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**SEEDING AND SEEING:
THE INNER COLONISATION
OF LAND AND VISION**

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In the impact of a forest on the steppe, or in a mass of lichens moving up from the tundra to stifle a forest, we see the actual movement of solar energy being transformed into the chemical energy of our planet. (Vernadsky 62)

Light, where it exists, can exert an action, and, in certain circumstances, does exert one sufficient to cause changes in material bodies. Suppose, then, such an action could be exerted on the paper; and suppose the paper could be visibly changed by it. (Talbot 4)

Observed mainly in plants, phototropism names the chemical ability of certain cells and organelles to self-divide and to grow as a reaction to the exposure to light. It is one in the set of massively repeated operations that transform sunlight into the vast, rich and varied envelope of life that we know as the Biosphere. This paper deals with the planetary wide capacity of processing light, a capacity that is related to a pervasive presence of different types of interactions with light: the ones that produce the visible, within the eyes or, more noticeably even, within the far-reaching omnipresence of visual media.[1]

The interweaving of the seen and the seeded will be exposed through an account of different episodes of industrial agriculture where the role played by visual operations has been critical. In particular, two agrarian reforms and land settlement programmes that took place during the 20th-century will be addressed: the German *Innere Kolonisation* and the Spanish *Colonización interior*. Invisibility, the notion of empty space and the practice of aerial photography were essential to these developments, as it will be shown, and simultaneous with the growth of infrastructures such as irrigation networks or workers housing.

In this paper, the coupled performance of both visual apparatus and infrastructures on the ground will be considered from what Eva Horn has called a 'medial a priori': the "assemblages or constellations of certain technologies, fields of knowledge, and social institutions" (Horn 8) that become the conditions of possibility of processes, transformations or events. A medial a priori consisting of "discourse networks, cultural techniques and formations of knowledge" (Siebert, *The Map is the Territory* 15) that, in the broadest sense, goes even beyond the technical assemblages, to deal with the flows of energy and matter that give rise to them. In this vein, the interweaving of operations of light that gives rise to the seeded and the seen steps into what Jussi Parikka has framed as an alternative deep time of media, where "any consideration of media should start not from media but outside it" (*Earth Volumes* 124). It is within this frame of reference this paper departs.

"Light fills and forms the world" (Cubitt 2), inside and outside our eyes. Outside our eyes, these inner colonisations changed the manner in which the encounter of light and soil took place on a large portion of the totality of the surfaces of the Earth. Their scale gave way to the Green Revolution, with its oversized agri-food corporations, and to contemporary information-based precision farming technologies. To what extent these colonisations of the encounter of light and soil also changed the way contemporary vision is produced, that is, the shape of the interaction of light with visual media, will be discussed at the end of the paper.



Figure 1: Workers building an irrigation channel in a forced labour camp in Krychów (Poland) managed by the German administration of the General Plan East preparing latifundia for the colonists (1940). Source: Wikipedia / HANSK

Emptiness and the German inner colonisation

In 1884 German economist Max Sering proposed a rational land allocation project meant to increase production. It was a plan inspired by the government-sponsored settlements in the US and Canada, where the productivity of the farms had made the prices of cereals sink. The *Innere Kolonisation*—as he named it—was presented as an agrarian economist argument that aimed to develop the Reich's politics in relation to the *Ostsiedlung*, a settlement plan based on a fund that financially helped Prussian farmers to buy land and move to the East. While the original government programme encouraged German landowners to acquire large inefficient estates and employ seasonal workers, Sering's thesis devised instead an "agrarian-industrial state" (Nelson, *From Manitoba* 449) constituted by committed "peasants turned into

landowners, as in western America" (Sering 98). In 1919, right after the end of WWI, Sering was promoted to lead the Kolonisation and appointed to write a new Settlement Law. The Weimar Republic, forced to give up its foreign colonies after the Treaty of Versailles, needed its domestic food production to be strengthened in order to replace the incoming flows of external resources that had been cut. Moreover, as the regions of Posen and West Prussia were gone too, the government wanted the Eastern provinces to be further populated in order to prevent future annexations. Sering's ideas on the inner colonisation as densification of the productive land were then applied, and further expanded in his newly funded Research Institute for Agriculture and Settlement. At the beginning of the 1930s, however, his position became increasingly unstable. His assimilationist colonisation model, committed "to raise the cultural level" through the Germanisation of the local Poles, was considered in opposition to the Nazi's race-based politics and ideas

of purification (Nelson, *From Manitoba* 440). Yet, despite Sering's differences with the racial programme, his settler colonialism and the following expansionist plan—the infamous *Generalplan Ost* [General Plan East]—shared a common abstraction: the colonial notion of empty space.

