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(POST)COLONIAL SENSATIONS. REMOTE SENSING TECHNOLOGIES AND CULTURAL MEMORY IN ART AND SCIENCE

Abstract: The essay critically discusses the use of remote sensing technologies in contemporary media art and sciences. It undertakes a thorough analysis of *Tropics*, the award-winning work of the French artist Mathilde Lavenne. The artist used lidar scanning to visualize the stories and memories gathered from interviews with inhabitants of the Mexican town Jicaltepec, who are mostly descendants of the French settlers-colonizers. Through the use of apparatus designed for architectural and geodetic purposes, along with its scientific and commercial contexts, questions arise about the relations between modern technoculture, nature, cultural memory, and overlapping colonial logic, in knowledge production and the micropolitics of affects management.

Keywords: remote sensing technology, geo-anthropology, technoculture, cultural memory, colonial sciences

In 2018, at the significant and opinion-forming Ars Electronica Festival, the work of Mathilde Lavenne, *Tropics*, was awarded the Golden Nica – the main prize in the category of Computer Animation. The work was created through the use of lidar scanning, which was employed to visualize the stories and memories 'haunting' a Mexican farm in Jicaltepec inhabited mainly by settlers-colonizers who had come to these areas in the nineteenth century. The work could probably be seen as a part of a broader discussion on the use of scientific devices in artistic projects, but this horizontal perspective is not so crucial for this work. In this case, we are dealing with the use of a very specific tool employed in the field of Earth sciences (such as cartography, geography, geology, and meteorology, but also archaeology and architecture), the primary function of which is to take measurements and create digital representations of scanned terrain and objects. In the film, Lavenne uses data recordings produced by the scanning technology to create a 'sense of depth' and evoke the colonial history of the place: the interpenetrating narratives on the initial building of the settlement, stories about the people who passed away from this community, and fragments of

everyday life in Jicaltepec. The artist achieves this effect by using raw data from the lidar as a map of points, which makes the image incomplete, layered, interpenetrating. Similarly, interviews with settlers were composed with the sounds of the tropics recorded and processed by the artist. Thus, lidar becomes not only an aesthetic device but, above all, an Althusserian "apparatus"[1] that produces methodologies for recording histories in the context of (post)colonial modes and narratives. The use of this technology is, therefore, not without ideological entanglements. Such a strategy of transplanting a device from the Earth sciences means constantly referring (more or less consciously) to the historical operational modes of data collection – and thus to mapping, establishing borders, the visualization and representation of the terrain and objects – and opening up a discussion on specific paradigms and goals of knowledge production in art and science.

Photo 1. *Tropics* by Mathilde Lavenne (exposition setup), Ars Electronica Festival, Linz 2018, photo by Agnieszka Jelewska

In *A Geology of Media*, Jussi Parikka analyzes the impact of technologies employed in the study of various layers and systems of planet Earth on the results of research, not only in the geosciences but also in transformations within cultural models. He argues that these technologies transform human perception by reconfiguring it with technologically moderated forms of data recording and visualization, or sonification, and thus various forms of presentation.

[1] L. Althusser, *Ideology and Ideological State of Apparatus*, in: *Critical Theory since 1965*, trans. B. Brewster, eds. H. Adams, L. Searle, University Press of Florida, Tallahassee 1986, pp. 239–252.

> Our relations with the Earth are mediated through technologies and techniques of visualization, sonification, calculation, mapping, prediction, simulation, and so forth: it is through and in media that we grasp Earth as an object for cognitive, practical, and affective relations. Geological resources used to be mapped through surveys and field observation, now through advanced remote sensing technologies.[2]

