Disappeared Places

An Analysis of Teufelsberg and Wolkenberg in Relation to Simondon's *On the Mode of Existence of Technical Objects*

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1. Introduction

Gilbert Simondon's On the Mode of Existence of Technical Objects focuses extensively on describing the genesis and evolution of technical objects. However, the term "technical objects" is not solely reserved for items of mechanical origin. Even physical locations can be defined as such objects, specifically as what is referred to as technical ensembles (Simondon 2017, pp. 76-77). This paper aims to elaborate further upon this connection by analyzing disappeared places using key concepts presented by Simondon. Essentially, the goal is to demonstrate how uniquely dissimilar objects can originate and be linked through a genetic context, where there is continually something passed on to the next, resulting in one needing the other to come into existence. Based on such a connection, it can be argued that places never wholly disappear, as certain aspects always remain.

In order to accomplish this goal, the paper begins by first providing a bit of background, focusing initially on the key theories and terms most relevant to the topic of disappeared places, and then a brief history of the specific locations that will be analyzed: Teufelsberg in Berlin and Wolkenberg in Brandenburg. The analysis section then strives to sketch a picture of the overall geneses occurring at these locations in a functional context. The following questions are thereby taken into consideration: which objects gained which specific functions, when did they become multifunctional, when did they lose these functions, and when did they gain new functions altogether. Furthermore, while staying within the confines of the overall genetic context, one object (radome) is selected to be examined in greater detail, using the terminology presented by Simondon. Throughout the analysis, the role of humans and economic considerations will be highlighted wherever possible, to help paint a bigger picture. All images referred to (figures 1-15) are found in the appendix of this paper.

Although at present, Teufelsberg and Wolkenberg are both artificially constructed hills, how they came to be so and the purposes for which they were used – and continue to be used – are significantly different. These places look unlike they did around a century ago; yet, the objects and overall structures at these locations did not entirely disappear, continually leaving behind remnants to enable further geneses. It is notable that throughout this process, several of these objects also underwent changes in functionality, something that can be ascribed to an oscillation between concretization and abstraction, terms that will be discussed in greater detail in the following section. That being said, the three terms I find to be most vital for analyzing disappeared places on the basis of Simondon's theories, are the level of the element, individual, and ensemble. While these will also be elaborated upon in short, it is relevant to point out that

it is not just the terms themselves that are so significant, but also how they stand in cyclical relation to one another. Specifically, how the cycle of element, individual, and ensemble is linked to the disappearing, re-appearing, and changing of physical locations. Hereby it is elements that are arguably the most significant. Not only can elements be seen as essential building blocks, necessary for these locations to exist, but – as will be exemplified throughout this paper – they also enable the transmission of technicity and are one of the few things that can truly withstand the test of time.

2. Theoretical Background

To understand disappeared places as going through a genesis similar to that of technical objects, it is essential to first discuss some of the key terms presented by Simondon. As previously mentioned, the three most relevant terms for this analysis are the level of the element, individual, and ensemble. However, here it is critical to differentiate between the various ways Simondon refers to these terms. In his introduction, Simondon paints quite a different picture than throughout most of the rest of the text. He begins by describing the level of the element as being exemplified by "the climate of eighteenth century optimism," introducing ideas of "infinite progress"; the technical individual as corresponding to a phase of "impassioned notion of progress, which turns into the rape of nature, the conquest of the world, and the exploitation of energies"; and the level of the ensemble as relating to the twentieth century, where "thermodynamic energeticism is replaced by information theory, whose content is normative and eminently regulative and stabilizing" (ibid., p. 21). This rather linear view is in stark contrast to the cyclical representation presented later in the book. Viewed cyclically, the evolution of technical objects proceeds from "the level of the element to that of the individual, then from the level of the individual to the level of the ensemble; here, in a new cycle, technical causality … descends to the level of the element … where it reincarnates itself in new individuals and then in new ensembles" (ibid., p. 67). Essentially, this cycle can continue indefinitely, as long as all conditions are adequately met.