In cultural historian Robert L. Nelson's analysis of the German inner colonisation and its links to the settler programmes in North America, it is observed that where colonisation meant "bringing under plough any 'unused' or 'wasted' property" (Nelson, *Emptiness* 162), an abstracted view of space was in operation. It was, in particular, a notion that likened the absence of German culture and productivity to the emptiness of people (*From Manitoba* 456).[2] Moreover, Nelson relates this emptiness to the principle of *vacuum domicilium* described by John Locke, allegedly operating in the English occupation of American lands: "in a pattern to be repeated throughout the history of colonialism, Natives who failed to practice modern modes of production disappeared into the empty backdrop of nature" (*Emptiness* 165). Interestingly, this abstraction in the encounter of settlers with the territory addresses the

visual, on the one hand, as it disregards and renders invisible native populations in most cases, while on the other hand it acts on the territory itself, allowing the clearing, replacement and the cultivation of land. However, this double operation of emptiness—instrumental and representational—collapses in Nelson's analysis, and becomes the consequence of a "colonial gaze" (169), a modulation of a pre-existing and untouched subject, the coloniser, able already both to represent and perform. A gaze, in Nelson's words, "that produces empty space in the eyes of the colonizer... followed by new, proper settlers and correct modes of production" (169).

If we, however, take into account the tools, techniques and practices put into play (instead of relying only on an acculturated subject) it becomes possible to consider this emptiness as part of a 'medial a priori' operating in the colonial. Such a material media history of the inner colonisation would characterize it as an unfolding of agencies and operating abstractions whose persistence, in particular as media forms, would help to understand the contemporary post-digital within larger temporal contexts. In the following, I am going to follow this path through

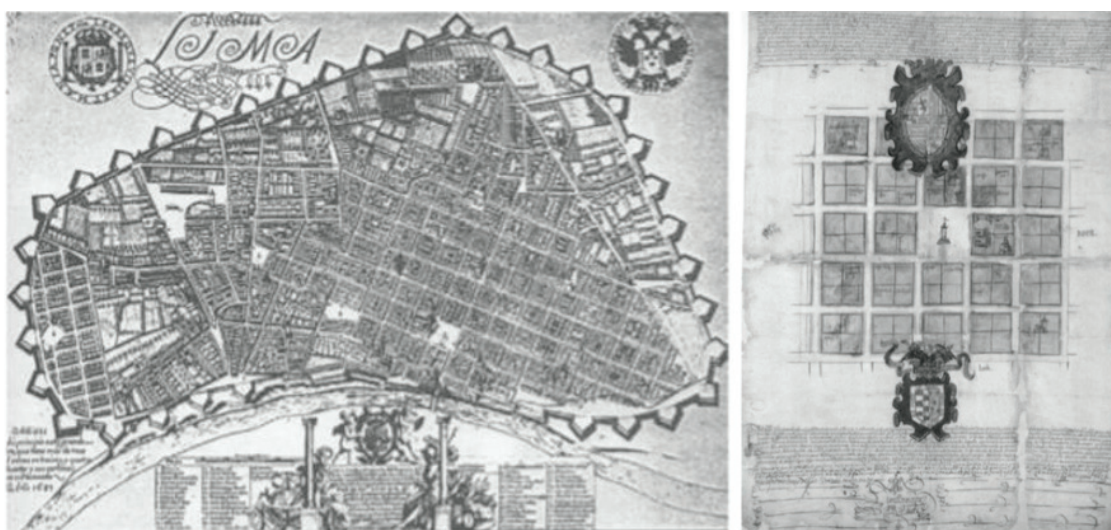


Figure 2: Lima (Perú) 1687, and San Juan de la Frontera (Argentina) 1562. Source: Siegert, *Cultural Techniques*.

two different developments: first, through Bernhard Siegert's account of the use of grids and lattices during the 16th-century colonisation of America, and second, through the crucial role played by aerial photography during the agrarian inner colonisations of the last century.

