reading maps, reading business

introduction

The paradoxes of extractions are situated in *mapping*. From maps being intended as a mediation of territory to maps being active *agents* that invite processes of resource extraction, and thus the potential for businesses.[1]

As technologies enabled humanity to travel long distances, and to document findings of "new" territories, and claiming those territories, Greenland (Kalaallit Nunaat) became in humanity's perception *the last imaginary place*[2] on Earth – the *Terra incognita* and later "*Terra nullius*"[3] – a sublime yet extreme environment, in which the compass is orientated with the cursor always pointing North. The territory in and around the world's biggest island has exponentially gained global attention. The consequences of climate change, its strategic military position and its unique and rich geology beneath the Earth's crust, makes Greenland something more than a frozen wasteland, but a chain of mineral discoveries reaching into modern times.[4] Although the world witnesses a *shrinking* Arctic as the ice caps melts, the global mining sector wants the Arctic to *grow*, as they are *waiting* to be represented in the narrative of a "new" Arctic. With the intensified mapping of raw material over the last years, science institutions, governments and mining companies have investigated the opportunities for resource extraction in the Arctic region through mapping underground mega-structures, with the urge to extract the Earth's resources. This thesis paper is about trying to

1. *Open for business* is a term used by the previous Greenlandic premier minister after the previous U.S President in 2019 made an offer to buy Greenland from Denmark. The term is also used in the attempt to attract foreign investors to Greenland. However, the previous U.S President saw buying Greenland more as a real estate deal, rather than an embarrassing imperialistic action to get valuable resources in the new geopolitical and investment *zone*.
2. Reference to Robert McGhee's book *The Last Imaginary Place – A Human History of the Arctic World* (2005).
3. *Terra incognita* (Latin) meaning; unknown land, or unmapped land, and *Terra nullius* (Latin) meaning; nobody's land.
4. Lola Sheppard and Mason White, *Many Norths* (New York: Actar, 2017), 393.

understand these processes of mapping and map readings as an act of alteration and *territorialisation*.[5]

In my practice, I am generally interested in political tensions and paradoxes. I am interested in the power of visualising relations between maps and extraction, and what that brings about semiotic readings, aesthetic meanings and values. The current political tension in the Arctic region is situated in mapping geology, with the intention to extract raw material. The map becomes an *agency* rather than a mediation, as the map functions as *self-referential*, meaning that the system within the map are imposing its own lived reality; the map generates information rather than simply storing information. As a designer who wish to emphasise and work in the Arctic region,[6] I see a need to analyse the different meanings of map and extraction before operating in the actual territory. Based on Emanuela Casti's critiques on cartography through semiotic analysis, I aim to understand the mechanisms of maps being agents, to discuss their performative aesthetics and realities, and how this generates and amplifies a political tension through the act of symbolic control, material control, and finally domination of meaning.

As the *race for the resources* is globally being played out between mining companies, investors and nation states, I will examine Greenlandic explorations and mining licenses, with the Nalunaq Goldmine in South Greenland

5. Territorialisation is the act of naming a territory in a particular society's interest, for the control and reproduction of that same territory and society.

6. I have for the last seven years engaged in the Arctic region through projects, education and residencies. Greenland and its geology are particularly interesting to me, due to family connections through the last 125 years, another interest is situated in the political relationship due to Greenland being a part of The Kingdom of Denmark for 301 years. At last, I see large opportunities - and an anchor point in my design practice – in the Arctic region – being an endless source of inspiration, fortune and promises.

as a case study, to discuss how the notion of extracting information from and reading of maps/ mapping is a signifier for political tension within Greenland, as it is echoed into global concerns. I wish to understand what maps can bring to the design discipline, and give agency to the title; *reading maps, reading business*.

Throughout this paper, three moments of semiotic analysis will appear as semi-fictive dialogic intermezzos,[7] always accompanied with a map or a model (referenced in footnotes and in the *image section*), responding to the treated theory interconnected in the three chapters; *symbolic control*, *material control*, and finally *domination*. The maps or models resonates to the dust cover **(IS.10)** of this book as an additive poster, and works as a visual translation of this paper's research. The intermezzos will build-up my argumentation and contextualization of the research question; *How the notion of extracting information from and reading of maps is a signifier for political tensions and business in Greenland?*

7. The semi-fictive intermezzos, *map readings*, are based on actual conversations I have had with different experts who use the representative maps. The intermezzos are not representing the conversation one to one but are carefully trans-formulated for the sake of the analysis, and hence semi-fictive.

action on territory 1

Previously in Greenland, and in the Arctic region, the indigenous people shared information on landscapes through oral storytelling and dance[8] as mapping also had a mythical meaning to the information which was shared throughout generations (also phrased as *Deep mapping*). When the missionaries, explorers and scientists came to the remote island, hand-drawn maps (earliest map of Greenland dated from 1380 by the Zeno brothers, **IS. 2**)[9] and observations were created at land or from sea with an eyewitness perception and expectation of the terrain, which for the first time in the mid 20th century resulted in photographs taken of isolated areas in Greenland from aircrafts. These photographic representations have been used ever since by the locals and foreign actors (military, industries and scientists), despite them being outdated, inaccurate or having a low degree of detail. Only recently have a mapping project launched a beta version map[10] of Greenland's 2,166,086 km^2 areal, and for the first time made the surface landmass information accessible and open for everyone, with zoom interface gestures due to satellite technologies, which updates the map in a new resolution every two hours. The use of satellite technology did not only reveal

8. Many readers would probably draw their thoughts to the Inuit wooden maps **(IS. 1)** found in East Greenland in Ammassalik during the *Umiak Expedition* in 1883-85, though there is no evidence that the Greenland Inuit produced such wooden maps for navigation. Instead scolars suggest it was an artifact for storytelling and imaginary landscapes or made to be sold to European trade ships. (Daniel Weiss, https://www.archaeology.org/issues/337-1905/features/7550-maps-greenland-wooden-inuit-maps).

9. William Herbert Hobbs, "Zeno and the Cartography of Greenland," *Imago Mundi* vol. 6 (1949): 15. **(IS.2)**.

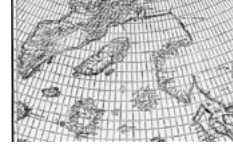
10. The project, *Landkortlægning af Grønland*, developed by Styrelsen for Dataforsyning og Effektivisering, funded by Danish investors and the Danish State. Beta version **(IS. 3)**, https://listservices.kortforsyningen.dk/#/map/WMS/satellitfoto_groenland_beta.

undiscovered dynamics within nature but also extended to identify resources for extraction and monitor land-use.[11] The use of satellites thus changed the practice of cartography, as it did not only provide access to information, it also enable the possibility to map out territory of property and territory of exploitation from the all-too-familiar top-view perspective looking down at the subject, *the* Earth and its material, as something to extract and possess.

Geological survey and Geology have ever since it became a discipline in 17th century never only been about the studies of the Earth's origin, structure and history, but also just as much about colonialism and the capitalistic urge, force and ability to map and extract. I acknowledge that Geology is scientific situated and inherent in the arguments and purposes of coloniality and capital exploitation on a vast global scale.[12] And that thus exposing conflicting political tensions of today are still relevant in the attempt to understand the discourses in Greenland and in the rest of world concerning mining operations and the 'race for resources'.

11. Jennifer Gabrys, *Program Earth – Environmental Sensing Technology and the Making of a Computational Planet* (Minneapolis: University of Minnesota Press, 2016), 2-3.

12. This is also treated in Kathryn Yusoff's book *A Billion Black Anthropocenes or None* (2019), which exams a series of important racial issues within Geology, as one of them being; *geology not being neutral,* which I find the urge to highlight as a relevant position in the discussions of today's maps and extraction strategies.



map readings with a geologist[13]

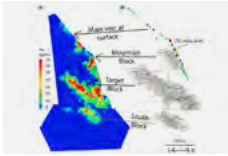
Geologist Due to the well mapped data from core drilling and the angles of these, it is possible to reconstruct a model of the Nalunaq mountain in a 3D space by placing and adding points from geochemical samples surveys. The model illustrates with different colours a projection of the Main Vein in the Psammite Zone where gold mineralisation was formed.[14]
The compiled geochemical data are collected inside and on the surface of the Nalunaq mountain, which to this date has resulted in 44,717 meters of core drilling on the surface and in the underground,[15] exclusive to the construction of the tunnel system.

