already resigned to diverting less than half the water specified in the draft bill of the National Hydrological Plan of 1993 (PHN 1993) by Borrell, which fortunately never managed to be passed. And, to crown it all, its star project, the great Diversion of the River Ebro, was repealed. In fact, we could say that the mind-set has gradually tilted in our favour and facilitated the massive protest against this megaproject, although it also encouraged the “water for everyone” demagoguery and the so-called “water wars”. But it was not our pitiful democracy that softened the government in this instance (remember the PP Minister for Agriculture saying the Ebro diversion would happen “whether we liked it or not”), but rather the battle was largely won in Brussels when the grants requested to finance the construction

6—Velasco, J. L. (2015): Crónicas eléctricas. Breve y trágica historia del sector eléctrico español, Madrid, Foca&Akal.

of this mega-project were deferred sine die due to the irrationality and amount of the same. As I argued in a letter to the Directorate General for the Environment of the European Commission⁷ regardless of the “environmental damage” the operation would cause, three requirements that could justify a diversion project were missing: that at the offtake there should be quantity, quality and height enough to transport through gravity the programmed amount of water, with good quality. But all three requirements failed, as I took the time to demonstrate, among other forums, in a monographic edition that I coordinated of the magazine *Archipiélago* (n.º 57) entitled “El agua: un despilfarro interesado”. The impasse in Brussels for the subsidisation of the “environmental investment” requested for the diversion gave enough time for the PP to lose the elections, for the first term of Zapatero and for the repeal of the Ebro diversion to be included in the investiture pact signed with IU and other parties, to obtain the support necessary to govern. Moreover, the repeal of the project appeared to offer a reasonable way out given that both the Minister for the Environment of the time, Cristina Narbona and the PSOE presidents of Aragon and Catalonia had previously opposed the Ebro diversion.

However, the investiture pact was exclusively limited to abolishing this project and nothing else. Meaning it removed the very visible and conflictive thorn of the Ebro diversion from its side, but left the rest of the indigestible hotchpotch of hydraulic works intact, including the PHN 2000 as an annex. These included the Júcar-Vinalopó

diversion (the blithe financing of this diversion, by the way, constituted one of the ruinous operations triggering the collapse of the Caja de Ahorros del Mediterráneo) which made no sense if the Ebro diversion had been eliminated, as it was dependent on it, and the Tagus-La Mancha diversion, which made no sense either as the project to divert 850 Hm³(!) from the Duero to the headwaters of the Tagus, included in the PHN of 1993, had already been abandoned in the PHN 2000.

But apart from maintaining works lacking any technical, economic or environmental rationale, it more than made up for the diversion of the Ebro with new and disproportionate investments in desalination throughout the Mediterranean arc, to meet the demands of a hydraulic lobby now reconverted into builders of desalination plants which, as they are underused, exponentially increase the price of their product. And as if the situation were not clear enough, the public company responsible for promoting and contracting the overambitious programme of investments in desalination plants along the Mediterranean coast, ACUAMED, is currently being prosecuted along with its directors for corruption.

Thus, in its context, the cancellation of the Ebro diversion has been only a relative triumph of the movement towards a new water culture (organised under the foundation of the same name Una Nueva Cultura del Agua) and the environmental movement in general, has not succeeded in changing the inertia of the traditional hydraulic works policy, nor the spiral of squandering that it generates. Further proof of this, as I will go on to describe

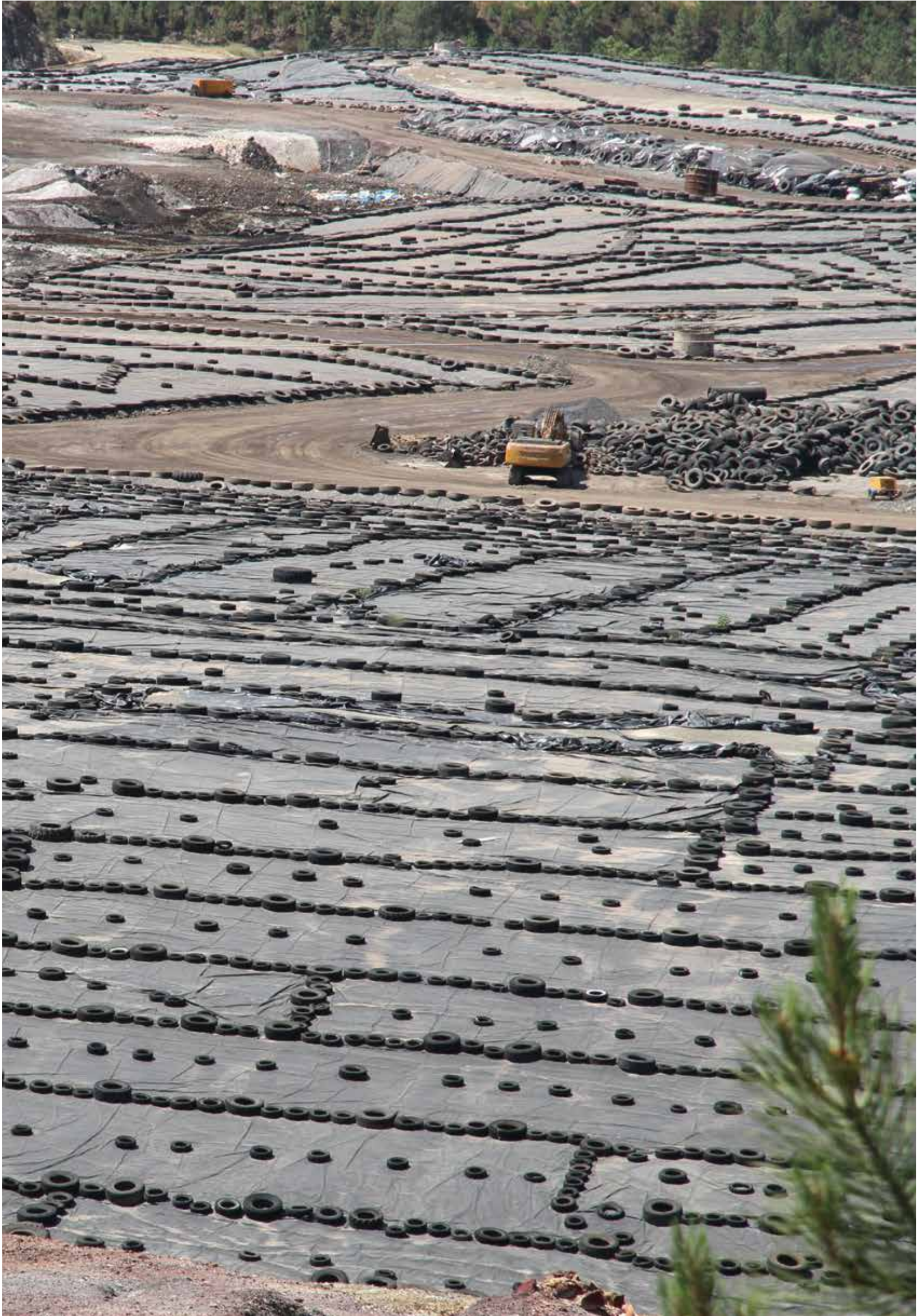
below, is that the Tagus-La Mancha diversion project went ahead, with the determination to promote and make money from hydraulic works of little technical-economic-environmental logic gaining the upper hand, to the detriment of good management of the hydro resources available.