Colonial grids

In his work on the role of maps during the foundation and early urbanism of Spanish colonial cities in America, Siegert remarks that urban settlements were not planned and built on the basis of an actual number of settlers, but were instead devised with future growing populations in mind. Initial drawings and plans used by the founders of these cities consisted of boundless grids as abstract layouts to be used at the same time as “plans, registers and cadastres” (Siegert, *Cultural Techniques* 107). They

had an indexing character, and were able to address both the already present settlers as well as future ones. For Siegert, they were tools that enabled and sustained “the possibility of writing empty spaces, that is, the ability to literally reserve a space for the unknown” (107). Grids introduced therefore a fundamental separation between data and address: “Persons... are turned into data that can be stored for subsequent retrieval by the correct addresses that logically and temporally precede them” (107). Settler homes, institutions or businesses would become the data to populate a space of addresses—the land reserved for the city—which would then coincide with the paper surface: an addressable, graphical emptiness. This means that this “semiotics of zero” (100) would not necessarily stem from an already acculturated colonial gaze, but would be inscribed instead in colonial media. Grids, coming from Antiquity and used during the Reconquista, were already identifying urban order with political order; as a Renaissance graphical tool,



Figure 3: Picture of the penal colony of Los Merinales in Dos Hermanas (Seville, 1945), displaying the construction of an underground water channel, part of the Spanish Inner Colonisation, by war prisoners. Source: Archivo RMHSA-CGT.

additionally, they entailed also the technics of a “data space” (100) to allow that “everything is assigned its own place” (108). Emptiness, therefore, was literally transported in the caravels, not as abstractions in the minds of those gold seekers, but in the instruments they used to operate: in the papers and inks, on the one hand, and in the knives and cuirasses, on the other.

Aerial enforced infrastructures and the Spanish inner colonisation

Cultural techniques such as the grid are practised, learnt and disseminated in time and space, and are also embedded, reshaped or codified within different tools, devices or media. This is the case, for instance, of photogrammetric equipment used in aerial surveys. Provided currently with GPS receivers and other movement tracking devices, digital cameras for aerial photography are able to produce images suitable to be automatically rectified with the adequate software and exported to fit within grid-based tiled maps (Jacobsen et al. 84). Although the first military and commercial procedures of aerial photographic surveys needed large amounts of time from skilled interpreters to build up the photo-mosaics with the aid of existing maps (Saint-Amour 243), they have been used, at least since the 1910s, as a measuring tool. Through them, military and civilian infrastructures were located and cadastral information retrieved and added with precision to the grids of cartographic maps. Subsequently, aerial surveys became particularly apt for 20th-century development and land reform plans in Europe, where the scale of operations such as water infrastructures or urbanisations met the spatial extent

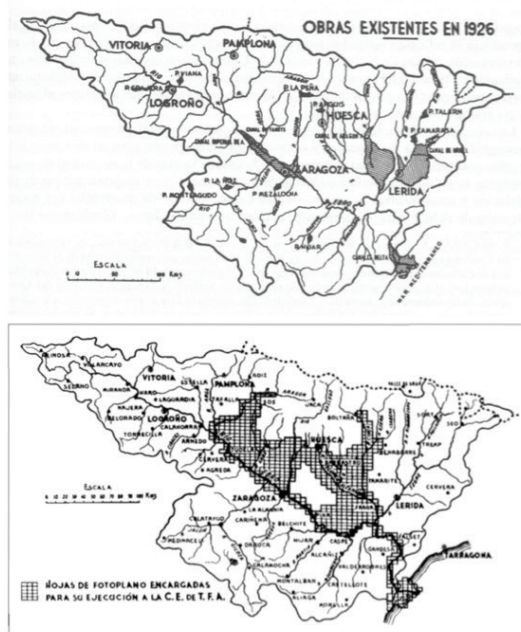


Figure 4: Upper image, works executed during the development of the Ebro River Basin in 1926; Lower image, areas aerially photographed in 1929. Source: Fernández..

of the aerial perspective. Wastelands had become empty; it was needed to monitor them in order to start making them productive. This process in Spain was called *la colonización interior*, the inner colonisation.

In 1926, during the dictatorship of Miguel Primo de Rivera, a new administrative entity was defined in Spain: the River Basin Authorities. Instead of the province or other political-geographical demarcations, the physical river basin and its connected waters became the territorial unit used to organize water planning in an integral approach (Martín-Retortillo 105). By means of it, one single institution supervised all the possible uses of fluvial waters, such as irrigation, transport and energy. The 1926 law demanded complete and precise cartographies of the territories under their control, detailed enough to display also their divisions into plots. As the existing resources were inadequate, and in order to acquire this material in a quick way, the only means to technically render it

possible was to contract the services offered by a private company that pioneered and promoted aerial photography (Fernández 223). The first set of official aerial photographic images of Spanish land dates from this time, and the use of aircrafts to produce cartographic documents was soon extended to the completion of an updated cadastre. The number of acres of land photographed from the sky grew then sustainably, until the Civil War paused everything.