In this cycle, the level of the element is perhaps the most important, since the cycle ultimately begins with it. The element can thus be seen as an essential building block, allowing for the level of individual and level of the ensemble to come into existence (ibid., p. 76). Ensembles can then produce new elements, which may then start new cycles, and so forth. Furthermore, Simondon claims, that "only elements have the power to transmit technicity from one

age to another … [they] alone have the power to survive the downfall of a civilization, and remain valid witnesses of a state of technical development" (ibid., p. 76). This highlights another reason why the level of the element is so vital, namely due to the role it plays in facilitating progress. "For progress to exist, each age must be able to pass on to the next age the fruit borne of its technical effort," and solely elements are able to be passed on (ibid., p. 71). Therefore, without elements, technical progress, according to Simondon, would be utterly impossible. The term technicity plays a crucial role in this. An element with high technicity is able to serve a variety of purposes, with technicity at the level of the element being analogous to concretization (ibid., p. 73). This is how elements are so easily passed on, especially elements with high technicity, as they are capable of finding applications in a variety of new systems. Consequently, they promote progress simply by being passed on along with their technicity.

Concretization is comparable to technicity at the level of the element because it, too, is associated with multifunctionality. However, unlike technicity, it is not an innate aspect of the element, but something that can be ascribed to technical objects in their entirety and is in direct opposition to abstraction. The essence of concretization is that technical objects are organized into "functional sub-ensembles within the total functioning … [where] each structure fulfills several functions;" the abstract technical object, on the other hand, "only fulfills one essential and positive function, integrated into the functioning of the ensemble" (ibid., pp. 38-39). Concretization is thus also closely linked to the notion of technological evolution. It is through evolution that technical objects lose their artificial, or abstract, character (de Andrade 2008, p. 10). One of the main reasons such evolution is necessary is that industrialization of the production of technical objects is only possible for stable objects, while abstract objects correspond to primitive, more unstable, stages of evolution (Simondon 2017, p. 29). Based on this notion, a concrete object returning to a state of abstraction could technically be a sort of de-evolution. That being said, industrialization is often promoted by economic considerations, the goal being to produce objects on a large scale as efficiently and economically as possible.

Economic considerations also influence humans in their decision-making, thereby impacting the overall role of human beings in technical processes, specifically concerning the direction and execution of technical evolution. Humans and economics thus also play a significant role in the disappearing, reappearing, and changing of physical locations, as will be illustrated throughout this paper. Although Simondon notes that "technical constraints prevail over economic constraints (aviation, military equipment)" as the "most active sites for progress," he nevertheless acknowledges that "economic causes indeed exist in all domains" (ibid., p. 31). He later points out, that "social and political thought manages to coincide well enough with the

representations of commerce" and that economic realities are the result of the existence of technics, but more specifically, "the manner in which technics are used by human groups" (ibid., p. 232). In effect, there is a reciprocal relationship between technics and humans, where economic realities are determined by how humans use technics, and how technics are used is driven by social, political, and economic considerations. Apart from such indirect influence, humans have a more direct role in the genesis of technical objects as well. Change does not happen within objects themselves, but due to the influence of "man as inventor and user" (ibid., p. 71). Technical objects do not decide on their own to mine for coal; such actions stem from human decisions. Moreover, Simondon also sees humans as playing an essential technical role themselves, namely that of the individual, where "man can intervene as a substitute for the technical individual, and connect elements with ensembles," a role he claims has been played by humans "thus far and until this day" (ibid., pp. 80-81). However, that is not to say that humans were the only technical individuals, as individuals can be found in other domains unaffected by humans as well, such as nature.

How Simondon views nature and natural objects is unsurprisingly also highly relevant to the topic of disappeared places, as these are physical places located in nature, and to a certain degree, thus a part of nature. "Simondon understands natural objects as completely concretized objects: all functional parts are 'overdetermined in them'. In contrast, the technological [object] … never reaches complete concreteness" (Schmidgen 2005, p. 15). Essentially, natural objects are concrete because they do not require any intervention to function; they simply function as naturally as they are produced. The ability of locations to be seen as technical ensembles, as previously alluded to, is arguably one of the more significant aspects of nature concerning the topic of disappeared places. Moreover, it is also pointed out that, "in the technical domain, an element is detachable from the whole that produced it, precisely because it is fabricated," whereas "[in] the domain of life, an organ is not detachable from the species" (Simondon 2017, p. 68). This can be exemplified by the basic building blocks of life itself. Astrobiologists consider the three basic ingredients of life to be water, energy, and organic molecules (PBS NOVA 2012). Necessarily, these ingredients can be seen as the basic elements of life, as all life on earth requires them to exist. Taking a natural location, like a forest, for example, one can quickly see how such a location can be regarded as an ensemble: the three basic elements of life (water, energy from the sun, carbon molecules) allow for individuals to form (plants), which then together form the ensemble of forest. This ensemble then creates elements (oxygen produced by photosynthesis, for example), one of the basic organic molecules necessary for oxygen-