In fact, the project of diverting water from the Tagus river to La Mancha using the Tagus-Segura diversion channel, remained in place in 1993, applying to Brussels for financing under the heading of “environmental investment”, though unsuccessfully.

A “committee of experts” was created to speed up this decision, of which I was made a member on the initiative of Brussels. A request was sent to Brussels for a decision on this project that promised to save the towns and provinces of La Mancha from the absurd scenario of “dying of thirst” in the midst of a sea of inefficient irrigation systems. An agreement between the committee members proposed by the Ministry for the Environment, who were openly and unanimously in favour of the megaproject, and those proposed by Brussels, who had an independent point of view, proved impossible. As a result, different reports ended up being released. In the report drawn up by me, together with José María Gascó and Gregorio López Sanz, and supported by Francisco Díaz Pineda, the project was disqualified as, once again, it failed on the three requirements that might justify a diversion: the project aimed to supply the municipalities scattered over the vast plain of La Mancha, bringing them water from another basin that was neither abundant nor offered better quality than

7—Accessible on the following link on the Website of the Fundación Nueva Cultura del Agua: <http://www.fnca.eu/fnca/docu/docu28.pdf>. Toxic waste dumps managed by the company Befesa, Nerva (Huelva), May 2014. © Foto E.L.

Vertidos de material tóxico gestionados por la empresa Befesa, Nerva (Huelva), Mayo de 2014. © Foto E.L.



the average found in La Mancha⁸ by means of a single system requiring a headwaters pump of three hundred metres. Our big success was preventing the megaproject from receiving EU financing, but the feeble opposition put up in La Mancha was incapable of stopping the regional and national governments of PSOE from satisfying the hydraulic lobby with this dream package of works and ended up financing this absurd project with taxpayers' money. It must be remembered that part of the water diverted was to supply the installations of the mega real estate project "Reino de Don Quijote", now bankrupt, in Ciudad Real (with its empty, 1.3 billion-euro private airport), that dragged the savings bank, Caja Castilla-La Mancha, down with it in its fall, as it had financed the project. And to top it all off, in spite, or perhaps because, of feeding a hydraulic and real estate demagogue of such dimensions, the PSOE government that had promoted it lost the second last elections in La Mancha.

The interested reader can find a summary of my views on water management in Spain, intrinsically associated with those of Antonio Estevan, in the book we wrote jointly to guide the hydraulic policy of Zapatero's⁹ first government from the perspective of a new water culture, as well as in my introduction to the highly recommendable book by Antonio Estevan (2008) entitled *Herencias y problemas de la política hidráulica española*¹⁰.

In short, all of this forms part of the new capitalist accumulation phase we are experiencing, in which the most powerful companies promote speculative operations and lucrative megaprojects of dubious social interest, oiled with

public money and/ or the financial help of local and regional despotism embodied over the years by the Savings Banks. The increase in company profits and the economic growth observed during the boom years have not, however, resulted in generalised quality of life improvements for the majority of the population, destined at the end of the day to pay for the banquet of profits, capital gains and commissions gained in this way, and guzzled down by some over the years¹¹.

E.L.— Which errors and successes -if there were any- would you highlight in Spain's raw materials policy of the last 20 to 30 years?

J.M.N.— I don't believe there is any veritable State policy in the matter of raw materials. Perhaps a more structured policy may have existed in the "autarchy" of the post-war years, driven by shortages and the difficulties with supplies, and because of similar worries and the autarchic solutions employed in Nazi Germany (such as the manufacture of artificial oil, mentioned above).

It is no surprise that in the early Franco years, to cover the shortage of fuels, a considerable fleet of cars running on producer gas (obtained in the gas producers incorporated into these vehicles) was in operation along with German technology, electric vehicles (that worked on batteries charged with electricity from hydraulic and coal-fired power stations) and that there was an attempt to obtain oil from the bituminous slates of Puerto-llano. In this context, the Instituto Geológico Nacional and the national company ADARO were promoted, with projects such as the Mapa

Geológico Nacional..., or the Instituto de Edafología del CSIC and the Mapa Edafo-lógico Nacional, on top of the well-known construction of reservoirs for hydroelectric and irrigation purposes, and the irrigation plans associated with the INC and the subsequent IRYDA (National Institute for Agrarian Reforms and Development). All in connection with the powerful conglomerate of public companies in the INI (National Institute of Industry).

As a civil servant and economic analyst, rather than reorientation, what I have witnessed is the mere liquidation or extreme reduction of this conglomeration of entities and companies which in its day had tried to foster knowledge and guide the management of the country's natural resources to promote self-sufficiency. This dismantling is rife with gaps in knowledge along with a lack of reflection and consensus that give rise to blithe and self-interested decisions on megaprojects as deplorable as installing a major gas deposit in front of the coasts of Tarragona and Castellón: the so-called Castor Project, that led to earthquakes and was abandoned, though not before paying a compensation of 1.351 billion euro to the construction company, partially owned by ACS, awarded the project, for abandonment of the same. All of this in times of severe budgetary restrictions, such as those of November 2014.

E.L.— How has the matter of natural resources inclusion in the national accounts progressed?

J.M.N.— The monetary reductionism of the current System of National Accounts (in turn, accredited by the

8—Our report, which is far more than a simple verdict, is available on the Webpage of the Fundación Nueva Cultura FNCA) del Agua: <http://www.fnca.eu/fnca/docu/docu85.pdf>

9—Estevan, A. y Naredo, J. M. (2008) *Ideas y propuestas para una nueva política del agua en España*, Bilbao, Bakeaz.

10—Antonio Estevan (2008). *Herencias y problemas de la política hidráulica española*, Bilbao Bakeaz. It is also worth referring the reader interested in my opinions on the paradoxes involved in the traditional opposition between public and private, and between planning and water markets to the following text available on the Website of FNCA: <http://www.fnca.eu/fnca/docu/docu243.pdf>.