Me So, the colour red in the projection signifies a higher concentration of gold in the mountain ore?

Geologist It is correct that the colour red indicates a high concentration of gold, up to 70 ppm, which looks very promising for the mining company compared to other gold deposits elsewhere.

Me So, the process of classifying and adding points from core drilling samples can also predict a picture of exploitation and wealth - and thereby illustrate a political tension for larger social- and environmental concerns?

Geologist The projection of the 3D space is an explanatory map for every mining company who has an interest in extracting gold from the most promising and concentrated deposits, and for that matter this projection is also very valuable. The



13. This conversation is a fictive text/conversation, though the content is primary based on an interview I conducted with the geologist Robin-Marie Bell in October 2021, on her research; "Assessment of lithological, geochemical and structural controls on gold distribution in the Nalunaq gold deposit, South Greenland using three-dimensional implicit modelling," in *Characterization of Ore-Forming Systems from Geological,*

projection defines additional exploration targets and lead to follow-up field work that potentially could result in new exploration licences for gold in South Greenland,[16] with a similar geochemical structure as in Nalunaq.

Me So, the red aestheticizes the promise of fortune towards global investors, mining industries and the Greenlandic population? Is the colour red's connotative meaning then related to power, prosperity and fortune in partnership for extracting gold? Or does red's connotative meaning signify danger and destruction, since the colour red appears as capsulated threats in the mountain, that can burst at any moment, and threats for whom?

Geologist The Greenlandic ecosystem has proved to be very fragile, and the Greenlandic population seems to be split on the matters of extraction. But as a geologist I cannot go on the record and elaborate on future mining extraction in Greenland any further.

Me As I see it, red signify threats for a geopolitical tension in the *race for resources*, in a territory, which previously have avoided large exploitation processes, but now faces unavoidable extractive processes, as the future societies will exists at the expense of resource extraction in those territories too.

Geochemical and Geophysical Studies, edited K. Gessner et al. (London: Geological Society, 2018), 393. The image or map is from the same article, "Three-dimensional model of Nalunaq Gold Deposit" **(IS. 4)**.

14. Simun D. Olsen and Denis Martin Schlatter, "The Nalunaq gold mine: a reference sample collection and compilation and interpretation of geochemical data," *GEUS report*, 2011/31: 14.

15. AEX Gold Inc., https://www.aexgold.com/projects/nalunaq/.

16. Olsen and Schlatter, "The Nalunaq gold mine," 7.

action on territory 1

The saying; *If it isn't grown it is mined*, speaks to one's cognition that all the extracted materials are mined from the Earth's crust, which humanity later have turned into products and uses in everyday life. This procedure has taken place since the Stone Age (3.000 BC) with the extraction of rocks to make tools, to then later in time extract metals, oil and gas for energy. Though mining in outer space already is a consequence of a need for raw materials, I will in this paper rather emphasize on how geological maps and models function as agents in political discourses in Greenland. While doing this, I will briefly touch upon the global markets' *race for resources* as it manifests itself on a planetary scale.

Analytical reflection on extraction:

Extraction is an active process of moving something with force. The extraction of resources, raw material, changes one's understanding of geological materials as mining moves more geological matter than other human endeavours[17] and thus impacting environments and landscapes. At the same token, the extractive raw materials are the basis of humanity's economic development and the basic inputs of our consumption of goods.[18] To extract is to draw forth, it is to select, it is to withdraw and separate. It is a movement of editing and rearranging matter, and knowledge, and thereby also control and domination.

17. Stuart Kirsch, *Mining Capitalism: The Relationship between Corporations and Their Critics* (Oakland: University of California Press, 2014), 3.

18. Regine Vogt, https://www.ifeu.de/en/topics/resources/raw-materials/extracted-raw-materials/.

Analytical reflection on mapping:

Mapping is an active act, a transitive verb, it refers to something that is in the process of becoming. It is an act of placing points of information and categorizing colours, numbers, figures and even ideas into a context of simulating something real; a physical space or surface, often in manipulated scales. Maps or cartography are information carriers laid out in a grid, often portraying the subject from above with various geographical designators in combination with various codes, icons, purposes and uses.[19] Maps are interfaces between knowledge and experience,[20] as maps replaces territories, rather than represent it.[21] This replacement contributes to a specific understanding of the world, as the map categorizes knowledges and experiences into a system of interconnected codes, signs and languages, and creates a model within the logic of representation[22] – a *hypertext* [23] or a self-referential *meta-image.*[24] These representations, the aesthetic and semiotic readings of the map, shape one's perception, sense and understanding of the world; political, environmental and social perspectival, which can vary depending on location, privilege and cultural history. Whether a perception of the world divides or connects territories into representations, one can recognise and perceive changes in the map as colours,

19. Emanuela Casti, "Towards a Theory of Interpretation: Cartographic Semiosis," *cartographica* vol. 40, issue 3 (Oct., 2005): 6.
20. Dirk Van Weelden, "Possible Worlds" in *Else/Where: Mapping New Cartographies of Networks and Territories* ed. Janet Abrams (Minnesota: University of Minnesota Press, 2006), 26.
21. Casti, "Towards a Theory of Interpretation," 12.
22. Martí Peran, "Making maps: Cartography, territory, modernity" in *Landscape as Territory* ed. Clara Olóriz Sanjuán (New York: Actar, 2019), 93.
23. Casti defines a hypertext as something that have the ability to handle a variety of different data, and specific ways of organising those data, while multiple positions and interrelation of data. (Emanuela Casti, *Reality as representation: The semiotics of cartography and the generation of meaning* (Bergamo: Bergamo University Press, 2000), 138).
24. Matthew Fuller and Eyal Weizman, *Investigative Aesthetics: Conflicts and Commons in the Politics of Truth* (London: Verso, 2021), 95. eBook edition.

figures etc. Or as the Geographer theorist J.B. Harley describes; “Far from holding up a simple mirror of nature that is true or false, maps redescribe the world like any document – in term of relations of power and of cultural practices, preferences, and priorities.”[25]

In the theory of cartographic semiosis, Casti argues that there is a shift from the emphasis on maps intended as a mediation of territory to maps being agents. The notion of a self-reference instrument in the analysis (or a meta-geographical discourse) of maps means that the cartographer’s self-reference is not the knowledge of the world, but rather the knowledge generated independently by the map itself.[26] *What* the map represents (signifies) of visual value and semiotics therefore also talks to syntactics (linguistic signs), as in the intermezzo *Map reading with a Geologist*.

One could argue that maps are design objects (*map-as-object*) with agency, as maps are data collected and compiled to create and communicate models of spatial information of a landscape.[27] Maps replaces and build upon the premise that reality is modelled. This manifests, that the roles of the cartographer and the maps have shifted, as the reading takes place according to situations; diagramming, deforming, drawing and redrawing, and segmenting the Earth[28] *in* the map, for then to be superimposed information *onto* a territory, which replaces that same territory, as also attempted in the *Map reading with a Counter-voice* **(IS. 8)**.

25. J.B. Harley, “Text and Context in the Interpretation of Early Maps” in *The New Nature of Maps: Essays in the History of Cartography* ed. Paul Laxton (Baltimore: John Hopkins University Press, 2001), 35-36.

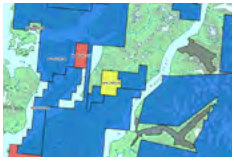
26. Casti, “Towards a Theory of Interpretation,” 1-2.

27. Wikipedia, https://en.wikipedia.org/wiki/Cartography.

28. Benjamin H. Bratton, *The Stack - On Software and Sovereignty* (Cambridge: MIT, 2015), 185. eBook Edition.

In Casti's work J. B. Harley's ideas are highlighted as the first theoretically deconstruction of maps, which claimed; that 'precision and accuracy in rendition were the new talismans of power and its exercise – and the culmination of this authority is the modern-day use of computers to draw maps,'[29] and the means to do so. This is something Casti follows up by discussing the procedures in action upon territory, as briefly mentioned in the introduction, and divided in the three following categories; (1) *symbolic control*, which tries to appropriate territory through intellectual modelling, (2) *material control*, a reification in the physical construction and direct modelling of territory, and finally (3) *structuralization* or the dominion of meaning, which is the creation of operational contexts for the performance with a social relevance,[30] that could indicate naming a place in the process of territorialization.