breathing animals to exist. Such cycles happen without any intervention and thus portray how natural locations can be perceived as concrete objects.

3. Historical Background

3.1 Teufelsberg

Focusing on the last hundred years, much has happened to the location now known as Teufelsberg. Known mostly for its flat topography, Berlin has two, large, human-made hills that stand out: Teufelsberg and Drachenberg. Before Adolf Hitler's rise to power, the area where both hills are located was simply another flat section of Berlin's Grunewald forest. While both hills were created out of rubble left over from World War II, this paper focuses on Teufelsberg, as it is not only the larger of the two, but also has a much more complex history. In March 1937, Hitler approved plans for the building of an expansive military academy (Wehrtechnische Fakultät und Hochschulstadt) at the location where one-day Teufelsberg would stand. At the foundation-stone ceremony in November of the same year, he personally laid the first stone of the building, claiming it to be the beginning of Berlin's complete structural remodeling, which would change the image and character of the city; the ultimate goal: transform Berlin into "'the eternal capital city of the first German Empire of the People'" (Frisby et al. 2012, p. 365). While the university town was never fully completed, much of the main building's exterior was finished before the end of the war. A blueprint of the building, along with a picture of how it actually looked after the war ended, are shown in Figures 1 and 2 for reference.

World War II, known as one of the deadliest military conflicts in history, caused a massive wave of death and destruction. Part of this destruction resulted in tons of rubble scattered throughout many cities, predominantly from destroyed buildings. In order for cities to rebuild, this rubble had to be removed. The area of modern-day Teufelsberg was chosen as one of the main sites for disposing of Berlin's rubble, primarily due to its outgoing geological position; the Wehrtechnische Fakultät was thereby dedicated as the foundation of this rubble heap, as allied forces were unable to completely destroy it (Toland et al. 2017, p. 2). Essentially, trash and rubble were used to bury any trace of the Wehrtechnische Fakultät. This is quite ironic, considering that Hitler expected this building to be a symbol of German power, and its architect, Albert Speer, designed the building "to last a thousand years and to look aesthetically pleasing even after [its] partial demolition, thus leaving evidence of a grand civilization, as in the case

of Greek and Roman ruins" (ibid., p. 2). Today, the only way of knowing about the Wehrtechnische Fakultät is through research. Apart from being associated with Nazism and buried under a mountain of rubble, there is another reason why this may be: the turbulent history of Teufelsberg did not end with the creation of the hill.

Much like most rubble heaps resulting from war, Teufelsberg, too, was covered with a layer of topsoil, undergoing "greening and beautification programs to conceal the rubble," including the planting of pine and oak trees to resemble the natural surroundings (ibid., p. 2). During this time, the allied forces, specifically Britain and the United States, decided to build a spy station atop the hill, precisely because it had the highest elevation in Berlin and this high ground could be used to their advantage. Figure 3 shows the formation of the hill and figure 4 the first buildings of the NSA spy station. While the exact operation of the spy station remains classified to this day, it is clear that one of the main goals was "to intercept and jam Soviet communications … until the fall of the Berlin Wall in 1989," after which the station was officially shut down, and all equipment was stripped (Walsh 2018, para. 7). Although equipment was removed, the buildings themselves were left standing and can still be seen today, albeit in a state of ruin. In fact, these ruins, if they can indeed be called this, have even become quite an attraction to "visitors who come to explore the mysterious aesthetics of the Cold War architecture, from film makers and musicians, to graffiti artists, young lovers, and thrill seekers" (Toland et al. 2017, p. 3). A picture of modern-day Teufelsberg and the remains of the NSA spy station can be seen in figure 5. Apart from the spy station itself, Teufelsberg is also visited by many for its superb hiking trails and picturesque views, or swimming in the nearby Teufelssee, after which the hill is named. The turbulent history of the location, other than that, which is clearly visible, thereby remaining unknown to most.