11—See: Aguilera, F. y Naredo J. M. (Eds.) (2009) *Economía, poder y megaproyectos*, Lanzarote, Fundación César Manrique, Col. «Economía & Naturaleza».

United Nations and the EU) means that its normal representation of the economic system does not reflect either the natural resources prior to evaluation and use, or the artificial waste products, which by definition also lack value, thus generating an «environment» unstudied by the system. The national accountants, aware of the limitations inherent to this reductionism, have opened the door of the system to relevant physical and social information through the so-called “Satellite Accounts”. Satellite accounts may appear in education (that include the number of teachers, students, etc.), in healthcare (with the number of patients, hospital beds, etc.) and the environment (with resources in the territory, soils, lithology, flora, fauna, ecosystems, landscapes... the flows of resources used and the waste generated, etc.) all in connection with the monetary flows assigned to these areas. Nonetheless, the National System of (monetary) Accounts continues to govern the management, displacing the rest to the category of “satellite accounts”. I remember an international meeting on national accounts at which I gave a talk on the subject and concluded by expressing my hope that in the future some of the “satellite accounts” would end up becoming true planets. But for that to happen, we would need to overcome the current monetary reductionism, making way for multidisciplinary and transdisciplinary economic approaches, for approaches that prioritise the principle of knowledge integration as opposed to the current dominion of sectorial and partition-based approaches that nurture the current Tower of Babel of scientific specialities and institutions responsible for making

«... The increase in company profits and the economic growth observed during the boom have not, however, resulted in general quality of life improvements for the majority of the population, destined at the end of the day to pay for the banquet of profits, capital gains and commissions gained in this way and guzzled down by some over the years.»

SAT— ELLITE ACCOUNTS

decisions.

At the same time, some countries have developed specific accounts systems adapted to their own resources and territories, that are useful for a management of the same based on knowledgeable guidance and agreement, in which not only are the physical and territorial dimensions of the natural resources associated with the territory and the extraction, transportation and usage flows recorded, but so also are the monetary flows linked to them. This is what I was trying to promote in Spain with the creation in 1987 of an Inter-ministerial Commission for the Natural Heritage Accounts, aimed at filling this gap in our country. After over two years of work, elaborating and agreeing the methodology and priority projects with the Governmental departments most involved in the area, it was halted in its tracks due to a lack of political support: as I did not obtain the budgets and means necessary to move it forward, I preferred to make the issue very clear by abandoning my duties as secretary of the Commission and even my job as a civil servant, taking my research interests to other fields. Unfortunately, over thirty years later, the majority of the information deficits underlined in the Commission’s final Report are still practically uncorrected at a time when the economic scenario and the technical means would have made it perfectly possible. The ANNEX 1: Brief history of the Inter-ministerial Commission on the Natural Heritage National Accounts (CICNPN) in the Autobiographical section of my website El rincón de Naredo¹², documents this sorry tale.

E.L.—In what part of the Spanish economic policy do you detect obstacles

¹²—<http://www.elrincondenaredo.org/autobiografia.html>

from the Franco regime that have not been eradicated and continue to drag down the country's functioning?

J.M.N.—The democratic metamorphosis from the Franco regime in the transition period gave rise to an oligarchical reorganisation of power, in which certain elites continued to make the big decisions and nurtured the big businesses turning their backs on the majority. The same public administrations continue to bow to the dominant business or party interests in each given sector... or in each municipality, meaning it is normal for them to work towards these interests and that corruption generally tends to prosper under a legal umbrella. In urban planning, legalisation exalted the “urban planning agent” which, in coexistence with the local politicians, freely used the land reclassifications tool “to make big bucks out of urban planning”. As a result, urban operations and megaprojects that would have been considered a scandal during the Franco years multiplied afterwards under the mantle of legal impunity and good political and entrepreneurial know-how.

The novelty compared to the Franco years lay in the fact that manipulation of public assets for private interests and the innate corruption this implies cannot persist if it is clearly visible in theoretically democratic regimes. Which is why there is an attempt to cover up the manipulation and/ or misappropriation of public assets, concluded in the shadows or justified with tall tales and misunderstandings aimed at confusing the people. And that is why the well-documented reporting of this plundering is essential to deflate these tall tales and so-called misunderstandings.

In general, the elites or castes have continued to plunder the public sector, tending to camouflage their despotic behaviour by flying liberal and democratic banners as a decoy to divert criticisms towards theoretical market dictates and the competitiveness that they themselves trample on a daily basis, to stealthily impose and assign *à la carte* privatisations, operations, capital gains, contracts and gifts in favour of their very individual interests, and to the detriment of the majority.

Let us review two premises of the dominant ideology that is accustomed to camouflaging and/ or justifying operations of this type: one is the theoretical lack of connection between public and private, and the other the hypothetical benefits of private management as opposed to public, or the market versus planning.

The first is that the usual discourse confronts the public and the private as if they were different entities, giving rise to the confrontation between a (neo) liberalism claiming to be in favour of the private and a left-wing that defends the public. This latter tends to assume that the public is independent of the private and that it is managed for the common good, or bearing in mind the general (not individual) interests. However, the problem lies in the fact that this independence has been remarkable for its absence in the majority of cases, although every effort is made to make it seem a given by dressing private interests up as public. Thus by declaring the majority of the works of “public interest”, they get around the fact that the lobby of the major construction companies is the entity truly governing the general

infrastructures policy in our country, guided by its eagerness to invoice “public” works and not correctly manage the territory, transportation or water, with its ecosystems and landscapes. This is why Spain has undoubtedly inflated its investments in public works, as a leader in airports, motorways... or high-speed rail per capita... as well as the percentage of geographic surface covered in reservoirs. And that is why the State administration and the public or semi-public companies have always been manipulated by power and used to shelter politicians or technicians loyal to the same, acting as procurers at the service of company and/ or political party interests, showing up the osmosis between economic power and political management. Occasionally, this management has bled the public companies to the point of bankruptcy, to then sell them at cut price claiming that they constitute a burden for the State. The example of how the savings banks have been acting as the financial arm of the local and regional despotism, to the point of ruination, to then be refloated with public money and sold at enormous losses to the State clearly demonstrates this behaviour.