Years later, after WWII, it was the US Army Map Service who continued the aerial mapping, completing two ortho-photographic archives of the whole Spanish territory in 1945 and 1956 (Fernández and Quirós 190). Spain was already governed by the Franco dictatorship, and a vast Agrarian Reform and Land Settlement programme was in operation, managed by the Spanish National Institute of Colonisation. Across three decades, from 1939 to 1973, enormous extensions of land were repurposed in order to increase agricultural productivity and demographic growth, parallel to the engineering of large-scale water infrastructures and other operations; among these, for instance, were expropriations, drainage of ponds, big movements of soil and population, formative practices, the supply of machines and fertilisers and a centralised management of the information gathered in the continuous monitoring of the process.[3]

This material redefinition in Spain also involved an ambitious project of networked rural urbanism. New towns had to be built to house the workers, where nothing existed but wasteland. These are well-known urbanism experiments today because of their intrinsic architectural qualities: an avant-garde of Spanish architects had the opportunity to build new villages, ex-novo, and designed them departing from a social and rationalistic point of view. During this process, that described exhaustively the shape of family



Figure 3: Picture of the penal colony of Los Merinales in Figure 5: Villalba de Calatrava, 1955. Source: Delgado (131).

units, the sizes of plots and the economic relation between the State and settlers, the foundation of approximately 300 towns and 30000 dwellings was triggered (Delgado 80)

Needless to say, the abstract and serialised urbanism did not mitigate the settlers' sense of loss when inhabiting the new villages. They arrived to towns with no memory, which offered only a predesigned future. Additionally, houses and plots were not theirs: during 20 to 40 years they had to pay off the housing and investments provided by the Institute, which was meanwhile the legal owner. They were instead left with an environment turned into a production system. The most informed critique to these actions is the book *Extremadura Saqueada* (Extremadura Exploited) edited by ecological economists Mario Gaviria, José Manuel Naredo and Juan Serna, which compares the organisation of human settlements inside an Irrigation Zone with a Mumfordian archaic work machine, oriented to the production of foodstuff: "Although it was made of living human parts, it was a work machine, so tightly articulated that individuals were reduced to 'things' to fit in a prearranged bureaucratic mechanism." (Gaviria, Naredo and Serna 18)

Some of the urban plans, additionally, emphasised an interweaving between population and soil: in Cañada del Agra, a root-like spreading of the streets allowed the town to

organically lay on the terrain; in many other towns, such as Esquivel, the main square was placed outside, as if crops were incorporated to the urban scene (Delgado 143). Furthermore, the space between towns was measured in terms of a magnitude called the “cart-module” – the maximum operative distance covered by a settler with a cart (Alagón 8). The centres of these circles of influence were the nodes of the irrigation network, which provided with water to a shared grid of canals that fed both the soils and the settler’s homes. It is as if settlers and crops were not necessarily distinguishable, as if an underlying managerial grid were addressing and symbolically manipulating both of them, at the same time, as if they had already been transformed into data; or as Parikka puts it, “isolated, analyzed, synthesized, and entered into circulation as deterritorialized bits of information that can be traded in complex, global ways.” (Parikka, *A Geology of Media* 110).

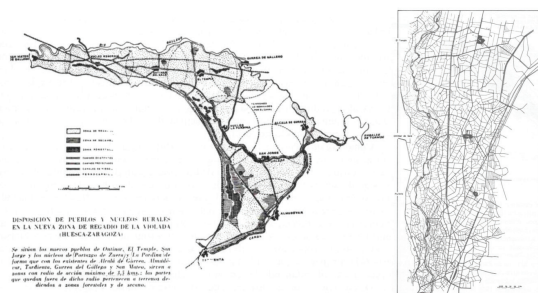


Figure 6: Maps displaying cart-modules and water channel infrastructures in the colonisation of the desert of La Violada, Zaragoza. Source: Villanueva and Leal.

A new soil

In a blurred, hybrid process, land became an infrastructural surface to hold and transform solar light energy into cereals, fruits and vegetables in an efficient way, while at the same time the reflected sunlight became gradually a source of information to be stored in the

photographic plates carried on by aircrafts owned by military and cartographic institutes. The same land was, on the one hand, measured, parcelled and populated and, on the other hand, photographed frame by frame by fleets of aircrafts. In some sense, these were two envelopes growing at the same time: a surface of hundreds of thousands of acres of uncultivated land transformed into green areas of productive yields, and the organised grid of images taken from airplanes.