3.2 Wolkenberg

Similar to Teufelsberg, Wolkenberg also has quite a tumultuous history. Although this paper focuses primarily on the changes taking place there since the late 1980s, a bit of the earlier history will be presented to provide better context for the subsequent analysis. Wolkenberg began as a small town, grounded in the 1300s. Around this time, wine was vastly cultivated throughout the surrounding areas, having been introduced to Lower Lusatia (Niederlausitz) sometime around the 12th to 13th century CE by Rhinelanders and Franconians who brought grapevines with them while immigrating east of the Elbe. (Heine et al. 2015, p. 8). Figure 6 displays a map of the most historical vineyards in Lower Lusatia, with Wolkenberg highlighted

in blue. The following centuries realized a period of prosperity for vineyards; however, this came to an end between the 17th and 18th century CE after a series of harsh winters and wars, along with wine consumption dwindling in favor of wheat and barley beers (ibid., p. 8). Furthermore, industrialization and railways allowed for wine of better quality and lower prices to be imported, further reducing the attractivity of viticulture in Lower Lusatia (ibid., p. 8). The last vineyard in Brandenburg closed in the late 1920s, ending the century-old tradition of wine production in the area – at least for the time being. Wine production had already ceased in Wolkenberg sometime before this, although the exact date is unknown.

After wine production ended, Wolkenberg continued as a simple agrarian town for a while longer. However, in the mid 19th century, industrial mining of brown coal came to Lusatia, with the 20th century marking the development of the first large excavators, allowing open-cast mining to take on a new dimension: "first forests, agricultural land and single houses, and later, whole villages were devastated to access the lignite lying below" (Ess 2019, p. 4). Wolkenberg was no exception to this development. The town's inhabitants were informed of the "impending devastation" at a town hall meeting in 1982 and were resettled into prefabricated buildings (*Plattenbau*) in neighboring cities from 1991 to 1992 to make way for one of the most extensive open-pit mining operations still active to this day, Welzow-Süd (ibid., p. 7-8). Since there are not many pictures of Wolkenberg before the mining began, a map of the town is portrayed in figure 7, and a picture of the open-cast lignite mine that replaced it in figure 8. Once all the brown coal had been extracted from the area that was once the town of Wolkenberg, the mining machines unsurprisingly moved on to other areas still rich with lignite. Thereafter began the period of "recultivation" and the idea to turn this now hilly area (hills formed due to the manner in which coal was extracted, see figure 8 for reference) into a wine vineyard, a project that began in 2005 together with the BTU Cottbus (Muthmann 2020, para. 3-4). Accordingly, the history of wine in Wolkenberg began again, albeit this time without a town at the center.

4. Analysis

If one were to view the relationship between element, individual, and ensemble linearly, the way Simondon describes it in his introduction, the association to Teufelsberg and Wolkenberg is relatively easy to depict. For Wolkenberg, the level of the element, representing optimism and ideas of infinite progress, could be seen as being embodied by the increased use of

railway transportation and the switch to agriculture. The individual, representing a rape of nature and exploitation of energies, epitomized by the begin of open-cast lignite mining. And lastly, the level of the ensemble, aiming for regulation and stability, is personified by the recultivation of the land to grow wine once again. Not only does this progression seem to fit the definitions provided in Simondon's introduction, but also the time periods seem to match up relatively well, albeit delayed by about a century for the last two stages[1]. For Teufelsberg, a similar trajectory can be witnessed. Here the time periods match up even less, though, as all the changes to the location mentioned in the historical section happened in the 1900s. However, more interesting to analyze, especially when aiming to trace the genetic development of these locations, is how the element, individual, and ensemble are portrayed throughout the rest of Simondon's book.