Having identified private management with a free, competitive, transparent market and perfect information, and attributed it the beneficial qualities that appear in the economy manuals, the conclusion is that private management is better or more efficient than public and the convenience of privatising such management is promoted. The prevalent confusion arises from the unrelenting spread of the idea of the market as panacea, with its theoretically ideal

beneficial functions, when at the same time the word market is also used to indiscriminately designate all exchanges in which price comes into play, whereas these are simply termed business exchanges. But the exchanges do not tend to be free, competitive, transparent or perfect, particularly in the case of water, land, money or other asset-related elements that are not produced, like tomatoes, for consumption. In addition, the businessman's goal is not to compete in a free market, but rather to rise as a monopolist, meaning that any result of the public-private struggle does not confront planning and market, but rather planning for the people versus planning for the profit of some.

No, the blame for the larceny committed in our country cannot be laid at the door of the market's free will or a malignant (neo) liberalism, but rather the exertion of a despotic power more characteristic of the Old Regime. Indeed, it is the hand of this power that continues in its wish to award privileges, concessions or monopolies to whomsoever it pleases. It is this freedom of the powerful, more typical of an absolute power regime, that now claims to be setting real estate "operations", privatizations and various contracts in motion, not the egalitarian freedom for all that the liberal utopia calls for. We must realise that the so-called capitalist society is not the embodiment of liberal utopia, but rather the fruit of a complex historic evolution conditioned by previous hierarchical societies which in our country laid the foundations for a despotism that rides again nowadays in a liberal guise. To unmask this character, I believe it is necessary to use the term neo(despotism)

rather than (neo)liberalism to describe the despotic power regime that has been organising the plunder of public assets during the democracy years. Indeed, the practices reported very clearly illustrate the "evil politician of despotism, whose goal -claimed Macías Picavea in his classic book on the subject entitled *El problema nacional* (Madrid, 1899)— is defined in two inferior aspirations: to dominate, not govern; to plunder, not administer". Let us conclude by saying that the economic restructuring required by the current crisis should go hand in hand with a political restructuring to prevent the people from becoming victims of abuse like that suffered in recent years yet again in the future, illustrated by the abundance of corruption cases being tried in the courts.

E.L.—What do you think of the statement made by André Gorz (author of *Crítica de la razón económica* in 1989 and *Ecológica* in 2008): "Catastrophe cannot be avoided without leaving behind the economic logic of the last 150 years"?

J.M.N.—I agree, as in my opinion this economic logic constitutes a key element in the prevalent ideology. But it is important to take into account that this economic logic goes far beyond what has been called capitalism. In fact, this is the logic that has also generally impregnated the experiences of "real socialism" presented as alternatives to capitalism. In line with the economic theories of Marxism, they accepted the idea of an economic system conceived by the classic economists, even further magnifying the metaphor of production and the myth of growth as unequivocal sources of progress, on presenting the development of the

"productive forces" as the driving force. The result of all this seems quite clear today: these systems could not give rise to truly alternative societies.

E.L.—Let's talk about the theoretical Green Economy, the basic idea is the commercialisation of the biosphere's regulatory functions via payment for environmental services, PES.

J.M.N.—It all begins with a conflict between economy and ecology that confronts different objects of study and reasoning systems: while the former reasons on the monetary aggregates of people, companies and countries, the latter does so on the biosphere, the territory and the ecosystems at different aggregation levels and it is clear that the first can grow by depleting the second. An "environment" unstudied by the system also appears, riddled with social and ecological damages that the economic process generates (and ignores) in its desire to increase certain monetary aggregates. An environment that would not exist as such for open and trans-disciplinary economic approaches that prioritise the principle of knowledge integration as opposed to the normal partition-based approaches.

In my book *Raíces económicas del deterioro económico y social* I spell out the rules of the economic game that drive the human race's predator behaviour, degrading this unstudied environment. And when the analytical network of one approach fails to include an unstudied "environment" there are two possible approaches. One, is to attempt to extend and cast out that same analytical network again in order to capture certain elements of that "environment". And the other

is to turn to other analytical networks considered more suited to this purpose. Both possibilities are currently under development.

The first uses the so-called “green economy”, by which it extends the yardstick of money to evaluate elements of this “environment” with a view to bringing them back into the fold of the ordinary economy by applying a cost-benefit analysis and the so-called “market-based conservation”. To do so, it attempts to extend property and exchange or allocate monetary value to the different elements, systems and processes that make up this environment”, to subsequently impose charges and payments based on two principles: who pollutes pays (for the “environmental damage” caused” and who conserves charges (for the “environmental services” or “ecosystems” supplied by a hypothetical nature removed from the human species, maintaining the old mind-body Cartesian Dualism, and ignoring the fact that the nature in question is so profoundly interfered with that there is no possibility of considering it separately from the human species which, moreover, obtains the majority of services from the agricultural, industrial... or urban, ecosystems). This is why we are witnessing the curious tenacity of a discipline that, without changing approaches, attempts to study the unstudied environment that it itself has segregated. The big problem lies in the fact that the imperialism of the prevalent economy is so strong that it renders the people incapable of seeing that this current desire to make an economy of that environment that was previously not even studied, is as surreal as it would be to make the metaphysical physical.

«... implicitly debated problem lies in clarifying whether the economic world should continue to revolve around the nucleus of pecuniary values or, on the contrary, we should displace the reflection towards the physical and institutional universes that surround it, to offer a satisfactory response to the ecological or “environmental” issues that concern us.»

**“ECO—LOGICAL—
ECO—
NOMY”**

The second is that applied by the so-called “ecological economy” which adopts a trans-disciplinary approach which, without discarding the monetary reasoning, turns to elaborations by disciplines such as ecology, thermodynamics..., or hydrology, for which the aforementioned unstudied “environment” does not exist as the elements and systems it is made up of form part of their normal object of study. But the imperialism of the ordinary economic approach is so powerful that it has succeeded in imposing its views and its language the world over, without any real consciousness of it.

Let us imagine that the “ecological economy” or as I call it “eco-integrational approach” goes beyond the normal disassociation between human and nature, economy and ecology, or economy and environment, by reasoning with broader approaches and objects of study than those of the ordinary economy, which considers the human species an inherent part of the biosphere and the economy an ecosystem to analyse with all of its pieces (physical, socio-political... and monetary). Rather than siding with the Cartesian Dualism and continuing to confront the human species with nature, this approach aims to create an enriching symbiosis between the two. Nor does it deem nature an erratic and uncontrolled “environment”, but rather considers it subject to the laws and systems of operation that must be taken seriously into account when it comes to management.