The Earth is perceived, sensed, analyzed and described by using measuring devices and algorithmic systems designed to collect and present data, hence they must be understood as an apparatus[3] consisting of hardware and software designed for the production of knowledge, and precisely through being such an apparatus they become an object open to scientific and technological manipulations. At the same time, this knowledge is always situated and correlated with the quality and functionality of the technological tools used, along with the software systems, machine learning operations, and special usage of AI. Therefore, this new dimension of the apparatus, as a combination of hardware and software systems, is responsible for knowledge production focused on the planet in its current and historical dimensions. As a consequence, the apparatus, thus understood, has a certain agential power in producing political, economic, social, and cultural relations at the local and global levels, thanks to the collection of data on a planetary scale.[4] It also significantly affects the cultural processing of this knowledge, which is no longer just a result of human calculations and inquiries, but also derives from a set of different devices connected with "methods for processing and analyzing high-dimensional data acquired from the 'real' world in order to produce symbolic or numerical outputs."[5] In addition, each output can be visualized, sonified, transformed into an infinite number of ways in which it can be presented, and is used to construct new 'images' of knowledge. It also has consequences with regard to redefining the culture-nature relationship as an inexhaustible modernization project, which started during the first colonial expeditions and exploitation of geological deposits.

In her latest book, *A Billion Black Anthropocenes or None*, Kathryn Yussof identifies the in the context of Anthropocene colonial origin of Earth sciences itself such as

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2 J. Parikka, *A Geology of Media*, University of Minnesota Press, Minneapolis 2015, p. 12.

3 In this text, 'apparatus' has two, overlapping meanings. As a technological device, defined in the middle of the last century, by Jacques Ellul, among others, then expanded later to include software and data analysis systems, as well as methods of their visualization and sonification. In the case of the remote sensing technologies apparatus discussed here, it is treated as a set (Object-Device-Software-Object). This definition of apparatus as ODSO is analyzed in the broader sense, namely as an ideology that is based on the use of specific devices and systems that change human perceptive parameters and cognition, and thus influence the modes of producing knowledge and managing affects in societies. See: L. Althusser, *op. cit.*

4 Recently, we could observe their agential force in the process of defining the Anthropocene era through data collecting and analyzing systems. These kinds of apparatuses are also used in predicting possible ecological crises and forecasting natural disasters.

5 R. Amaro, *As If. Becoming Digital*, e-flux: https://www.e-flux.com/architecture/becoming-digital/248073/as-if/ (accessed: 15.02.2020).

geology and its related fields geodesy, geoengineering etc. She discusses geology and its apparatuses as an example of white colonial science, and identifies the strategy of "colonial geologic" as being continued in the language in which the phenomena are described. As she puts it, "the extractive grammars of geology labor in the instrumentation and instrumentalization of dominant colonial narratives and their subjective, often subjugating registers that are an ongoing praxis of displacement."[6] "Colonial geology" as a strategy and method present in the study of the planet, the environment and ecology, but also in artistic practices, exceeds the framework of one discipline and becomes visible to many others, because the logic in the language of description is similar. That is why they still require more in-depth analyses and deconstruction, also through critical studies of the technological devices used to create a specific knowledge, experience and sensing[7] the planet.

Remote Sensing Technologies in Science and Cultural Practice

One of the modern technological apparatuses used to produce knowledge about terrain shape and the location of objects in space, based on distance detection, is lidar scanning. Lidar scanners (Light Detection and Ranging) appeared in the 1960s. The technical principle underlying the device itself is quite simple – it consists of a laser and a photo-receiver. By exposing and receiving reflected laser beams, lidar can create 2D or 3D representations of space and the objects, along with information about what the density of objects is. This technology is based on the use of qualitative analysis and determines the type of matter from which objects are built. Due to its specificity, lidar and other 3D scanning technologies are inherently connected with virtual and algorithmic reality. The obtained data, e.g., in the form of a cloud of points, require a process of computation and visualization, which in itself is based on a virtual representation of the existing terrain or on generating an artificial reality in which the scanned phenomena can be embedded. From the very beginning, lidar was used as a measuring device in many scientific disciplines – from meteorology, through forestry, urban planning, architecture, archeology to geology. In 1971, lidar was used during the Apollo 15 space mission to measure the topography of the Moon. Currently, it is used in engineering, research in the Earth sciences, and commercial projects.