These three categories respond and fit remarkably well with the mining sector and the involved actors in Greenland on the matter of mapping and extracting. Whereas the actors having *symbolic control* are the maps that signify geological/geochemical meaning (*Map reading with a Geologist*, **IS. 4**). Those having *material control* are the maps that models the actual territory and physical appropriation that is used by the mining companies (*Map reading with a Mineworker*, **IS. 5**). And finally, the maps who feed the creation of structure and dominion meaning on the behalf of the Greenlandic population – a *structural control*, are visualised in



29. Casti, "Towards a Theory of Interpretation," 3.

30. Casti, *Reality as representation*, 24.

the *Minerals and Petroleum Licence Map* **(IS. 6)**. The different maps, of the same territory, included in this paper varies according to the types of used designators (*referential*, *symbolic* or *performative designators* [31]) expressed in different colours, scale, numbers, languages and figures, as well as the meanings and significance they feed when being self-referential. It is in these designators inside the communicative systems that maps contain a large amount of political and territorial tension. The *Minerals and Petroleum Licence Map* is the most obvious example of this tension as the designators of polygons show how the licence territory to explore and exploit the geological material are an appropriation of the landscapes with the political and business orientated promises; that mining operations will allow prosperous developments in the future for the Greenlandic society and on a planetary scale. It is the administrative domination and practice of an aesthetic power with superimposed polygons amplify, translate and synthesize exploration licenses. The map signifies a promise to the industry and the Greenlandic population, that Greenland is on its way in becoming a 'mining nation'.[32] Whether the designators appears in colour, names or size etc., the designators cannot establish a presumed objectivity, instead they create links,[33] that manifest aesthetic power when revealing and claiming territory. The map's blue coloured territories signify Mineral Exploration Licence, yellow territories signify Mineral Exploitation Licence, whereas red territories signify Application for Licence under approval. All

31. Casti, *Reality as representation*, 25.

32. At this moment Greenland have only two producing mines; Aappaluttoq and White Mountain/Qaqortorsuaq (Jan. 2022).

33. Syntactic analysis between the different designators' expression borrowed from Casti's *Reality as representation*, 36.

the polygons are labelled with a licence code (name) and an expiry date, to communicate the maps active role, and political agenda; the urge to extract. The map embodies the practical representation of physical spaces of extraction, with the agency to fulfil the administrative role in the structuring territory[34] in licences, as well as being the gatekeeper of those territories. Through this *domination* the *Minerals and Petroleum Licence Map* reveals an aesthetic image about mineral deposits and geochemical data, as well as a political strategy.

The dual interpretative perceptions and processes of maps (its uses and its origins) calls for the opportunity for misunderstandings or counter-knowledge too, since maps as carriers can conceal something for one, while being exclusive or presenting a displacement for others. And in that regard maps function more as agents on its own right: "the map communicates with regard to the significance and meaning of territory."[35] The map can signify and endorse through aesthetic potentials an economic development of unexploited territory, as the map feeds meaning to the political debate in Greenland (including the EU and Denmark) on extraction and business deals with foreign industries and investors. Or as it is formulated in *The Stack*: "Framing is how chaos becomes territory".[36]

A counter reading of the *Minerals and Petroleum Licence Map* is that even though the Mineral Authorities have in the recent years tried to attract investors in doing business in

34. Casti, *Reality as representation*, 27.
35. Casti, "Towards a Theory of Interpretation," 2.
36. Bratton, *The Stack*, 224. eBook Edition.
37. After having followed the Mineral Authorities geological surveys and licences strategies since 2017 many changes have improved since then in the attempt to be more transparent and show willingness to attract international mining industry and to show goodwill to the Greenlandic population, which have been demanded for a long time, for the two main reasons; to give the Greenlanders access to information, and to smoothen the

Greenland[37] as it is after all a lucrative business for investors, since mineral extraction gives a steady stream of production – the map instead visualise the fiasco of the exploitation licences or the lack of them, since actual productions from the mining industry is far from sight. Another counter-reading that generates a political tension and critique of the map fails to account for other values, such as the settlements near these territories, or the wildlife, that underpin the lines in nature, which is significant for the Greenlandic culture, but instead simulating practices from colonial cartography. The map does not represent the real territory, but replaces it with polygons for licences, while superimposing an extraction on top of a green-like natural terrain with fjords and islands.

application process for exploration licenses. This is something the report *To the Benefit of Greenland* (2014) also emphasises. Still it seems to be the conflicting discussion, as roughly half of the Greenlandic population lack trust in the (previous) Government's ability to protect their interests and to function as a strong counterpart to the power and influence of foreign companies, which was also addressed during the Arctic Circle Assembly 2021 where I attended.

map readings with a mineworker[38]

Mineworker Nalunaq means in Greenlandic 'the place that is difficult to find' (60° 22' 30" North, 44° 51' 0" West). The Nalunaq Goldmine starts with a steep slope in the mountain in Kirkespirdalen. The slope continues up inside the mountain and take shape of a spiral upwards with a number of detours. It is a network of tunnels without names – a transportation system in worm-like shapes.

Me On this image I can see a grid inside the mine. What does the grid mean? And what knowledge are you extracting with this grid deep inside the Nalunaq mountain?

Mineworker With guidance from our geologist we draw lines with spray-paint. The lines marks where to extract, and function as an instruction for our machines on where to drill, collect samples and place explosives. That is how the network of the tunnels continues to grow in our search for the Main Vein from the Target block with the high-grade gold concentration.[39]

Me The vertical and horizontal lines in the grid does not indicate lines of latitude and longitude projected on maps that divides the Earth into a readable and spatial coordinate system in a 1:1 perspective?

Mineworker No, we are operating with explosives and machines that blaster. For then later to remove and transport raw material out of the mountain.

38. This conversation is a fictive text/conversation, though it is primary based on an interview I conducted with Greenland's School for Minerals and Petroleum in conversation with Hans Hinrichsen, Eslam Aljabali and Curtis Chapman in October 2021 on mineral strategies in Greenland, prospects development for the school and for the mining sector in Greenland.

39. Olsen and Schlatter, "The Nalunaq gold mine," 5.

Me So, the grid is just a performative designator, a socially produced concept,[40] that signifies the simplest and most ubiquitous form of mapping? As I see it, the grid signifies that something needs to happen, as it symbolises a type of activity 'within' the grid. It signifies an act of knowledge extraction, which we, as map users, need to pierce through in the grid, in the map and in its signs, in order for us to get to the real thing, a knowledge of the resources in the mountain ore.

Mineworker Blasting the mountain ore is like a treasure hunt for us, especially in the exploration phase of gold.

40. The term, *performative designator*, is borrowed from Casti's article 'Towards a Theory of Interpretation," 5.

The language of the map functions by virtue of cultural rules, conversions, and standards, like the use of designators listed in the explanatory legend or the context the map is placed within. But at what moment does the map become unreadable, inaccessible and exclusionary? Is it when too much information, becomes nonsense, or when the map in the act of replacement of the territory loses its meaning and sense?

Mapping and sense-making of the underground through geological surveys is typically through vertically core drilling and horizontal sample collecting.[41] Geological/ geochemical maps reveal not only the Earth's and all lives' history, they also reveal hidden fortunes and potentials for mining entities (the ability to be *open for business*, as Greenlandic politicians have highlighted in various occations). In Greenland the interest to develop the mining sector has roughly, with regular intervals after Greenland gained Home rule in 1979, sparked to the political discourse that Greenland can develop economic independence from The Kingdom of Denmark, if large scale mining operations were given licence to *run* production. Due to environmental concerns, unstable or indecisive political positions, Greenland's current lack of infrastructure and the market's change in demand, or the possible profit for the mining entities to start exploring and exploiting, have previously either postponed or cancelled mining operations.[42] The Mineral Authorities have in the last years developed a pragmatic approach in ongoingly adjusting regulations for mining.[43]

41. As well as satellite images and laser scanners in the creation of 3D models such as LiDAR.

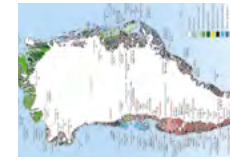
42. The latest example being Energy Transition Minerals (formerly Greenland Minerals) which have sued the Greenlandic Government, whom in the company's assesment were preventing them from the right to get an exploitation license (May, 2023)

43. Rasmus Ole Rasmussen and Arild Gjertsen "Sacrifice Zones for a Sustainable State? Greenlandic Mining Politics in an Era of Transition" in *The Will to Drill* eds. Brigt Dale et al (Cham: Springer Polar Sciences, 2018), 127.