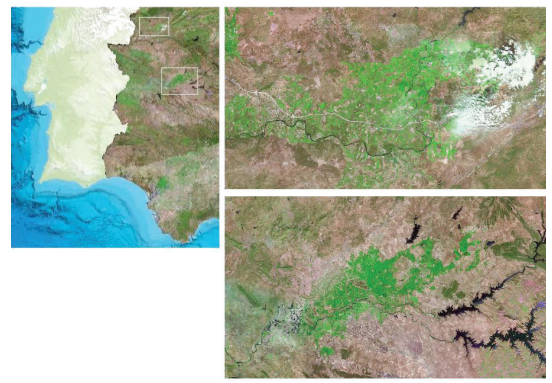


Figure 7: Two Irrigation Zones—Alagón and Guadiana—as seen from a satellite in 2014. Source: Instituto Geográfico Nacional (IGN).

This image (fig. 7), where the scale of the transformations of the Spanish Inner Colonization is visible, shows a portion of the planet brought materially to behave productively, displaying how vast territories were activated thanks to their connection to huge water reservoirs. The image can be read in fact as a thermodynamic diagram, displaying the inner workings of an abstract machine. Interestingly, during the first decades of the 20th century, and after the chemical industries had ended up synthesising nitrogen to fuel the productivity of yields, a thermodynamic stance started to be applied to the Biosphere, the uppermost layer of the planet, encompassing the Earth’s soils, waters, oceans and living entities. In this vein, the works by the Russian mineralogist Vladimir Vernadsky or the American mathematician

Alfred Lotka introduced an additional agency, the biochemistry of the soil itself. Interfacing the Earth with the Universe, the Biosphere as an “envelope of life where the planet meets the cosmic milieu” (Vernadsky 39), was fully described in 1926 by Vernadsky as an ensemble of living and non-living agents that create and keep active a biochemical film, a “living film” “where the radiant energy of the Sun is transformed into free terrestrial, chemical energy” (Vernadsky 148). To Lotka, in his seminal book *Elements of Physical Biology*, this ensemble and context of living creatures in the Earth could certainly be considered a machine, a “World Engine” (Lotka 331), an energy transformer composed by a multitude of subsidiary units, each separately working together as a whole. “It is well to accustom the mind to think of this as one vast unit,” he wrote, and added: “one great empire” (Lotka 331).

Focusing on the molecular cycles where the soil was involved, Lotka emphasised the practical aspects of his quantitative approach, and drew upon outcomes and statistics relative to recent agricultural engineering. Among them, remarkably, the synthesis of ammonia and its industrial production, a particularly relevant technique that had been recently created by the German chemical complex. Thanks to it, synthetic fertilisers could be industrially produced from the open air, and thereby increase the productivity of the “World Engine”. After WWII, the growth of synthetically fixed nitrogen was exponential, forcing even the need to look for high-yielding varieties of crops, as the previous ones could not absorb the extra nutrients. Combined with the use of different types of pesticides, the increasing consumptions of water caused a need for large-scale irrigation infrastructures. In the 1960s, all of this was marketed as the Green Revolution, an ensemble of techno-scientific developments, patents and planetary management

strategies, announced somehow by Lotka, already in the 1920s, for whom the consequences of synthetic nitrogen would be considered “literally comparable in magnitude with cosmic processes” (Lotka 241).

The inner colonisation of land and vision

This development of aerial, mechanical and chemically-aided soil operations has evolved to become a multi-scale practice today; in a much more dense and intensive way, in fact. Under the umbrella term of *Precision Farming*, devices on tractors are programmed to control the dispersion of water and chemicals upon information gained from satellite or aircraft based sensors that measure the wavelengths of radiant energy absorbed and reflected from the land surface. Soil moisture, surface temperature, photosynthetic activity, and weed or pest infestations are addressable with a resolution of a square metre, almost exactly the size of the irrigation system actuator. Other irrigation infrastructures carry their own imaging devices, feeding the soil according to real-time data obtained from infrared cameras.