Viewing elements, individual, and ensembles as having a cyclical relationship, all three should theoretically be present simultaneously at every location[2]. Simondon illustrates the notion that physical locations can be considered technical ensembles with the example of a shipyard. He states that such an ensemble requires "a fairly flat ground, yet close to the water, sheltered yet luminous, with supports and wedges to keep the ship standing while it is being built," noting that this ensemble, like any technical ensemble, "can be temporary" (ibid., 76-77). Beginning with Teufelsberg before the Nazi academy was built, and Wolkenberg before the start of lignite mining, both locations can equally be described as such ensembles.

Before anyone ever thought to build anything in the Grunewald forest of Berlin, at the location that is now Teufelsberg, the area was merely part of a natural forest. As such, it represented a natural object. Therefore, it was also a concretized object, because it was natural and thus did not require any intervention to exist. The basic ingredients of life, introduced in the theoretical section, can be understood as the elements of this location: water in the soil and nearby lakes, the sun providing energy, and a plethora of organic molecules. The various forms of life in the area, from plants and fungi to insects and mammals, can be seen as individuals working together naturally and harmoniously to form the ensemble of forest. This forest then produces elements – organic molecules such as Oxygen, for example – which go on to be incorporated back into the cycle itself or to be part of other cycles.

[1] Simondon refers to the level of the element, individual, and ensemble as representing the 18th, 19th, and 20th centuries, respectively. While the first level seems to fit Wolkenberg, the latter two stages happened around the 20th and 21st centuries, thus around one century later.
[2] "Cyclical" as defined in the theoretical background section of this paper.

Wolkenberg can similarly be viewed as an ensemble, albeit not an entirely natural one, since to be considered a fully functioning town, intervention is required. Naturally, the three basic ingredients of life also play a role as elements, but additional elements are also present, such as bricks produced by the ensemble of brick factory. The individuals of the town of Wolkenberg were humans, buildings, and any farm animals or plants, for example. However, the ensemble formed here required the intervention of one of its individuals, namely human beings, in order to properly function. Without humans, the farms would begin to undergo ecological succession, where "dormant seeds, native or otherwise … would start to emerge" and over time, shrubs and trees would "venture into [the] abandoned fields" (Sandom 2016, para. 6-7). As is with most abandoned buildings, the buildings would also begin to dilapidate and crumble, while slowly being reclaimed by plant and animal life. This is best exemplified by the current state of the NSA spy station at Teufelsberg, which will be discussed in detail later on.

Moving on to the first big event at each of these locations, which largely altered them from their prior state. The resulting new "places," or ensembles that came to exist, will be referred to as the first "geneses" of each location. For Teufelsberg, this genesis was the construction of the Wehrtechnische Fakultät; for Wolkenberg, it was the complete razing of the town to make way for industrial lignite mining. While a new ensemble replaced the prior ensemble in both cases, the changes to Wolkenberg resulted in a considerably greater transformation, affecting the surrounding areas as much as the location itself. By examining these first geneses, one can witness the role of humans and economic considerations, as well as which objects were gained, lost, or had a change in functionality. Furthermore, although the ensembles that used to exist at these locations may seem to have "disappeared" in order for new ensembles to take shape, considering Simondon believed elements have the power to survive downfalls and remain witness to technical development, it is also interesting to note, which elements were passed along during these geneses.

In the case of Teufelsberg, the natural ensemble (forest) was cleared to make way for the main building of the Wehrtechnische Fakultät. While trees and other individuals of this ensemble were removed accordingly, the ground itself remained the same. The ground, along with the organic molecules present within it, was passed along to be the foundation of the new ensemble of Wehrtechnische Fakultät. This unsurprisingly did not occur on its own, but through human intervention. The term invention is described as "a creation of the individual, [which] presupposes in the inventor the intuitive knowledge of the element's technicity; invention occurs at this intermediate level between the concrete and the abstract" (Simondon 2017, p. 74). Clearing a forest to make way for a building is nothing innovative, although in this case the

type of building, specifically its architecture, was. Whether or not the Wehrtechnische Fakultät can conventionally be interpreted as an invention, it presupposes the architect's knowledge of the technicity at the location: the forest ground can be used as a foundation for plants just as it can be a foundation for a massive building. However, the functionality of the ground as fertile for trees and other plants was not forgotten. The building's architect, Speer, envisioned a park to be built on-site as well, where students would take part in sports in "antique-style" (Gerber n.d., para. 11). Figure 1 also shows that the building's plans envisioned it surrounded by trees, unlike the almost barren surroundings of the unfinished building in figure 2.