In all, the reliable application of the monetary evaluation techniques require good physical knowledge of the “environmental” assets or impacts to be valued, necessitating information on the

resources and behaviour of the physical processes and resources analysed by other disciplines. Hence, when analysed in depth, the extension of the object of study to encompass “environmental externalities” leads to a connection between economic reasoning and both the discourse and modelling of disciplines which, like ecology and thermodynamics, already included these “externalities” in their usual field of reflection. And with it arises the need to change the statute of the standard economy itself that the aforementioned evaluation approaches discarded right from the beginning.

These and other paradoxes implicit in the objective of creating an “economy of the environment” are fruit of the desire to transfer the economic reflection to the physical world within the framework of a mental and academic compartmentalisation that are unsuitable for this purpose. And as usually occurs when new problems that are difficult to fit into former conceptual and administrative structures arise, situations rich in ambiguities that are anything but enlightening are generated. This is what happened when the eclectic Tycho Brahe system (that admitted that the planets revolve around the Sun, but still maintained that the Sun revolved around the earth) replaced the Ptolemaic model, as an intermediate step towards acceptance of the new cosmology of Copernicus, Kepler and Galileo. Now the implicitly debated problem lies in clarifying whether the economic world should continue to revolve around the nucleus of pecuniary values or, on the contrary, we should displace the reflection towards the physical and institutional universes that surround it, to offer a satisfactory response to the

ecological or “environmental” issues that concern us. The result of all this is coexistence, and the implicit struggle between two economic approaches that aim to broach the natural physical environment from two different perspectives of nature: one, the idea of the “environment” (that maintains the Cartesian Dualism and the human species-nature divorce) and another based on the notion of the “biosphere”, which the human species participates in, with all of its ecosystems (including clearly manipulated industrial, urban... or agrarian ecosystems). I believe that a clear plurality of approaches would contribute to dissipating the ambiguous current situation.

E.L.—Might the indigenous peoples that inhabit sensitive areas of the biosphere such as tropical forests or coastal marshes be positively affected if they are paid to conserve them?

J.M.N.—Yes they could, but the experience in Ecuador of saving the Amazonian rain forest and the indigenous peoples, paying to conserve them, did not prove to be a very successful use of this type of tool. The experience never came to fruition and my friend, the economist and minister, Alberto Acosta, who proposed it had to resign when the extraction and exploitation interests in the government itself and even among the indigenous people affected prevailed, as they were offered gifts and promises.

E.L.—Now let’s move on to the myth of development and delve a bit deeper into the subject of language. I was particularly interested in you drawing attention to the fact that -to put it briefly- deconstruction, afterwards commonly called post-modernism,

has laid the ground for the fraudulent use of language we witness daily. If deconstructivism calls for the evasiveness of meaning, the endless task of hermeneutics, the infinite interpretation in which full meaning is never attained, then the doors are opened a chink to the mendacious and fraudulent use of language, and nothing, on the other hand, could be further from the authors described as deconstructivists. But the fact is that at present we coexist on every front with this deceptive and twisted language, which is why Public Works are suddenly called Infrastructures (God forbid anyone should associate them with the public good...), genocides are called collateral damages, asbestos is called crysotile (because nobody knows what crysotile is) and the search for the maximum benefit is called sustainable benefit, etc.

There’s certainly nothing better than reading your book *Raíces económicas del deterioro ecológico y social* to understand the tangle that sustains the alleged “sustainable development”. But, what’s the remedy for that? Apart from the fact that a good diagnosis constitutes half the cure.

J.M.N.—It’s true that in that book I do provide some of the key aspects governing self-interested management which is the whole point of using language to side-step problems or defuse conflicts. One very widespread procedure consists of combining the opposites of a conflict in a new word, or making an adjective out of another, to imply that this conflict has been resolved or is in the process of being resolved. That’s the case of the term

sustainable development, used to build a virtual bridge between developmentalists and conservationists through language thereby defusing the traditional conflict. The term sustainable development has the benefit of pleasing both developmentalists and conservationists at the same time, resulting in a gift for politicians and businessmen, as by flying this flag they succeed in attracting everybody.

To answer your question, my first recommendation is to distrust the language of power and to use the new adjectives ascribed as possible detectors of gaps or unsolved issues. For instance, if the goal of sustainable development is invented, it's because there is an implicit admission that ordinary development was by nature unsustainable. The same would be true if, in the Escuela Técnica Superior de Arquitectura, of which I am professor ad honorem, a masters in bioclimatic architecture were created, it would be because the architecture taught in the ordinary curriculum of the Escuela paid no attention to the climate, orientation... or the materials of the environment, thus implicitly highlighting this gap. Or if mention is made of the quantitative economy, it's to cover up the fact that the economy works with pseudo-measures of pseudo-magnitudes that fail to meet the requirements of metrology when it comes to real quantitative science (for instance, it makes no sense to speak of quantitative physics when -unlike the economy- physics is the quantitative science, par excellence).

My second recommendation consists of approaching the meaning of the adjectives or suffixes independently. For instance, setting aside the oxymoron of sustainable development, to hone in on the future

sustainability, stability or viability of the systems, we realise that this is what ecology had been doing all along and it is what triggered the original unsolved conflict between developmentalists and conservationists. And we see that at the heart of all this lie the conflicts between the economy and ecology, consubstantial with the Western notion of human nature and the dominant economic ideology which, as I have already indicated, would benefit from a revision.

E.L.—You advocate an eco-integrationist approach, the need for the economic system to co-evolve, adapting to the ecological demands. What measures could be taken to drive this process?

J.M.N.—Precisely, compared to Cartesian Dualism and partitioned knowledge, I believe the principle of knowledge integration needs to be prioritised, which is why I advocate the eco-integrational approach.

An approach that in one sole eco root brings together the oikos of the economy and the ecology, preventing the current divorce between the two. Unlike the monetary reductionism inherent to the usual economic approach, this approach will have to be multi-dimensional and trans-disciplinary. It posits that humankind forms part of nature and that the economic system, with its urban, industrial or agrarian offshoots, is an ecosystem and as such needs to be studied, along the lines described above. Regarding the means and measures, they are the same ones we've been proposing from the perspective of the ecological economy, agro-ecology, industrial ecology..., or urban

ecology¹³. Proposals that range from the subject of information on territory and natural resources and the metabolism of the systems, such as that developed by the former Inter-ministerial Commission for the Natural Heritage Accounts..., to the aforementioned book *Thanatia*. Or also proposals relating to the institutional framework, such as those developed in the case of water... or urbanism, that I've just referred to.

E.L.—What do you think of the Free Trade Agreement with the USA, the TTIP?