And although many such projects have begun to appear, and despite the fact the technology itself is very widely available today, lidar images are still groundbreaking in science and culture. For example, in 2016–2017, as part of the Pacunam Lidar Initiative, an interdisciplinary team researched the Maya Biosphere Reserve (MBR)

[6] K. Yussof, *A Billion Black Anthropocenes or None*, University of Minnesota Press, Minneapolis 2018, p. 2.

[7] See J. Gabrys, *Program Earth: Environmental Sensing Technologies and the Making of Computational Planet*, University of Minnesota Press, Minneapolis 2016.

in Petén, Guatemala. The team conducted the largest lidar survey to date of the Maya region. Taken from an aircraft using the advanced Teledyne Optech Titan Lidar system, measurements of the tropical forest over an area of 2144 km^2 have enabled the current scientific views on the development of the Maya civilization and culture to be revised. In the process of visualization, the data revealed the hitherto unknown scale of Maya cities. The collected data have made it possible to describe ancient settlements and infrastructure over an extensive, varied, and representative swath of the central Maya Lowlands. In the process of analysis, it became possible to establish not only the architectural shape of the ancient city but also its demographic functions and forms of applied agriculture. As the researchers claim:

> These perspectives on the ancient Maya generate new questions, refine targets for fieldwork, elicit regional study across continuous landscapes, and advance Maya archaeology into a bolder of research and exploration.[8]

New techniques and methodological tools called "prismatic openness"[9] have been created to carry out these complex analyses. Differentiated data from the lidar allowed the "soft" forest layer to be separated from the "hard" ground layer. In this way, it became possible in the visualization process to "remove the layer of forestation and vegetation", which revealed the extensive and previously unknown urban grid of the Maya city.

There are also lots of examples of the commercial use of lidar as a device for cultural visualization, one of them being a project realized by the architects Charles Matz and Michael Dillon, who have been taking 3D scans of the historic structures of the city of Harar in Ethiopia since 2011.[10] The result was a series of scans that recorded not only elements of space and architecture, but also people form the market place in Harar. The authors themselves pointed out the artistic use of the scanner; in their opinion, the nature of the acquired images recalled the early photographic techniques of the nineteenth century. Both the first photographs and contemporary scans of human silhouettes were assigned mediumistic meanings, the characteristic ghosting aura, kind of insight to the "invisible" layer of reality.

> In the images that the team – as Calla Cofield writes – captured, the people are blurry and often look as though they were sketched with vertical pencil lines – the shapes of their bodies are apparent, but their features are lost. Each lidar scan takes about 9 seconds, and two to three scans are needed to get a 3D map.[11]

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8 M.A. Canuto, F. Estrada-Belli, T.G. Garrison *et al.*, *Ancient Lowland Maya Complexity as Revealed by Airborne Laser Scanning of Northern Guatemala*, "Science" 2018, 28 September, vol. 361, issue 6409, DOI 10.1126/science.aau0137 (accessed: 2.02.2020).

9 *Ibidem*.

10 C. Cofield, *3D Laser Scanner Makes Haunting Works of Art*, "Live Science" 2015, 24 February, https://www.livescience.com/49920-lidar-technology-works-of-art.html (accessed: 2.02.2020).

11 *Ibidem*.

The Matz and Dillon project is an example of how social affects can be manipulated by means of modern technologies and visualization techniques. A context of aestheticization is added to the images of scanned people through the lenses of technological apparatus. The aestheticization is the effect of the process of establishing relationships between scanning technics, objects (the ruins of the lost civilization, people who now reside in this place), and the images produced as an output of these practices. A key point is that the authors used the scanner to register the pictures of people living in Harar as a sort of additional option for the effect they primarily wanted to achieve. Showing the silhouettes of people captured in the scans and constructing a nostalgic vision of a hidden and lost place in Ethiopia, this work becomes a part of long history[12] of the aesthetics of cultural appropriation through technological processing. As we can read in the online article:

> One particularly striking image shows a boy against a pitch-black background, dragging a stick in the dirt. His clothes are captured in brilliant detail by the lidar system – even the texture of the fabric is apparent. But his head appears split in half.
> "I think he turned his head in the middle of the scan, and we recorded it, and the resulting 3D model had this cleft in it. That's what gave it that haunting expression," Matz said. Talking through a translator, the boy told Matz and Dillon he was an orphan.
> "We were told that many young boys travel in groups to look for agrarian, farm hand work far from their birthplaces and that many came from the conflict zone as their parents may have been killed," Matz wrote in an email. Matz said the boy's story adds a "thematic message" to the image. "I think that thematic message is what makes this 'art,' rather [than] simply a piece of the scientific study."[13]

The apparatus here is not just lidar. The apparatus is a system of recording people and places, and compressing their traumas, microhistories, and individualities into the blurred image through technological processes. The aesthetics of this work is not "thematic message" but the politics of presenting and producing knowledge, adding a new technological device to the long-lasting colonial discourse and practice. What seems also to be important in remote sensing technology is that it is closely related to software, i.e., methods for analyzing and processing data collected from the environment, as well as forms of their visualization. It operates on structures that reveal spectral relationships between individual elements of these structures. It is also an example of understanding the relationship between the knowledge produced by human actors and by machine-software analysis; the calculation methods and forms of perception of the latter are not the domain of human users. The operations of separating layers of space, as was done in the examples mentioned above, which are carried out on the collected data and re-establish it, are also crucial for scaling culture in its historical, and social relations. Let us add that the spatial designs resulting from these

[12] It is enough to refer to the first anthropological expeditions from which researchers brought back pictures of so-called savage people, which then served as fetishist sensations of colonial appropriations.

[13] *Ibidem*.

operations usually do not encompass the human aspect of history, and if they do, it is rather an aesthetic accent. These operations represent depopulated places where historical memory is generated by computer algorithms. Virtual objects become more real than their ruins and the material remains that are still visible in these places. At the same time, these processes establish new relationships between recording technology, data, methods of analysis, and cultural memory, privileging what arose as a result of the process of machine vision. Thus, they re-produce what Gilles Deleuze, and then Brian Massumi, called "affect"[14] and incorporate it in the micropolitical strategies that govern cultural memory.

Aesthetics of Geo-anthropology. Lidar in the Tropics

In the context of the use of lidar scanning at the crossroads of art, technology and cultural memories about colonial times, I would like to take a closer look at widely discussed and highly awarded art project of the French artist Mathilde Lavenne, called *Tropics*. It was realized in Jicaltepec, in Mexico, during the anthropological research the artist conducted from 2017 thanks to the local foundation Casa Proal. The work was first shown in 2018, and was made with the use of a lidar technology scanner mainly used for architectural work. The aesthetic dimension of the film is rather minimalistic; the animation is based on data from the lidar scanner. The artist does not create photorealistic images; she only uses the cloud of points acquired from the scanner. Stable black and white images in the process of post-production are set in motion through zooming, panning, and layering. In an interview for the Ars Electronica Festival, at which she received the Golden Nica in the Computer Animation category, the author stated:

> I chose to scan the Mexicans who crossed this zone, with whom I shared my daily life and who lived close to the riverside ecosystem. The people I have recorded have given me extraordinary stories in which a real connection to death, a hint of superstition, an incredible imagination and real experiences of connection with other levels of consciousness mix. They came to me spontaneously after seeing images of the project and, above all, because they had a memory to pass on to me.[15]

One of the descriptions we find on the website devoted to the project seems relevant for understanding the relationships that are shaped in Lavenne's work between technology, cultural, social and individual memory, and the images and sensations that appear in the process of their computer animation:

[14] B. Massumi, *Of Microperception and Micropolitics. Interview with Joel McKim*, in: *idem*, *Politics of Affect*, Polity Press, Cambridge 2015, pp. 47–83.

[15] V. Graf, *Interview with Mathilde Lavenne*. *TROPICS: The Golden Nica of Computer Animation 2018*, https://ars.electronica.art/aeblog/en/2018/08/31/tropics/ (accessed: 12.02.2020).