Wolkenberg, on the other hand, underwent a more drastic shift. Here the ground was also passed on from one genesis to the other; everything else was razed. However, it was not the ground's functionality as a surface or foundation coveted in this instance, but rather something below the surface: lignite. The ground used to have optimal potential for wine production and agriculture, this function disappeared, and the coal content within the ground became relevant. To be precise, this was not the same soil, but a different layer, shifting the relevance of the ground's functionality from the upper layer of soil to the lower layers. The ground and the coal extracted from it can be seen as elements, humans and the machines used for mining as individuals, and the open-cast mine itself as the ensemble. In fact, Simondon even refers to coal mines and ironworks as "great ninetieth-century industrial ensembles" (Simondon 2017, p. 69). In this ensemble, humans are not just relevant as organizers and inventors of the mining machines, but also through their decisions driven by economic considerations:

> Economic agents and markets use technology and environmental resources within the same basic projects: by means of fixed patterns and goals, in accordance with the necessities of firms. In the same way that they do not explore technical objects, they instead instrumentalize them for finalities that are foreign to the technical possibilities, and natural resources have their own values stolen and injected into the market economy. (de Andrade 2008, p. 9)

In the case of open-cast lignite mining, natural resources in the form of brown coal are "stolen" from nature and "injected" into the economy. The technical objects are instrumentalized, or organized, by humans to do this bidding at the behest of economic agents and markets. For Welzow Süd and many other open-cast lignite mines in Brandenburg, these interests were driven, in part, by an increased energy demand brought on by industrial growth (Ess 2019, p. 4). Furthermore, the ensemble of coal mine can also be seen as an abstract object, since human interaction is required to determine where should be mined, and perform maintenance on the machines, for example.

The next state of genesis at both Teufelsberg and Wolkenberg concerns the creation of the hills that are now hallmark to these locations. While both formed as the result of devastation, it was a different form of devastation: for Teufelsberg it was war, for Wolkenberg lignite mining. Taking a closer look, the preliminary formation of these hills, and what then became of them, can be seen as two separate geneses. The hills were not formed for the purpose they ended up being used for, but were repurposed, given additional functionality apart from being just mere hills, sometime after their conception. In essence, the formation of both hills was simply a byproduct of human action. At Teufelsberg, World War II reduced a large portion of Berlin to rubble, while at Wolkenberg, the dredging and removal of topsoil resulted in mounds of dirt. Both were treated as functionless obstacles: the rubble was in the way of rebuilding the city of Berlin, while mounds of dirt were in the way of mining machines trying to reach coal beneath the surface. To deal with these "problems," Berlin's rubble was exported to a remote location, while Welzow Süd's mounds of dirt were simply swept aside. Figure 3 shows rubble being dumped on top of the Wehrtechnische Fakultät, and figure 8 the mounds of "useless" dirt packed on either side of the mining machine. Throughout this process, it is relevant to note which objects "disappeared," or were repurposed along the way. At Teufelsberg, the Wehrtechnische Fakultät did not truly disappear; it was repurposed as the foundation of the rubble hill now known as Teufelsberg. At Wolkenberg, most of the soil layers were simply tossed around, but were still there; the only thing that had truly disappeared from the location was lignite.

In moving on to the next genesis of these locations, it is also important to point out that often "it is difficult to define the genesis of each technical object, since the individuality of technical objects is modified throughout the course of this genesis" (Simondon 2017, p. 25). The repurposing of the Wehrtechnische Fakultät as a foundation for a hill of rubble corresponds quite well to this idea of a change in individuality, especially in combination with the idea that "no fixed structure corresponds to a definite usage" (ibid., p. 25). In the last paragraph, it was mentioned that the preliminary formation of both hills, and what then became of them, could be seen as two separate geneses. However, one can just as easily view this as solely one genesis per location, since, without the formation of hills, the following ensembles could not have materialized. For the sake of this paper, they are viewed as two separate geneses so that it is possible to analyze the following ensembles in greater detail.