J.M.N.—I take a critical stance because deep down, the intention of the TTIP is to prepare the ground for the transnational companies from the USA to run amok in *Ecología y ciudad*, Barcelona, *El viejo topo*, for my participation in more official documents such as the territories of other countries, granting freedom of exploitation to the powerful. Nonetheless, I believe that once again it has triggered deceptive controversies. As the word Free appears in the agreement title, all that seems to be missing is for the words trade prohibition or contingentation to come before it, confirming the rules that currently govern the evaluation on which this trade rests. As I already warned in the book *Raíces...*, unless corrective institutional frameworks are put in place, what I call the "notary rule" will determine an evaluation hierarchy that benefits the countries, companies and people responsible for the final phases of management and commercialisation, causing the growing international specialisation to make the "North-South", "city-country" or "rich" and "poor" imbalance more pronounced on every level. Indeed, in the trade case at

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3—For instance, in the case of water, see the aforementioned book I wrote with Antonio Estevan (2008) *Ideas y propuestas para una nueva cultura del agua en España*. In the case of urbanism, see the chapter «Instrumentos para paliar la insostenibilidad de los sistemas urbanos» that I penned in the book coordinated by Teresa Arenillas (2003) the *Libro Blanco de la Sostenibilidad en*

el Planeamiento Urbanístico Español (2010), for the former Housing Ministry, that I directed with José Fariña or the extensive chapter I jointly wrote with Salvador Rueda, applying the eco-integrationist approach to the urban issue, in the *Libro Verde de Sostenibilidad Urbana y Local en la Era de la Información* (2012). In the case of Agriculture, among my numerous works,

hand, the valuation of goods based solely on the cost of obtaining them, that is, ignoring their “ecological deterioration baggage”, along with the growing specialisation, is also a source of ecological deterioration and social and territorial polarization. And on top of the actual rate of monetary valuation governed by these asymmetries, there is also a financial system that increasingly contributes to reinforcing the economic power of the rich countries and their “economic agents”, apart from what the merely commercial equilibriums would permit.

Like the WTO in its ongoing crusade for free trade, the TTIP aims to extend the “notary rule” to an international scale. This determination tends to ignore the fact that the broad exercise of freedom is fostered by the establishment of rules of play that are so unequivocally clear that, at the same time, they allow for the conflicts, arbitrariness and inequalities to be reduced in the way they are handled.

Since the French Revolution it has been common knowledge that *laissez faire* requires rules and “social networks” that help spread the exercise of freedom to the entire social body which in the former Regime appeared to be monopolised by just a few. I would like to refer to the implementation of the Decimal Metric System in 1791 in post-revolutionary France, for instance, which unified and simplified the existing system of weights and measures, thus facilitating trade and that very same year made it possible to suppress the specialised juries who had to notarize the exactitude of the measurements and intervene in the endless trials and complaints generated by the issue, juries whose lack of popularity

was fruit of their commonly self-interested arbitrariness. In the trade case at hand, I would insist that the valuation of goods based solely on the cost of obtaining them, that is, ignoring their implicit “ecological deterioration baggage”, combined with the growing specialisation, is also a source of ecological deterioration and both social and territorial polarization. Remember that in the book *Raíces...* and in the more specialised volume *THANATIA*, the criteria needed to evaluate the complete physical cost of obtaining products is established as a first step towards alleviating the current imbalance between physical cost and monetary value described in the “Notary Rule” by laying down suitable rules. We believe the establishment of this type of rules will enable the spread of freedom of trade on healthier ecological and social bases than at present.

However, these matters continue to be ignored in the discussion of “free trade agreements”.

E.L.—And, finally, a question about the Riotinto region and the phosphogypsum in the estuary of Odiel: What is your diagnosis of the social and ecological situation of the mining area of Huelva and the toxic material deposits, repeatedly reported by the local inhabitants?

J.M.N.—As my knowledge of the subject is so precarious, I couldn’t make the diagnosis you’re asking me for. My opinion is that I distrust the mining restoration as a general, ideal solution. Rather, I believe that there should be a balance between some restoration and the maintenance of the landscape generated by mining,

which is sometimes tremendously impressive and should be preserved and occasionally, should even be open to visitors, presenting it as a reflection of a system that has promoted extraction as opposed to recovery and recycling, distancing itself from the biosphere’s innate functioning model (accustomed to closing cycles of materials, reconvertng waste into resources) to make way for Anthropocene.

For example, the landscape of Las Médulas, generated by the Roman gold mining, is extremely interesting, as is that of Riotinto. They are unusual constructed landscapes worth seeing, in which neither the cost nor the aesthetic result would justify the desire to return them to their original state. However, what should not be allowed to happen is for them to be left by the wayside, continuing to pose pollution issues and for there to be populations who suffer from their toxicity.

the book I co-wrote with José López Gálvez (1996) *Sistemas de producción e incidencia ambiental del cultivo enarenado y en sustratos*, Fund. Argentaria y Visor Distrib., Col. «Economía y Naturaleza» is worth mentioning (currently accessible in the publications section of the aforementioned Fundación César Manrique).

AND BEYOND, ON THE OTHER SIDE OF THE EARTH, THE LANGUAGE OF WATER¹

Isabel Tejeda

Before the wig and the coat were the rivers,
the arterial rivers;
the mountain ranges, in whose weary wave
the condor or the snow appeared, unstirring:
the thickness of the humidity, the yet unnamed
thunderclap, the planetary pampas.

Man was earth, a vessel, the eyelid
of the quivering clay, a form from the mud of the
earth, a Carib pitcher, a chibcha stone,
an imperial chalice or an Araucanian silica.

Tender and bleeding he was, but on the hilt of
his moist crystal weapon, the earth's initials were
inscribed.

Nobody could remember them later: the wind forgot
them, the language of water was interred, the keys
were lost or drowned in silence or blood².

Pablo Neruda



1—This text would not have been possible without the collaboration of Adela Chacín, Tomás Estévez, Rafael Robles Cuéllar and Natalia Cardona. Thanks to each and every one of you for your generosity when sharing knowledge. And to Matías Estévez-Chacín for his excellent photos.

2—Fragment by Pablo Neruda, "Amor América (1400). La lámpara de la Tierra", en *Canto General* (1950).