Though later on intensified its focus towards mining entities from abroad by staging that; "the development of a mineral resources industry in Greenland is the top priority".[44] This is done in the attempt to make Greenland a more attractive mining territory, highlighting the unique geology and the expertise to *do* business in Greenland **(IS. 7)**.

However, there are different macro-political strategies and positions in relation to mining activities in fragile ecosystems and small inhabited communities. Depending on what raw material is planned to be extracted and where, whether that being the radioactive uranium in the development of Green Energy or rare earth minerals due to China's increasing monopoly, Greenland is highly advised by Denmark to make business deals with allies in the Western world. Greenland is thus facing challenges with maintaining a scalar imaginary that both sees Greenland as being inside and outside the Danish sovereign realm,[45] in regard to the discourses around the mining sector, and thereby also externally the political leeway for businesses executed through an aesthetic power *in* maps. The aesthetics in maps is the superimposition manifested with a specific political agenda. The practice of an aesthetic power can be divided into two modes; *affect* and *effect*. Where the *affect* demonstrate how aesthetic power are used to intensify fluctuations of feeling, the *effect* seek to integrate everything as its own map and

44. Naalakkersuisut, "Greenland's Mineral Strategy," 2020-2024 (Nuuk: Government of Greenland, 2020): 2.
45. Hannes Gerhardt, "The divergent scalar strategies of the Greenlandic government and the Inuit Circumpolar Council" in *Greenland and the international politics of a changing Arctic : postcolonial paradiplomacy between high and low politics*, eds. Kristian Søby Kristensen and Jon Rahbek-Clemmensen (New York: Routledge, 2019), 119.



monitor.[46] Both modes marks a political urgency and acknowledgement of the influence and use by aesthetic power, since the mapping is only secondary to the meaning of the map itself.

Geological mapping is produced to be explanatory for the geologists, mineworkers as well as the local authorities and mining entities – and occasionally to the public. It reveals scientific processes, and can produce a range of different maps, all based on the recording of geological information from the Earth's crust, for many different purposes. But since this paper treats maps as agents, how is it then relevant or situated in a design discipline? The following chapter tries to unpack the artistic participant's urgency in deducing and engaging with semiotics and aesthetics (the fundamental approach when assembling, connecting, recognising and multiply different forms of meaning) in maps, through amplification, translation, and synthesis.[47]

46. Fuller and Weizman, *Investigative Aesthetics*, 129. eBook edition.

47. Fuller and Weizman, *Investigative Aesthetics*, 70. eBook edition.

"Maps are too important to be left to cartographers alone".[48]
Since I will not treat the means of the cartographer, it is however necessary for me to understand my own design practice's urgencies in the engagement and use of the multiplicity of critical approaches in the practice of map making and map reading, and furthermore to prevent acting upon the dual colonizing gaze toward Greenland as a privileged Danish citizen. J. B. Harley stated that the value-making of maps is the power dynamics in the creation of maps, which in this case study speaks to the geochemical mapping of Greenland's underground and the discourses of power relations, amongst many other agents in search of domination. There are those agents who try to censor maps and its significations, and those who try to legitimize maps through the notion of public access and distribution. I will advocate for the last, as it gives important insights on valuable and often complex and conflicting information that *waits* to be read and interpreted. For the designer the act of mapping proposes a type of function and a proposition of knowledge, where one gets to define what the aesthetic (or hyperaesthetic[49]) the map manifests and links to. Then making use of semiotic readings in maps, one can create work with the map's designators and use the map's agency to support a counter visual point and position, to guide the spectator to interpretat the meaning of the map with a certain political discourse and strategy, and thus demonstrate domination.

48. Abrams and Hall (eds.): *Else/Where*, 12 (quote by J. B. Harley).

49. A hyperaesthetic image is the result of a collapse or overload, where there is no longer any sense making present, and formed in the configurations of power relations (from Fuller and Weizman, *Investigative Aesthetics*, 79. eBook edition).

domination

As for the geochemical maps, they visualize politics in spaces of the underground. Often the visual knowledge of the underground is very expensive to produce, and if not impossible to get access or insights to. The act of mapping, as it is also treated in the *Map readings*, can be compared with the power dynamics in the other medium photography. Photography laid down routes of traceable references[50] as Susan Sontag argued, as it was a very important medium during the period of high colonialism and numerous nationalist conflicts in Europe. The map also (re)produced an imaginary that recorded and documented the progress of the civilisational missions, which became an integral part of this progress; the conquest of the Earth to the last square centimetres. Maps helped to occupy "the other" territory and to take possession through territorialisation and to fill out the "blank" spaces with names of European celebrities in "property"-processes, as the maps claimed and legitimized territory through documentation, geometry and coordinates.

As photography, maps became a crucial part in the exploitation phase in Greenland. However, the difference between photography and maps is that photography, apart from being a much younger medium, visualises a split second of a specific moment in time, whereas a map in another dimension is an active act of collecting information often into a larger and complex system of a terrain, as well as it replaces the terrain itself by becoming referential. In that regard maps are also the contextualisation of

50. Susan Sontag, *Regarding the Pain of Others* (London: Penguin Books Ltd, 2019), 74.

information that proposes and replaces a particular reading of the world, and the perception of Greenland too. Mapping (and eventually extraction) of raw material at present times are therefore also a part of the global (markets) demand for resources and thus the connection between colonialism and capitalism. Maps and mapping are tools in the practice of superimposition and aesthetic power, as it all at once deals with politics, markets and planetary governance. One could argue that the problem in maps are not only 'aesthetics of politics', but 'aesthetics of the economy',[51] that leans towards a Marxist critique on capitalism and how for instance the *Minerals and Petroleum Licence Map* signify the aim towards targeting for an increasement of investments in the mining sector with national and non-Greenlandic companies. The map in itself is a symbol of territorialization and intellectual appropriation, as the map's performative function bears the witness to the exclusive right to explore and exploit the territories,[52] by superimposing a polygon over a territory, and replacing its meaning and (economic)-value.

51. Alberto Toscano and Jeff Kinkle: *Cartographies of the Absolute* (Winchester: Zero Books, 2015), 108. eBook Edition.

52. Casti, *Reality as representation*, 25.

domination

map readings with a counter-voice[53]

Counter-voice Maps are usually easily communicated, customized and distributed, especially after satellite technologies were introduced. What do you see on the map?

Me I see lines that separate the colours from each other and from the white. According to the map's legend the different colours indicate different rock types in the specific territory. I also see contours-lines. It must be of heights. But looking through this viewfinder's window are these lines then dividing or linking megastructure of the Earth's crust?

Counter-voice Lines in maps on territories are normally considered as agents of political concerns. The division of lines and points indicate a change in material. These are water/lakes, granite and volcanic rock among many others. And then there are the figurative designators '@', '&', '?' and '#' that acts as code for core drilling in the crust.

Me For me the map signifies activity of geochemical mapping of a territory. It signifies a remote or inaccessible territory with no names. The map signifies on one hand; an analogue terrain, a topography, and on the other; a complex digital system of codes. I see exploration opportunities in the 2D map, with an intensified interest from mining entities and investors, as they finance the largest amounts of these geological surveys in this particular territory.

Counter-voice There are two types of designers;

53. This conversation is a fictive text/conversation, though it is primary based on conversations I had with colleagues in November 2021. The roles are sometimes shifts. **(IS. 8)**

the one that wishes to map in flat structures, in grids, and the other that wishes to map in volume.

Me — But does the map not know that there exist no straight lines in nature?[54]

Counter-voice — The map renders the territory figurative on where deposits can be found in 'symbolic' designators[55] with elements of recognition on the actual territory in its physical material. This is signified when there is a high level of designators, as in this map. The designators are generated from the increasing geochemical survey activities. These designators are presented as symbols, as it is a way to illustrate points of interest in the map.