Starting with Wolkenberg, the latest ensemble at the location of what was once a town, and then a mine, is now the Wolkenberg GmbH vineyard. As mentioned earlier, the vineyard is the result of a recultivation project. Consequently, the current ensemble of vineyard came into existence as a result of human intervention. Through recultivation efforts, the functionality

of the ground's surface came to be coveted once again, specifically its ability to produce wine. The ground was passed along to the new ensemble. Although this ground was altered by mining and recultivation efforts, the organic molecules of clay and sand necessary for wine were likely still present, considering the location of most of Lusatia's vineyards were known for their predominantly sandy soil (Dehner n.d., para. 3). However, it is not just the ground, and a renewed human desire to grow wine at this location, which has allowed this progression to occur; climate change has also played a significant role (Heine et al. 2015, p. 42). As discussed in the historical background section, one of the several reasons why wine initially ceased being produced in the region was due to a series of harsh winters. Grapevines are plants of sub-Mediterranean origin, suggesting they require warm climates. Specifically, for wine production, the average monthly temperatures from April to June must be higher than 13°C, from July to September higher than 18.7°C (although preferably more than 18.75°C from April to June and 24°C from July to September), and the average rainfall should be less than 120 mm from April to June (Dehner n.d., para. 1). Comparing the monthly average temperatures and rainfall of the nearby city of Cottbus in 1990 (two years before mining began) to those in 2019, it is notable that in 1990 only the minimum temperature for April to June was met, while in 2019 all requirements were easily attained. This comparison is shown in figure 9 for reference. Whether this change in climate is due to overall global warming or precisely due to mining done in the area is difficult to say; likely, both are implicit. Either way, the change is a result of human intervention, primarily driven by industry and associated economic interests.

Coming back to Teufelsberg, the ensemble of NSA spy station was built there because it was the highest elevation in Berlin at the time. The top of the hill, and everything it is made of, was passed on to this new ensemble, bequeathing a solid and advantageous foundation. The location was perceived as advantageous because it afforded allied forces the ability to gather high-quality information. While "information" here is referred to in the conventional sense, how it is collected interestingly also corresponds to some of the ideas about information mentioned by Simondon. For example, "[the] greater the predictability of the signal, the easier it is for it to be distinguished from the chance phenomenon called background noise" (ibid., p. 149). The elevated position of Teufelsberg provided greater signal predictability. In going from a hill to a hill with a spy station on it, the hill did not disappear, but merely gained the functionality of also being a location of NSA information gathering. The ensemble NSA spy station thus effectively made use of the technicity of the hill as a vantage point. The individuals of this ensemble are the various radars, radomes, shredders, and other objects required for such a station. However, humans also came into play here as organizers, deciding who or what will be

spied on, what will be done with the information gathered, and so forth. Apart from this, human interaction was also required to keep the station from undergoing ecological succession.

Simondon notes that the "essential artificiality of an object resides in the fact that man must intervene to maintain the existence of this object by protecting it against the natural world, giving it a status of existence that stands apart" (ibid., p. 49). After the abandonment of the NSA station following the fall of the Berlin wall, no one intervened to protect it against the natural world any longer. It has hence undergone some of the first stages of ecological succession, as depicted in figure 5. In what could consequently be seen as the final – or at least the most recent genesis – of the location, the entire structure, apart from some confidential equipment that was removed, was effectively passed on to the new ensemble. This ensemble, as suggested in the historical background section, can be seen as a ruin, graffiti gallery, or even a type of adventure park. Similar to how the Wehrtechnische Fakultät had a change of individuality from a military academy to a rubble hill foundation, the NSA spy station atop Teufelsberg also underwent such a change. Although here the change in individuality left the structure looking quite the same as it did before (from the outside), one cannot dispute that the structure no longer corresponds to its original usage.