Local children learn about mycelium in the dead leaves of the woods

Liverworts, moss and bromelia store water
© Fotos: Matías Estévez-Chacín

A year ago, when I was with Eva Lootz starting on her project *The Song of the Earth*, we came across three core elements of the first stages of the peninsula's history: copper, salt and water, the latter being of cardinal importance in the economic growth of Spain in recent decades. Lootz had been pondering all three for years. In the mid-eighties she photographed the salt marshes of Torrevieja in Alicante, immense open-air containers of raw material formed by the neo-quaternary basins. Salt, now piled in mounds next to the coast, was once currency, an instrument of commercial exchange and Salario, Salary, an installation of salt, wood and olive leaves in paraffin, that tells a metaphorical story. Copper had caught Lootz' interest throughout those years, particularly the copper on which the history and landscape of the Rio Tinto mines in Huelva were constructed and, although she had not yet completed a specific project on the material, she included it in her latest book *Escultura negativa*. We worked together on water in *Hidrografías*, in Murcia's Sala Verónicas: an asset that is now the subject of territorial disputes but over which, in a dystopian future, wars might be fought. A few weeks ago, in the last phase of the project, Eva Lootz put together the music of Mahler with a "martinete" sung by Manuel el Agujetas, while I contemplated her peculiar history of the planet told through water, copper and salt. And that was when I was reminded of a Colombian mountain steeped in tales, displaying common protagonists in admirable form. As Eva Lootz suspects, the gorge I visited a year ago on the other side of the ocean demonstrated that "the elements of the earth and their properties come before ideas as guides to human destiny. In other words, materials make the world and prefigure the history of humankind, because the Earth always comes first and human beings afterwards".³

Europe is anthropic almost in its entirety. Those of us born in this area find the concept of a region where nature has not been transformed by human activity difficult to grasp. These mutations are those designed by our ancestors and which we continue to develop, in a slow and secular distancing from origins. The fact that we have transformed nature into a landscape is intimately related to the imagination. And from this an estrangement is born, as occurred with the aesthetic category of the exotic in the eighteenth century, which fashions our current attraction for things wild and indomitable. Our

imagination turns to a search for what we were, a longing imbued with the category of the sublime that places us at the brink of a precipice over which we are lured to leap. I believe this is why, in highly anthropised regions, like some areas of increasing desertification in the south east of the peninsula, people feel the need to stain their roads and roundabouts green; a scenography of plastic and paint which is soothing to the eyes.

The Earth preserves relicts of primeval nature; one European example of this is the Białowieża forest (Poland), and, of course mention should also be made of the coldest and most inaccessible areas of the planet. The Amazon rainforest, the planet's major biological reservoir is undergoing unstoppable destruction by deforestation, under attack by speculation from the rubber, wood, oil and farming industries. The fact that reserves which preserve areas of primary forest exist only a few kilometres from areas of overpopulation, is surprising. Such is the case of *Passiflora*, a mountain gorge which has a strip of primary forest, as well as secondary forest.⁴ The gorge is in Tabio (Colombia), in the eastern range of the northern Andes, specifically the Cundinamarca region, and only fifty kilometres from the city of Bogota with its nine million inhabitants. It is a natural reserve of 20 hectares, its highest point is 3100 metres, and it is private – there is a very limited public structure in Colombia. It was purchased years ago by the museologist and visual artist Adela Chacín and biologist Tomás Estévez. Tabio lies in an area in the midst of real estate speculation. With its spectacular beauty and proximity to the economic and political centre of the country, Bogotans find the area very attractive for both main residences and second homes. Therefore, the *Passiflora* reserve is in permanent danger, but is being healed and cherished, so that not only will it continue to speak the language of water, as Neruda would say, but will reveal to us what we are and what we were.

The main contributory of the Chicú flows from a mountain spring, the river Tincé; its water streams purified through the mountain's sandstone soil, lichens and minerals. This water has no need for further purification because the mountain regulates and filters it, ensuring its quality. *Passiflora* lies on a Cretaceous sandstone formation that was seabed 65 million years ago and whose rocks form aquifers. In this region,

³—Eva Lootz, "The Song of the Earth", in this same publication.

⁴—The secondary forest is generated from the remains of lost primary forest.

Chacín and Estévez coordinate environmental knowledge, archaeology of the landscape and its social use and convey to their guests, friends and strangers alike that: “depending on the cycle of the aquifers and the mean retention time of the water’s journey to the subterranean world, visitors have the opportunity to try different tastes at the side of the springs, knowing that they are drinking waters which rained down decades or even millennia ago, according to the depth of each spring. Thus visitors can experience the water’s memory”.⁵ For the Muisca, the pre-Columbian culture that inhabited this strip of the Columbian Savannah, Tincé, named for knowledge and use, meant “hidden waters”; the mountain from which it flowed was thought sacred, a sanctuary. The Muisca worshipped water, considering it a supreme being. Even the number 1, in the Chibcha language – the family of languages to which these native languages belonged – was pronounced in the same way as water: ata. In Muisca culture, which was very anthropologically sophisticated and maintained crossed matrilineal filiation, Bachué was the great goddess, the original figure, the great mother, and was again identified with water⁶. According to the late eighteenth century chronicles of José Domingo Duquesne, a priest who wrote a dissertation based on his field studies of the Muisca calendar, water signified the beginning, it was a sign when it fell from the mountains in the first winter, in January, that the crop should be planned.⁷ Aware of the dangers of uncontrollable nature, such as river floods with their furious waters inundating harvests and dragging lives along with them, the Muisca formed a homeostatic relationship with nature: they cared for it and were cared for by it, they received and they gave⁸. Life protected life, it generated the conditions to make life possible. Offerings to the gods were buried under hundred-year-old trees and votive objects, often of gold, thrown into the waters; this happened ceremonially in the sacred lake of Guatavita.

After the arrival of the “wigs and coats” under the leadership of Gonzalo Jiménez de Quesada in 1536, the Spanish Empire commandeered enormous amounts from both the material and the symbolic culture of the Muisca. Acculturation was brought about in the name of evangelism, and steadily and mercilessly a *damnatio memoriae* declared on the language

of water, which was considered idolatry. Rituals of gratitude were forbidden.

The Muisca temples were destroyed. Drunk on the notion of El Dorado, some of the colonists desecrated the lakes in search of the precious gifts of gold that had been thrown to the waters. From a mythical element and basis of the Muisca’s farming tradition, water became a possession of the State. The Muisca’s other economic base was trade: emeralds, copper and, above all, salt. The same fate as water also befell salt, as a highly important raw material: the Muisca used it not so much as a condiment but as currency for trade with neighbouring tribes. They formed it into cakes for ease of transport. Muisca land was rich in salt, with countless deposits throughout the region.⁹ The Muisca also lost their monopoly over copper, which was essential firstly, for their fine gold work and secondly, to trade for gold, plentiful in the southern populations, that they used in their offerings to the lake. The exploitation of the salt, emeralds and copper of the area which had already been baptised New Granada fell into the hands of the Spanish Crown. This change of name erased part of the memory of the region in a process of appropriation and syncretism which, over time, resulted in symbolic meanings becoming superimposed and hybridised.