Me — There is always a point between two points. And one manifestation of a map might be different from the other interpreter's reading.

Counter-voice — And therefore, comes a map often with a legend that suggests a normative piercing of information through the map and its knowledge. With the legend one also has the power of appropriating territory, building infrastructure, establishing mines, where no one seems to live, for then to profit. One can also read against it, by emphasising on the aesthetic power practiced in the map, and indicating the effects or affects.

Me — So, the designators, '@', '&', '?' or '#' could signify places of settlements and ecological sites. And despite promising geological deposits in the underground, the social- and environmental

54. Reference to Sophie Chao's article ""There Are No Straight Lines in Nature": Making Living Maps in West Papua" in *Anthropology Now*, 9:1, 2017.

55. Casti, "Towards a Theory of Interpretation," 5.

impacts hopefully have to be taken into consi-deration before domination, before establishing mines and drawing polygons that leads to exhaustion on many dif-ferent levels.

domination

When making maps there is a large opportunity to investigate strategies and systems of codes within the information *of* the map. In the attempt to describe the world, the map either renders or recounts interpretations in the recontextualization of information and categories *in* the map. Thus it is crucial to pay attention to meanings-effects of the map's aesthetics, *what* the map monitors and shows, and what the map's hypertext (variety of different data in interrelation) signifies through self-generating processes of representation. This is relevant for the design discipline as it constantly when assembling and selecting information makes interconnections. Casti also points out that the selection transmission is a tool for a verifiable vision of reality,[56] or a way to articulate a critical counter-knowledge, by leaving out or including information. An example could be, the action of rendering the map by including names, as an acknowledgement that this specific territory presented in the map is inhabited or protected.

Despite what methods designers make use of there are always in the processes of visual representation content that is left out or edited. This is essential in the understanding of the artistic approach *Aesthetic Journalism*,[57] since it as a methodology seeks to collect visual documentation to investigate and to question image and narrative production. This is done in the attempt to get closer to what is perceived and assumed as being the *truth*, by commenting and constructing models of the experienced and the knowledgeable. Aesthetic Journalism thereby

56. Casti, *Reality as representation*, 51-52.

57. Alfredo Cramerotti, *Aesthetic Journalism: How to Inform Without Informing* (Bristol: Intellect, 2009), 42

creates a production of counter-knowledge, which never claims to be telling *the* truth, but only revealing moments of a truth,[58] which could relate to alternative ways of mapping and sense-making, such as for example *social mapping*. Maps claim to conduct a reality through representation in a visual performance. What maps signify have especially in recent years been challenged through notions of propaganda (or *fake news*, which can also be articulated as a counter-reading). This is done in the attempt to claim conception of reality, that blurs the common *sense* or perception of the world we live in that generates the referential framework of reality, as an act of domination; political tensions, territorial conflicts or business opportunities. A notion that can be applied to political propositions, such as the wall between Mexico and the U.S which the rightwing would argue needs to be built because all immigrants are ”taking all the jobs” and making ”all the criminal activities in the country”. Another proposition in another context; could be the ”investigative” work done by Bellingcat, the supporters of Putin’s regime would claim that Bellingcat’s work is *fake news* and their only aim is an attempt to harm the Russian Federation, its military and diplomatic officials.[59]

The concern of this matter is something the research agency *Forensic Architecture*[60] does very successfully, as they seek to critique and do investigative work on human rights violations and working against political propaganda, as it is shown in the reconstructed model of the chlorine canister in the work, *Chemical Attack in Douma*

58. Also referred to as *Visual Journalism* or *Design Journalism*.
59. It is important to note here, that I am very much support the work conducted by Bellingcat and Forensic Architecture.
60. Forensic Architecture, “About,” https://forensic-architecture.org/about/agency.

from 2018 **(IS. 9)**. In their practice of investigative journalism, they succeed to work with visual material often to reconstruct the scene of a crime as they are recreating a model of the event and territory. This simulation is presented as an alternative source of information, a counter-knowledge, that succeeds to work despite tensions and political conflicts. Forensic Architecture's work is based on open-source material and civilian recordings, which is then analysed, placed in timelines and communicated with a sober narrative, which often demonstrate something else than the dominating political discourses (the very same discourse they are trying to destabilise through mapping and sensing). Forensic Architecture is relevant in the understanding of how we (designers, and others in the aesthetic disciplines) read maps, and how maps then can trans-formulate its designators and its iconization[61] into valuable explanatory information and aesthetics, to return to J. B. Harley's quote,[62] Forensic Architecture's maps favour their agency.

To lead this paper back to its case study on maps being signifiers for a political tension in Greenland, there is a wide political consensus to develop the mining sector into a leading industry that can differentiate the economy and make Greenland a *mining nation*. The mining sector is promising to contribute revenue to the treasury to the economic development for the benefit of *all*,[63] which has changed the previous perception of the Arctic region being a low-tension zone to being a high-tension zone with the increasing attention in

61. Iconization means that direct knowledge of the world we experience is sidelined with the greater relevance being given to the knowledge generated by the map itself (Casti, "Towards a Theory of Interpretation," 1).

62. "Far from holding up a simple mirror of nature. That is true or false, maps redescribe the world like any document – in term of relations of power and of cultural practices, preferences, and priorities."

63. Naalakkersuisut, "Greenland's Mineral Strategy 2020-2024," 2.

the *race for resources*. However about roughly half of the Greenlandic population are sceptical towards mining extraction in Greenland (here especially extraction that includes uranium as a by-product) and fear a too high cost of the social impacts, and too many irreparable damages on the environment, health and nature. Still 80% of the Greenlandic underground is covered by the glacier and ”waits” to be explored and exploited by mining companies to maintenan modern societies and future technologies. Recently a geochemical survey indicated new gold deposits in South Greenland to contain several million ounces of gold, much larger than initially expected, which are located in the licensed territories of AEX Gold Inc.[64] The process of communicating a real territory with its raw materials through maps and models is inevitably about selections, synthesize and simplifications of semiotics and coded visual meanings, which is quite similar to the methodology practiced in an editorial design practice. Where moments of edits and transformations in a representation or in the production of propositions, aesthetic counter-knowledges and replacements are made in order to amplify and translate a research into a work, that occur as a rendering of an event or a scenario created with the use of additive material.

The aesthetic value of the geochemical maps gives promises not only to the Greenlandic population, and the rising Greenlandic nationalism, it also performs promises to international mining entities and foreign cooperative- and national investors to explore the underground

64. Mining company of the Nalunaq Goldmine. In November 2021 I had the opportunity to interview the director of AEX Gold Inc., Eldur Olafsson, in relation to my ongoing graduation work, *Promises For Business*.

and apply for licences. The *Minerals and Petroleum Licence Map* ensure a certain ”security” to extract these licence territories in the representation of the territory. A territory in the map that is covered by polygons and governmental laws and agreements, and thus a map that becomes an instrument of domination. This brings a greater geopolitical concern into play in the production and use of territory, and the development (or the interruption) of social relations mediated by territory,[65] where the mining industries' slow progression is closely observed by the rest of the world's investors, scientists and environmentalists.

Maps are not only instruments of orientation and mediation, maps also perform agency in the process of territorialisation.[66] This tension on territory towards Greenland's raw material were particularly also vivid when the previous U.S President made the attempt to buy Greenland, which later brought the ever so referenced quote by Greenlandic officials; “Greenland is *open for business*”.[67]

65. Casti, *Reality as representation*, 36.
66. Casti, *Reality as representation*, 66.
67. As the “real estate deal” did not go through, the Trump administration instead made a 12,1-million-dollar aid-package to Greenland for the development of the mining sector in 2020, while establishing an U.S. embassy in Nuuk.

conclusion

Maps manifest their own representations and replacements independently as they are self-referential with agency. The semiotics *in* the map guide the user in analysing its signs and aesthetics for then to interpret the complex meaning-systems onto the world. This is also how aesthetic power operates, through an interpretation of the map onto the world that manifests a certain position and agenda.