Precision Farming comes then at the end of a list of what I so far have been addressing as a set of practices on the ground, and as media operations linked to periods of colonisation and agrarian development. Periods where big portions of the surface of the planet became green: nominally, as in the Green Revolution, or literally, as in post-processed satellital images, where areas that reflect infrared frequencies are rendered in this colour as they trace vegetation activity. In this paper, this has been described in terms of grids and the production of emptiness; the aerial and the new scope of the various

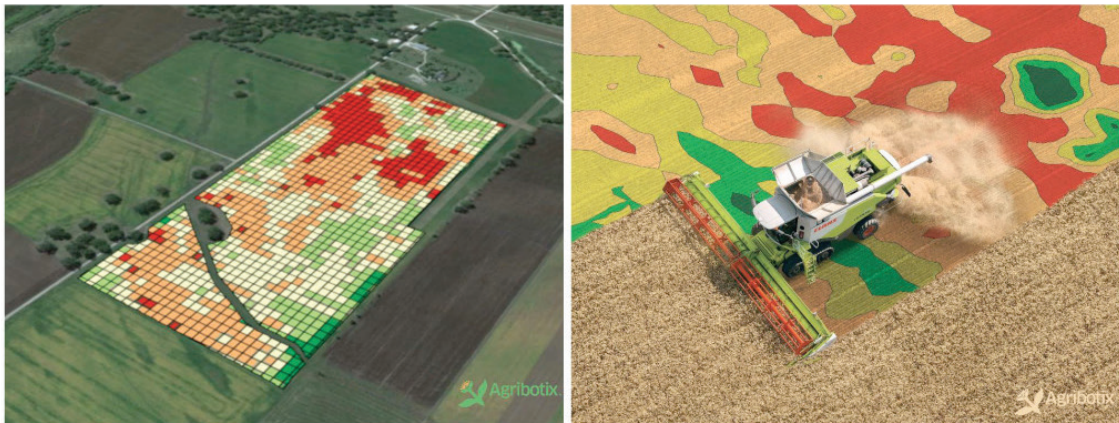


Figure 8: Images from the website of Agribotix, a company that commercialises precision farming technologies.

transformations; and the chemical as the, so to say, colour fixer. These are episodes, in the end, that might be appraised as a media history of soil.

The question now is whether vision becomes something else, once visual media techniques are considered from the point of view of the entanglement with operations on the soil. “To engage aerial sightedness—or even vision in its most basic form—,” writes Ryan Bishop, “is to yield almost completely to the promise and problems posed by the surface,” and to rely thus “upon some other entity, some other ground, not visible or graspable for its support” (Bishop 276). Vision inherits in its historicity and technicity the issues and nuances linked with the ways and contexts where it is produced and communicated, a ground of practices and operations that, without dealing directly with the visual contents themselves, belong to the relationships between humans and the environment. We might ask, then, in which ways this media history of soil can be understood the other way round, as a soil-based genealogy of visual media. In this vein, the notion of “medianatures,” coined by Parikka as an elaboration of Haraway’s ‘naturecultures’ (Parikka, “Media Zoology”), is particularly relevant. They characterise the entangled set of practices where media and

nature appear as “co-constituting spheres, where the ties are intensively connected in material nonhuman realities as much as in relations of power, economy, and work,” making it impossible to distinguish such spheres separately (Parikka, *A Geology of Media* 14). It is a relevant notion at this point, if we insist once more in the double operation that light exerts on the world: it allows us to see, on the one hand, and it makes the living crust of the planet grow, on the other. These are two parallel imprints that give rise to the apparently separate realms of visual culture and agriculture, which might therefore be considered as parts of the same whole. Put in a different way: we see, but not alone; as the world “sees” too, giving the Biosphere its elaborate output.

Episodes such as the inner colonisation of the wastelands, the nitrification of yields and the subsequent assimilation of the Biosphere into the regime of the industrial display a tamed “practice of light,” in Cubitt’s words. This is a mediation that has been again “parceled out, amassed, ossified, delayed, hypostasized” (Cubitt 2), affecting not only the Biosphere, but seeing on a planetary scale. An inner colonisation of the seeded, then, where the seen might have become the sown.

Notes

[1] On the unavoidable and politically significant presence of the non-human within the contemporary regime of the visual, see for instance the recent essay about the machinic circuits of invisible images by Trevor Paglen.

[2] A similar case of colonisation is the Israeli one, described in *The Conflict Shoreline* (Weizman and Sheikh).

[3] For more information, see the exhaustive collection and review of documents in relation to Spanish Inner Colonisation in the series of volumes *Historia y evolucion de la colonizacion agraria en España*, edited by the Spanish Ministry of Agriculture. (Villanueva and Leal).

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