The indigenous farmers have kept the culture of water alive. They believe in the existence of the Mohan, a mythical being that is a mixture of hermit and creatures of fable. Fierce and elusive with skin of moss and long hair trailing the ground, the Mohan lives in creeks, streams and gorges, wherever there is water. It is possible that the creature originates from the figure of the shaman and indigenous doctor.¹⁰ According to native farmers these beings very occasionally contact them and people from outside or “from the dry”; they are both venerated and feared.¹¹ According to popular culture, the Mohan continue to care for the water sources and are angered when they are contaminated or the course of streams altered. This is why, following the Muisca tradition, some farmers protect these resources and take care not to defile mountain springs such as those of Tabio. They continue to throw offerings to the water in the form of cigarettes and alcohol.¹²

5—Adela Chacín and Tomás Estévez, “Un encuentro con el agua y la biodiversidad de los altos Andes en Colombia”. Unpublished paper sent to the author.

6—According to Muisca mythology, Bachué was a woman who came out of the lake accompanied by a boy child. When the child became a man, Bachué married him and their children were the Muisca. The mother goddess taught the Muisca to cultivate the land, to hunt and to respect the gods. She transformed into a snake and returned to the lake with her husband.

7—José Domingo Duquesne, *Disertación sobre el calendario de los muyscas, indios naturales de este Nuevo Reino de Granada*, 1795. Last entry 12/3/2016. <http://www.accefyn.org.co/proyecto/Documentos/Duquesne/Calendario.pdf>.

8—We have allowed ourselves to translate the concept of homeostasis of live organisms and their capacity to maintain an inner balance to an exemplary relationship between nature and culture.

9—The monumental mines of Zipaquirá are now famous and have become a site of religious pilgrimage and a tourist spectacle of questionable taste.

10—Roberto Arturo Restrepo Arcila, “Los cacicazgos del Área Intermedia. Entender el antes para construir el ahora y proyectar el después” In *Sabiduría, poder y comprensión. América se repiensa desde sus orígenes* (Roberto Arturo Restrepo Arcila ed.), Bogotá, Siglo del Hombre Editores, UNESCO, 2002, p. 160.

11—María Alicia Uribe et alii., *Historias de ofrendas muisca*, Bogota, Museo del Oro, UCL Institute of Archaeology, 2013, p. 82.

12—Ibid., p. 83.

Passiflora is an example nowadays of sustainability and conservation of natural and cultural heritage and serves to illustrate that alternative energy policies are possible and can be supported by documents which, like the Unesco Charter of 2000, demand a change of mentality towards the environment in order to find ways of harmonising “diversity with unity”. Unfortunately, these documents enable some of our political representatives to appear on the front pages of the international press one day, yet the next are no longer worth the paper they were written on. As I mentioned, *Passiflora* could serve as an example. It was constructed on the principles of permaculture: a system theorised by Bill Mollison and David Holmgren in 1978 which imitates the formulae of balance and energy exchange of natural ecosystems. The water resources of *Passiflora* maintain their role as a vital source as they are collected in a tank which supplies 100 families in the area. Connections are also made with other relicts of the area, also created by civil society, forming corridors which are essential for the survival of endemic fauna, ensuring that these species, many in danger of extinction, do not disappear through inbreeding or lack of genetic mobility.¹³

The mountain has become a museum: it has been interpreted, it has a route that holds a dialogue with those who travel it, translating the language of water and the codes of nature familiar to our ancestors which we as urbanites have lost – from telling the time of day from the sun to understanding what a footprint means or how a particular plant can be used. It is, therefore, not only a natural but a cultural relict, a school for the region’s homeostatic knowledge.

A visit to this gorge means entering the Gaia hypothesis materialised: the Earth as a self-regulating organism.¹⁴ The mountain is both one and multiple organisms: under the newly fallen leaves lies a continuous mesh of organic material created by mycelia, which covers kilometres of the mountain’s surface to ensure that when it rains not a drop of water nor an ounce of soil is lost. *Passiflora* contains sustainable human habitation, while serving as a reservoir of endemic species, some considered extinct and others thought to have fled the region – such as the mountain ocelot or the white-tailed Olalla. We now know that these species remain in their original environment,

thanks to the chambers that Estévez and his team have created in the water springs visited by the animals of the region.

Chacín and Estévez have preserved a micro-habitat which causes these species no stress, while keeping popular culture alive with the sensitive and empirical knowledge of the use of plants in indigenous medicine; for example, the plants used in Muisca tradition for their sedative and healing properties. This is biodiversity in connection with human beings, a balance to enable co-existence.

Although now an AICA area, an Important Conservation Area for the Birds of Colombia and the World, *Passiflora*’s existence has been threatened on several occasions by an aggressive process of land capitalisation. This capitalisation is new and, as suggested by Boltanski and Chaipello, is deploying strategies to justify that this process is for the common good, in order to pre-empt any possible local objection.¹⁵ In 2009, the Colombian State, through the public company Ecopetrol, planned the construction of a poliduct, the Mansilla Tocancipá, to cross mountains and reservoirs (the problem was that the existing oil pipeline had suffered numerous leaks and theft, hence the plan to modify its route). Five municipal offices of other small communities which were affected, artists, universities and the civil population in general united to protest against the project, and held many peaceful activities including musical and theatre performances, creating posters, etc.; the poliduct project was halted. At the moment, and since 2014, the Empresa de Energía de Bogotá has plans to lay electrical cable in the area: to be specific, a high voltage tower of 12 x 12 m on the edge of *Passiflora* in order to bring power to the valley. The mountain would undergo considerable trauma and injury in the construction of the tower in the transportation of machinery and materials to its summit.

In Colombia, as in the rest of Latin America, a healing approach is taken rather than that of curator, which is more usual in Spain. Chacín and Estévez along with their two children Elisa and Matías have learned the native language of the gorge and understand it as a common heritage that must be interpreted and made known, protected and preserved as they heal its wounds, while ethically easing the pain of the Earth.

13—Adela Chacín and Tomás Estévez, op. cit.

14—James Lovelock proposed the hypothesis of Gaia, in 1969. Nowadays, this theory has many detractors, even internally. Lynn Margulis, a follower of Lovelock’s theories, has shunned the metaphysical readings which, from areas outside science, have been created from the Gaia hypothesis.

15—Luc Boltanski and Ève Chaipello, *El nuevo espíritu del capitalismo*, Madrid, Akal, 2002, p. 56.

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