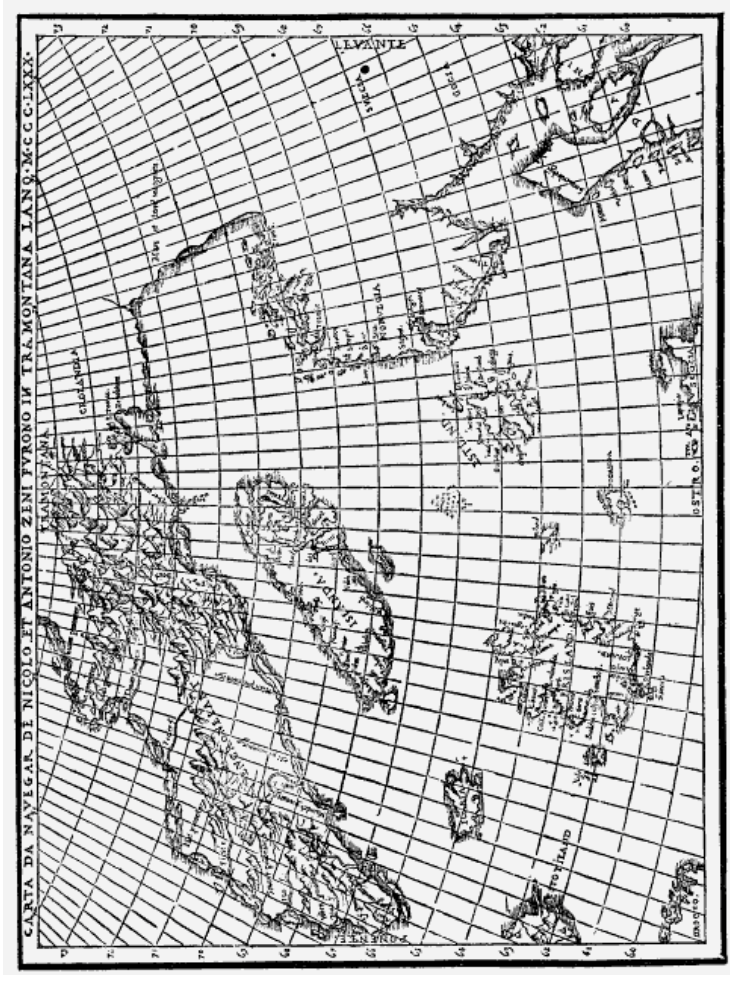
In analysing and reading maps as aesthetic agents it feeds the design discipline with the critique to approach and analyse tensions in politics of extraction through maps, and to discuss and question the modelling of the real; what is being superimposed though visuals, and what is the underlying counter-knowledge. It was demonstrated in this paper that the map replaces rather than represents territory, and that certain analysed maps signified tensions that manifested a legitimation of action - alteration and territorialization of actual territories – through different levels of symbolic, material and structural control.

The aesthetic power, whether that being three-dimensional models, top-view cartography or grids *in* maps signifies the political tension in Greenland, and that the very notion of mapping is an active act to profit on Greenland's natural resources from political- and business-minded urgencies. The argument of a national as well as planetary need and demand to extract Greenland's raw materials manifests itself in the maps. A counter-reading of the same map does something else. It questions the normative

truth-value in the map and its legend. The counter-mapping acknowledges the aesthetic within the map. It is superimposing another meaning, political discourse or concern into the map and its agency, to read potential businesses or prevent these, due to other value-regimes. As treated in the *Map readings* throughout this paper tries to create a counter-knowledge *of* the maps based on the same semiotics enables the artistic and editorial practitioners to analyse, translate and engage with maps to create investigative work and debate.

1

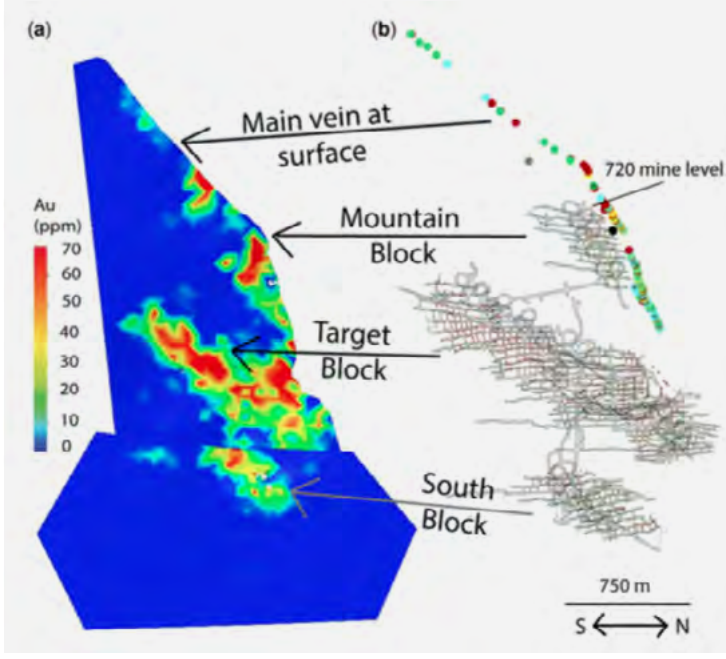
Wooden Inuit Maps by the hunter Kunit from East Greenland traded these maps to Danish polar explorer Gustav Holm, 3D map of the coast north of Ammassalik, 1885. (Greenland National Museum and Archives).



The Zeno Brother's imaginary map of the Greenland, 1380 (1558) in W. H. Hobbs article "Zeno and the Cartography of Greenland," in *Imago Mundi* vol. 6 (1949).

3

Beta-Version Map of Greenland, satellite photo, 2022 (The Agency for Data Supply and Efficiency). https://listservices.kortforsyningen.dk/#/map/WMS/satellitfoto_groenland_beta.

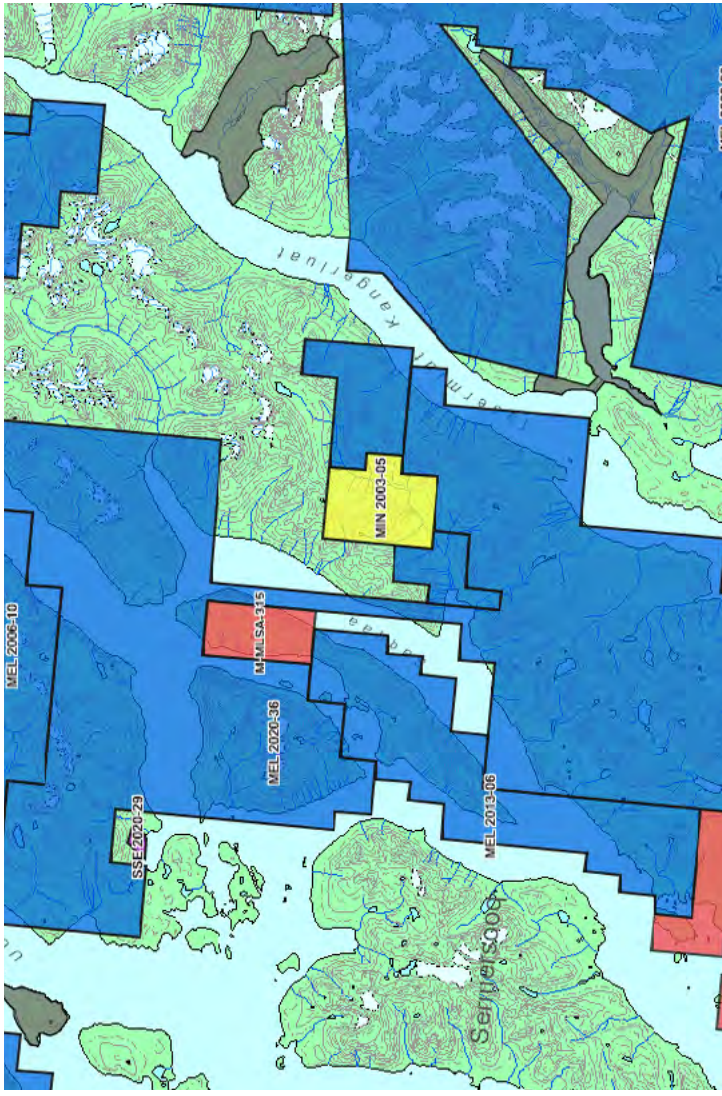


Three-dimensional model of Nalunaq gold deposit in Robin-Marie Bell's article "Assessment of lithological, geochemical and structural controls on gold distribution" in the paper *Nalunaq gold deposit, South Greenland using three-dimensional implicit modelling*. (*Geological Society*, 2017).