> TROPICS draws an orbit around a Mexican farm. Scattered voices seem to revive and disturb the memory of the place. Crossing the matter, the film attempts to stop time and men, and reveals the ghost of a lost paradise.[16]

From this introduction, it becomes apparent that the functions of technology have been transferred to the cognitive and aesthetic layers of the work. The technology here generates a primary level of relationship between the type of scanning and data visualization methods, as well as objects, people and the environment: "TROPICS draws an orbit around a Mexican farm." A stationary space-saving scanner, set at a specific point, becomes not only a device to study the time and space of this place with apparatus (which is primarily used for studying terrain, architectural objects, and particle detection, and for map creation, or for creating photo-realistic representations of matter), but also for producing historical, intercultural and inter-species relations (as it scans both people and their surroundings). Subjected to the aesthetic process of computer animation, previously recorded material also becomes a sign of the relationship between who or what perceives/records/experiences, and the people, objects, emotions, time, and space that are subject to this recording. Lidar technology not only serves the author for "crossing the matter", but creates a methodology of "remote sensing" that sets and establishes the relationship between the apparatus (object-device-software-object) and the micropolitics of managing affects and emotions that are conveyed by the "recorded" people and are supposed to be experienced by the audience of this movie.

The animation is divided into four sequences that introduce the subsequent stories of characters. They mainly concern the disruption of cultural and historical memory, as well as the relationships of subsequent people speaking with the dead and the ghosts that surround them in their everyday life. All these micro-stories together shape the specific collective memory related to this place. In terms of cultural identity, the history of this place and people is not simple, hence the man's opening story:

> I'm worried to learn more about my family's origins. And the genealogy is complicated because before our grandparents, our great-grandparents or great-great-grandparents, there were other people but we can't find their names. And through generations names disappear, there are information and questions that get lost. There didn't use to be the technology that we have today to communicate. So the story, from what I can understand is that almost all migrants who arrived in Jicaltepec were looking for a better future, because the situation in France was difficult. […][17]

The man who speaks these words refers to the history of the colonization of this place by the French, which began in 1828, when, according to historian of this area, David Skerritt:

[16] M. Lavenne, *TROPICS*, official artist's website, https://www.mathildelavenne.com/t-r-o-p-i-c-s/ (accessed: 12.02.2020).

[17] *TROPICS*, dir. M. Lavenne, prod. Jonas Films, 2018.

> […] ex-fourieriste and ex-paymaster in the French army, Stéphane Guénot, harboured the idea of forming a model agricultural colony. A visit to Mexico, where he fell sick, put him in contact with his CO-national, Dr. Chabert. The latter convinced him to buy a large plot of land (in Jicaltepec), near the small port of Nautla to the north of Veracruz. By 1833 he was able to ship the first group of migrants out of Le Havre to the Gulf toast. The group was made up almost exclusively of peasants and small agricultural producers from the Bourgogne and the Franche-Comté, especially from the village of Champlitte, in the Department of the Haute-Saône.[18]

Photo 2. *Tropics* by Mathilde Lavenne, Ars Electronica Festival, Linz 2018, photo by Agnieszka Jelewska

The history of the place and people is closely related to the formation of geosocial and geopolitical relations with the inhabitants of Mexico, but also with French cultural roots and relatives who remained in France. It is also worth remembering the complicated history of Mexico, of which the settlers became part. As David Skerritt writes:

[18] D. Skerritt, *A Negotiated Ethnic Identity: San Rafael. A French Community on the Mexican Gulf Coast (1833–1930*), "Cahiers des sciences humaines" 1994, no. 30(3), p. 457. What is also important to understand the complicated definition of ethnic identity of this community is the fact that the migrants tended to move as whole families. As David Skerritt puts it: "For example in 1833, 39 people left Champlitte for Jicaltepec; only 3 were bachelors with no direct ties to the rest of the group. Whole units of family enterprise were uprooted and transplanted: in one case, the head of family arrived with his wife and children, her parents, and even the domestiques." p. 458.