5

Nalunaq Gold Mine A/S's image from Ole Dahl's article "Nalunaq Guldminen - på femte år" (*Geologisk Nyt* 4, 2008).

image section

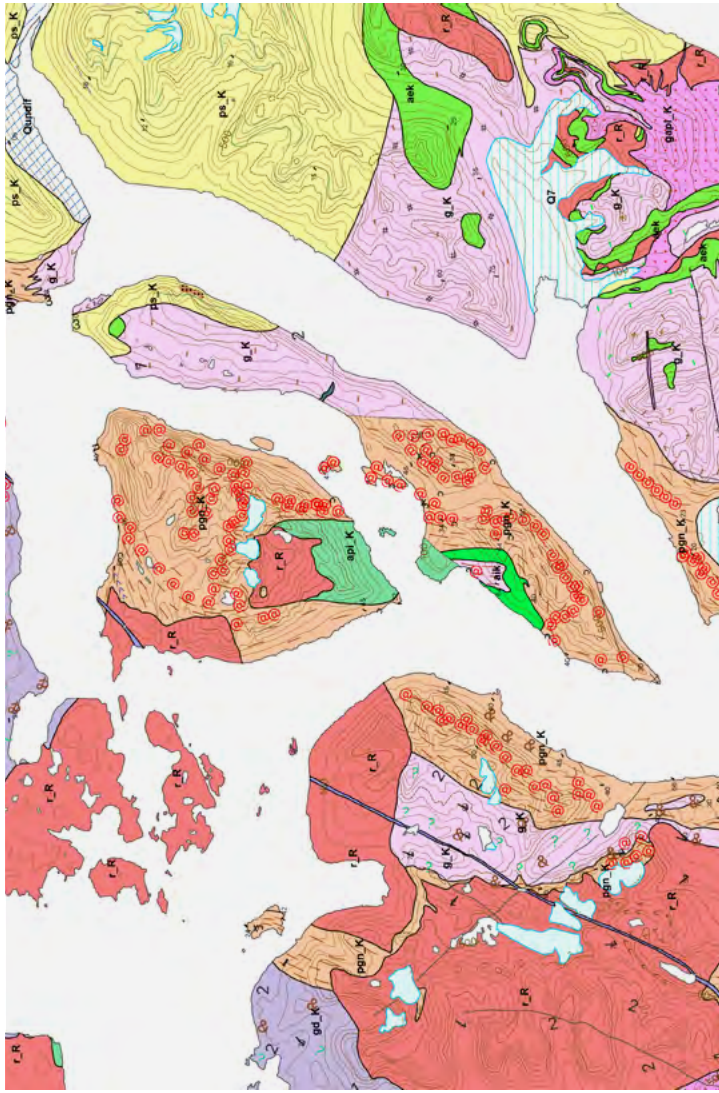


Interactive GIS-map Minerals and Petroleum Licence Map from the Mineral Resources Authority in Naalakkersuisut (Government of Greenland), 2020.
Scale 1:185000.
https://asiaq.maps.arcgis.com/apps/webappviewer/index.html?id=819ff201b76f44f99b31da7ef630c18e&locale=en.

image section

7

Greenland Geology and Selected Mineral Occurrences by Naalakkersuisut (Government of Greenland) and Geological Survey of Denmark and Greenland (GEUS), 2018.



Geological map of South, South-West and southern West Greenland by Geological Survey of Denmark and Greenland and Danish Ministry of Energy, Utilities and Climate, 2019.
Scale: 1:100768.
https://eng.geus.dk/about/news/news-archive/2019/mar/new-geological-map-of-south-and-south-west-greenland.

9 Forensic Architecture, *Chemical Attack in Douma*, 2018. A chlorine canister was photographed on the rooftop balcony in Douma. Russian media reports claimed the attack was staged by rebels. In collaboration with Bellingcat, Forensic Architecture reconstructed a 3D model, based on Russian reporters' images, of the site and the canister, and they were thereby able to verified that the canister was dropped from airspace which was exclusively regime c ontrolled led by al-Assad.

Dust cover by Gudrun Havsteen-Mikkelsen, riso printed at Onomatopee, 2022

bibliography

books and articles

Abrams, Janet and Peter Hall (eds.). *Else/Where: Mapping New Cartographies of Networks and Territories*. Minnesota: University of Minnesota Design Institute, 2006.

Bell, Robin-Marie et al. "Assessment of lithological, geochemical and structural controls on gold distribution in the Nalunaq gold deposit, South Greenland using three-dimensional implicit modelling." In *Characterization of Ore-Forming Systems from Geological, Geochemical and Geophysical Studies*, eds. K. Gessner et al., 385-405. London: Geological Society, 2018.

Boersma, Tim and Kevin Foley. "The Greenland Gold Rush - Promise and Pitfalls of Greenland's Energy and Mineral Resources" in Energy Security Initiative, Brookings (September, 2014): VI-57.

Bratton, Benjamin H.. *The Stack - On Software and Sovereignty*. Cambridge: Massachusetts Institute of Technology, 2015. eBook Edition.

Casti, Emanuela. *Reality as representation - The semiotics of cartography and the generation of meaning*. Bergamo: Bergamo University Press, 2000.

Casti, Emanuela. "Towards a Theory of Interpretation: Cartographic Semiosis" in *cartographica*, vol. 40, issue 3, October 2005: 1-16.

Chao, Sophie. "There Are No Straight Lines in Nature": Making Living Maps in West Papua" in *Anthropology Now*, 9:1, April 2017: 16-33.

Cramerotti, Alfredo. *Aesthetic Journalism: How to inform without informing*. London: Intellect, 2009.

Dale, Bright et al (eds.). *The Will to Drill: Mining in Arctic Communities*. Cham: Springer Polar Sciences, 2018.

Dahl, Ole. "Nalunaq Guldminen – på femte år." In *Geologisk Nyt* 4, 2008: 20-30.

Gabrys, Jennifer. *Program Earth: Environmental Sensing Technology and the Making of a Computational Planet*. Minnesota: University of Minnesota Press, 2016.

Harley, J.B. and Paul Laxton (eds.). *The New Nature of Maps: Essays in the History of Cartography*. Baltimore: John Hopkins University Press, 2001.

Hobbs, William Herbert. "Zeno and the Cartography of Greenland" in

bibliography

Imago Mundi vol. 6, 1949: 15-19

Kirsch, Stuart. *Mining Capitalism: The Relationship between Corporations and Their Critics*. Berkeley: University of California Press, 2014.

Kristensen, Kristian Søby and Jon Rahbek-Clemmensen (eds.). *Greenland and the international politics of a changing Arctic: Postcolonial paradiplomacy between high and low politics*. London: Routledge, 2019.

Fuller, Matthew and Eyal Weizman. *Investigative Aesthetics: Conflicts and Commons in the Politics of Truth*. London: Verso, 2021. eBook Edition.

Minik, Rosing et al: "To the Benefit of Greenland: The Committee for Greenlandic Mineral Resources to the Benefit of Society," in Copenhagen University and Ilisimatusarfik (University of Greenland), 2014.

Naalakkersuisut (Government of Greenland), Ministry of Mineral Resources. "Grønland's Mineral Strategy 2020-2024." (February 2020): 1-28.

Olóriz Sanjuán, Clara (ed.). Landscape as Territory. New York: Actar Publishers, 2019.

Olsen, Simun D. and Denis Martin Schlatter. "The Nalunaq gold mine: a reference sample collection and compilation and interpretation of geochemical data." Danmark og Grønlands Geologiske undersøgelse rapport 2011/31 (2011): 1-77.

Sheppard, Lola and Mason White. *Many Norths: Spatial practice in a polar territory*. New York: Actar Publishers, 2017.

Sontag, Susan. *Regarding the Pain of Others*. London: Penguin Books Ltd, 2019.

Steinberg, Phillip E. et al. *Contesting the Arctic: Politics and Imaginaries in the Circumpolar North*. London: I.B. Tauris, 2015.

Toscano, Alberto and Jeff Kinkle. *Cartographies of the Absolute*. Winchester: Zero Books, 2015. eBook Edition.

websites

Weiss; Daniel. "Wooden Inuit Maps." Accessed Oct. 30, 2021. https://www.archaeology.org/issues/337-1905/features/7550-maps-greenland-wooden-

bibliography

inuit-maps.

Wikipedia. “Cartography.” Accessed Oct 29, 2021. https://en.wikipedia.org/wiki/Cartography.

The Agency for Data Supply and Efficiency. “Beta Version Map.” Accessed Oct 13, 2021. https://listservices.kortforsyningen.dk/#/map/WMS/satellitfoto_groenland_beta.

AEX Gold Inc. “Nalunaq”. Accessed Nov. 5, 2021. https://www.aexgold.com/projects/nalunaq/.

Vogt, Regine. “Extractive raw materials.” Accessed Nov. 11, 2021. https://www.ifeu.de/en/topics/resources/raw-materials/extracted-raw-materials/.

Naalakkersuisut (Government of Greenland), Ministry of Mineral Resources. “Minerals and Petroleum Licence Map.” Accessed Nov. 23, 2021. https://asiaq.maps.arcgis.com/apps/webappviewer/index.html?id=819ff201b76f44f99b31da7ef630c18e&locale=en.

Forensic Architecture. “About.” Accessed Nov. 8, 2021. https://forensic-architecture.org/about/agency.

GEUS. “Geological map of South and South-West Greenland.” Accessed Oct. 10, 2021. https://eng.geus.dk/about/news/news-archive/2019/mar/new-geological-map-of-south-and-south-west-greenland.

further readings

Breum, Martin. *Hvis Grønland river sig løs*. Copenhagen: Gyldendal, 2018.

Curtin, Brian. *Semiotics and Visual Representation*. Unknown publisher, 2006. https://www.arch.chula.ac.th/journal/files/article/1JjpgMx2iiS-un103202.pdf.

Hjorth, Heidi. “Nalunaq Gold Project: Scoping and Terms of Rerence for the Social Impact Assessment for the Nalunaq Project 2020” Nalunaq A/S (Dec. 2020).

Juul Holm, Michael et al. *Arktis* in Louisiana Revy, no. 54, Louisiana Museum of Modern Art, 2013.

Kadenic, Maja Due. “Socioeconomic Effects of Mining in the Arctic: Enhancing Benefits for Greenland.” PhD diss., Aarhus University, 2016.

Kocur, Zoya. *Global Visual Cultures: An Anthology*. Malden: Wiley-

bibliography

Blackwell, 2011.

Mandrup Jacobsen, Erik and Morten Christensen. "Nalunaq Gold Project: Scoping and Terms of Rerence for the Environmental Impact Assessment for the Nalunaq Project 2020" Nalunaq A/S (Dec. 2020).

McGhee, Robert. *The Last Imaginary Place: A Human History of the Arctic World*. Chicago: The University of Chicago Press, 2007.

Yusoff, Kathryn. *A Billion Black Anthropocenes or None*. Minnesota: University of Minnesota Press, 2018.

Weizman, Eyal in e-flux. "Open Verification." Accessed Nov. 8, 2021. https://www.e-flux.com/architecture/becoming-digital/248062/open-verification/.

Winther, Rasmus Grønfeldt. *When Maps Become The World*. Chicago: The University of Chicago Press, 2020

on behalf of the Geo—Design 2022

This thesis is part of a larger collection of texts from the inaugural class of the Geo—Design Master's program at the Design Academy Eindhoven. In recent decades, the social, political, ecological and technological contexts that give shape to the planet have undergone drastic transformations, calling into question the future habitability of the earth. Geo—Design views these transformations as neither inevitable nor random, but as the active result of design, broadly conceived. While the design discipline has typically neglected its entanglement within broader planetary processes, Geo—Design confronts this entanglement head on. It is an attempt to cultivate alternative design practices and pedagogies fit for the complexity of the present. The department is defined less by a shared topical or methodological commitment, and more by a shared sensibility attuned to trans-scalar and trans-disciplinary thinking.

As the texts in this volume demonstrate, developing a planetary sensibility does not require a ballooning of agency to the scale of the planet. Rather, the projects are united by a shared attempt to establish situated narratives that stand in open relation to both larger and smaller contexts. The wide variety of scales, methodologies, and urgencies present in these texts reflect the heterogeneous and open-ended nature of Geo—Design. As such, they should be understood as starting points; initial sketches that contribute towards a more pluralistic understanding of both design and the world.

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16:16 CET
Design Academy Eindhoven

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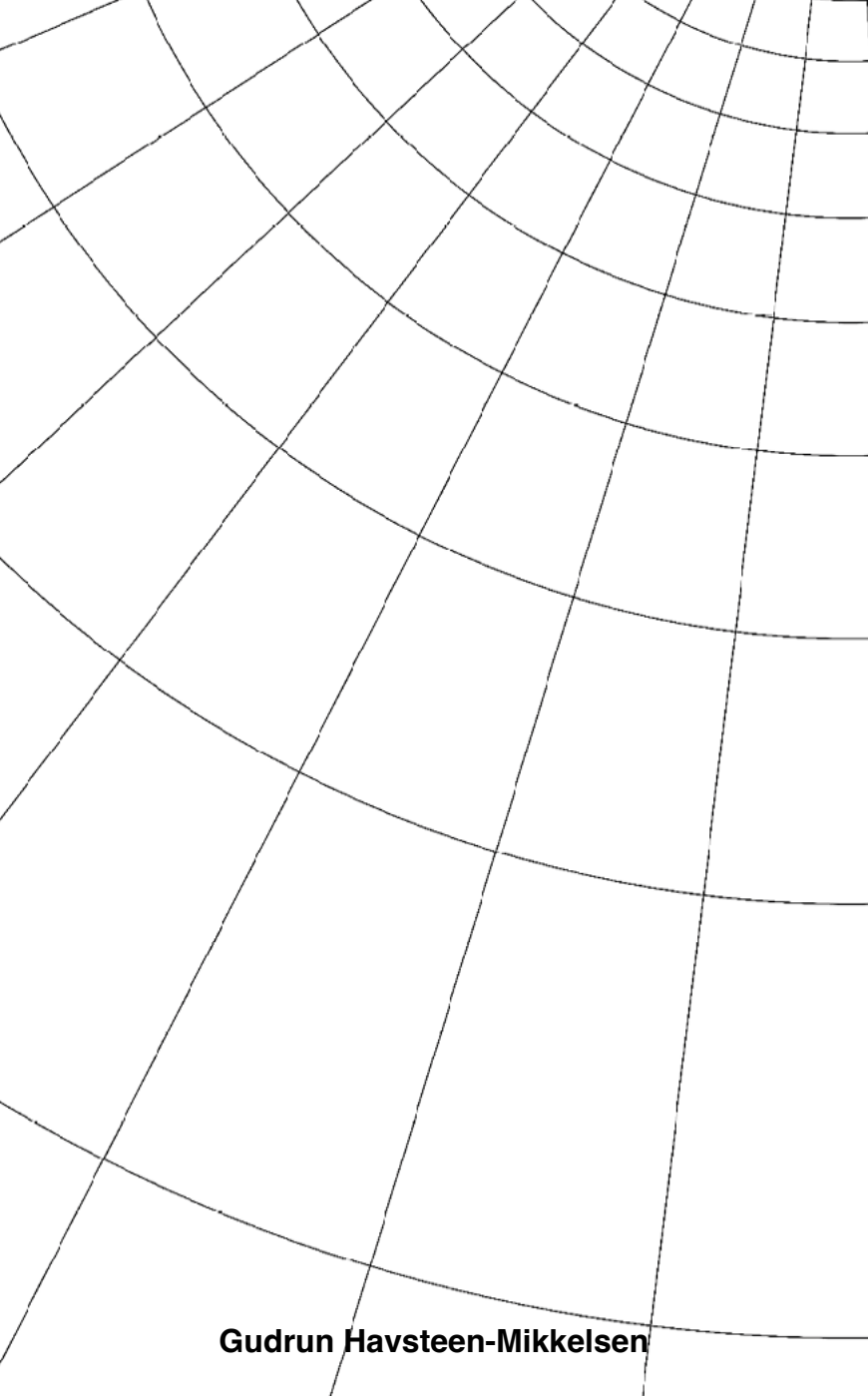

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