> […] the land purchased by Guénot was located in Jicaltepec, an ancient Totonac Indian settlement, long de-populated by the Spanish colonial policy which had concentrated the tributary and labour force in and around strategic points. However, the colonists arrived to find remnants of Indian practices of social and spatial organisation. At the same time, they would have to share space with Spanish criollo and mestizo landowners. Even if they were relatively few in numbers given the adverse occidental image held regarding this type of low-lying, hot, humid and selvatic lands.[19]

The "French roots" of settlers at various times in Mexico's development resulted in different legal and economic consequences. During the French Revolution, they were able to claim certain privileges that suggested social status. The situation changed during the Mexican Revolution and the expropriation projects of foreigners, with the new law of limiting the share of foreign capital in mining and mining industries, and also agricultural areas. It was the apparent end to the policy which would come to encourage foreign investors to invest capital in the country. At that time, a person who had Mexican roots could have been seen as potentially having better social status than a French/foreign settler. This situation and the complicated relation to the past meant that the settlers created a sort of separate system of social relations, defining nationality in a fluid way for their use. Thus, they rather ahistorically shaped the relationship of collective and individual memory to the past. Anthropologists often write about the situation of the settlers in Jicaltepec as one of "double exclusion" – both from their French roots and the cultures of the Mexican area, while stressing that this group was able to create not only their individuality but also adaptation strategies. In *Tropics*, Lavenne makes just a subtle reference to this double exclusion, ignoring these contexts, and instead introduces anthropological and social issues to the level of beliefs, feelings and relationships with those who passed away and who had once been part of this community. Meeting and talking with the inhabitants, the artist also looked at the remains of pre-Columbian cultures. Using the data collected from the places to create overlapping images in post-production creates multilayer spectra not only of particles and points, but also splinters of cultures, beliefs, and historical times in which individual narratives and identity problems associated with the place are gradually vanishing and collapsing.

> I had the feeling that, by showing these clouds of points, we could make visible the invisible structures that constitute us. And at the same time make perceptible the strata of memory: the ones that remain in us in our cells and those outside us that haunt the territories.[20]

In lidar technology, which is becoming the methodology of Mathilde Lavenne's work, we have another level of the micropolitics of managing affects in the hauntological entanglement of the past and the present, as well as the human and inhuman. In the project, the technological apparatus dedicated to the recording objects "frozen

[19] D. Skerritt, *op. cit.*, p. 458.
[20] V. Graf, *op. cit.*

in time and space" collides with discontinuous, fluid and often alinear human individual and collective memory, and random and chaotic sounds from the environment. The movement in the film is, therefore, the result of post-production: the computer animation of image and sound. The movie's soundtrack has many layers. One of them consists of field-recorded sounds from the tropics. We can hear the full specter of forest life, squawking and calling birds, insect sounds, plant noise – these recordings create a very dynamic soundscape. From this primary layer of the soundtrack we begin to distinguish the second layer: narratives in the foreground – the stories of settlers whom Lavenne interviewed during the film.

> I lived several months – the artists said in the interview – in this atypical place that was this colonial house located in the center of the banana plantation, an artefact of its time, without windows, without comfort, without limits between the inside and the outside. The tropical sound environment was omnipresent there.[21]

Along with the human voice, reverberation was also recorded, which was related to the quality of the surroundings in which the interlocutors were located. They have a specific index of authenticity related to the principles of conducting field studies. Furthermore, the artifacts appearing in the soundtrack make all the recorded material more credible. The same applies to the narratives of the people who appear during the film; they are intertwined with the sounds from the environment. One of the women from the film narrates her experiences of perceived time from the perspective of a dreaming:

> When I was young, I dreamt that they were going to bury someone and they were walking on a long road with trees. I woke up and I told my mum: You know what? I dreamt someone was dead and he was carried on a very long road with a lot of trees, a very strange road, people were covered with shawls because of the cold and they were carrying lit candles. I didn't know that place. Years later, when I buried my grandmother, they took me on that road, and it was the path that I had taken when I was younger.[22]

The words she utters refer directly to distorted sound objects we can recognize in the sonic environment, for example trees – they are conveyed by the noise of leaves; and funeral activities – conveyed by people's cultural activities. In the background we can just make out sounds of work that are difficult to clearly identify, the noise of people chattering, and deep in the background the sounds of a music group performing folk melodies. However, it is impossible to notice that the whole soundtrack was carefully composed to convey these emotions. Recordings of the tropical soundscape are intertwined with sounds of mechanical and electronic origin, and also with the third layer: intentional sound artifacts – such as glitches or reverb. Individual sound layers are extracted and are positioned at the front of the sound stage, only to later sink into the background. In the whole composition, the human voices become part of

[21] *Ibidem*.

[22] *TROPICS*, dir. M. Lavenne, *op. cit*.

the environment, they are more a background sound activity than an index of a living person. The sonic environment of the film is then the entire spectrum of relations between various sound objects in the composition, regardless of whether their origin is natural or artificial. As a result, the sound design is similar to the methodology used to work with a 3D scanner that creates a three-dimensional space based on a cloud of points, its individual objects do not have opaque textures, and each object has the potential to penetrate others.

The *Tropics* is an example of the emerging geo-anthropological approach in arts, which uses remote sensing instruments (from the field of sciences such as archeology, meteorology, geodesy, geology and soil science, physics and astronomy, robotics and transport, and also mining and military), to create stories and affects referring to colonial times. This approach presented in science, but also cultural practices designing new forms of visuality based on technological devices and operating systems for collecting and interpreting data, introduce significant changes in the perception of the materiality of culture. Jussi Parikka describes them with the term "media geology", as:

> […] a different sort of temporal and spatial materialism of media culture than the one that focuses solely on machines or even networks of technologies as nonhuman agencies. […] – is not restricted to traditional ideas about media as devices but can refer back to cosmology and geology: that the geological sciences and astronomy have already opened up the idea of the Earth, light, air, and time as media.[23]

The examples of using remote sensing technology presented in this text also reveal the ambiguity of the consequences of geo-anthropological practices. On the one hand, as Parikka tries to put it, they are "a way to investigate the materiality of the technological media world. It becomes a conceptual trajectory, a creative intervention to the cultural history of the contemporary."[24] These practices design new images of the Earth, through visualizing history, and social and economic relations. However, on the other hand, the possibilities of digital manipulation open up new problematic levels. Many of the currently used devices based on remote data collection are becoming part of geoengineering projects and the search for new possibilities for exploiting the Earth, even in the times of scientifically confirmed climate crisis within the discourses centered around the Anthropocene. Kathryn Yussof links "colonial geo-logic" with the Anthropocene, as a part of the project of expansion.

> In the blocked horizon of the Anthropocene in which geology emerges as an end-game negotiation with the planet and late liberalism, geology can finally be recognized as a regime for producing subjects and regulating subjective lives – a place where the properties of belonging are negotiated. Anthropocene monumentality is a way to unpack the language that geology carries and a way to push a conversation that admonishes the idea of the neutrality of geology as a language of the rocks and deep time, which is immune or innocent of its current deadly configurations. What often

[23] J. Parikka, *op. cit.*, p. 3.

[24] *Ibidem*, p. 4.

becomes "political" in geologic relations is infrastructure – mine, pipeline, coal field, water rights, land dispossession, namely, material political economy.[25]

We are dealing with infrastructural maps – as multidimensional and multi-media structures – updated forms of two-dimensional colonial maps. In addition to economic, political, and cultural vectors, there is also an algorithmic operation that arranges these maps. It is a computer and machine vision that produces a symbolic representation, often omitting what is socially, politically and culturally significant, and problematic. It also has consequences for defining the visuality and perception emerging from artistic projects that reach for technological tools and use them to establish new relationships between tradition, culture, and technology. The sensational images and sounds which they project within the research instruments, which are not subject to criticism, become an apparatus in the Althusserian sense: producers of a system of narratives taken from the sciences for which they were invented. And there is also a threat that the message and aesthetics they propose may lose its uniqueness, becoming a visual form of 'abstracting' history, events, and emotions and in this way continuing the labor of colonial modes of presenting the stories and cultural memory.[26]

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[25] K. Yussof, *op. cit.*, p. 13.

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