One of these structures, the radome, presents itself as quite an intriguing object to analyze more concretely. Not only have the radomes at Teufelsberg undergone a significant change in functionality since the station's official abandonment, but also the history and usage of radomes can be explained well through Simondon's terminologies. As shown in figure 10, the first radar ever invented looked much like a simple radio tower. These towers slowly shrunk in size, as depicted in figure 11, before eventually taking on the form of the satellite dishes most are familiar with today. "Radio telescopes vary widely, but they all have two basic components: (1) a large radio antenna and (2) a sensitive radiometer, or radio receiver" – the most familiar type of antenna being a parabolic one similar to a TV satellite dish (Kellermann 2016, para. 4-5). But why do some satellite-shaped radars have radomes while others do not? In the 1940s the United States Air Force planned to install radars in the Northwest to provide an early warning system for military attacks, but the snow and ice in the area hindered these radars; the first radome was invented a few years later by Walter Bird to solve this problem (Steingard 2018, p. 30). However, while the first radomes were created merely as environmental protection for radars, technological advances soon allowed further functionality. Radomes not only provide protection to the radar within it, while also being transparent to radio waves, but they also protect nearby personnel from being accidentally struck by quickly-rotating antennas, increase the overall performance of the antenna, and conceal the equipment inside from public view

(Soumya 2017, pp. 42-42). The latter point undoubtedly essential for a spy station, where the public was not to know – and to this day still does not fully know – what exactly was done there. Figures 12 and 13 depict fully functional radomes for comparison.

The evolution of the radome is in a way quite similar to that of the transport glider: "the transport glider is only one of two asymmetrical halves of a technical totality, the other being the tow plane" (Simondon 2017, p. 54). Primarily, one object that could do everything, take-off and land in the case of the airplane, was split into two separate objects, which can no longer adequately function without the other. This is a clear case of the process of abstraction, in this specific case, something Simondon would refer to as "functional over-adaptation," which can "fluctuate between symbiosis and parasitism" (ibid., p. 53). Although modern radars can technically exist without radomes, just as a tow-plane can without something to tow, their efficiency is widely reduced. Furthermore, while some sectors, such as military and intelligence, require the most accurate and highest quality signals, other sectors do not need such accuracy. Another obstacle to fitting all radars with radomes is the cost, since "the cost of enclosing a large antenna in a suitable temperature-controlled radome may be almost as much as the cost of the movable antenna itself" (Kellermann 2016, para. 11). Not only are radomes associated with the initial installation cost, but there are maintenance costs involved, especially when considering how thin and breakable the panels are, as can be seen by the current state of Teufelsberg's radomes in figure 14. Thus again, an example of economic considerations at play.

This brings us back to the current genesis of the location. With all the radars and other espionage equipment removed from the former spy station, the radomes are virtually useless, at least in regard to the functions they were invented for. That being said, that has not stopped them from gaining new functionality, namely as canvases for art. Like the walls of the former spy station, art in the form of paintings, graffiti tags, and stickers now cover most of the radomes. One of the most striking of these artworks is in the tallest radome tower, shown in figure 15. To a certain degree, this artwork also corresponds to how Simondon presents art: "as the 'neutral point' between technics and religion" (Barthélémy 2012, p. 206). Apart from the quote underneath the callosal human figure, which reads "The black God gives birth to light" *("Der schwarze Gott gebiert das Licht"*), the echo, amplification of sound, and minimal light present – due to the fact that it is the only radome still fully intact – give one the feeling of standing in a church or other such place of worship. Considering that a spy station was undoubtedly a location of cutting-edge technology, at least while it was in operation, this artwork seems to bridge a gap between technics and religion. However, to thoroughly analyze it as such, Simondon's definitions of religion, art, and technics would need to be discussed in greater detail.

5. Conclusion

While this paper attempts to cover a significant time-span of changes to two separate locations, resulting in a range of themes and topics, something that truly stands out is the fluctuation between concretization and abstraction. More specifically, there is a fluctuation between objects needing intervention, and those not needing it to exist and appropriately function as an ensemble. Teufelsberg started as a forest, a natural ensemble, and thus concretized as it needed no intervention. After the genesis of the Wehrtechnische Fakultät, this location, specifically the ensemble existing there, was no longer natural and would have required human intervention to be a fully functioning academy. This evolution thus resulted in a more abstract ensemble than what was present before. With the dumping of rubble at said location, the new ensemble of hill could simply remain there as a hill without any intervention, thereby realizing a more concrete ensemble again. Finally, the ensemble of NSA spy station that followed can be perceived as abstract, whilst the current ensemble (if viewing it simply as a ruin or hiking and adventure area) is rather concrete again in comparison. That being said, the progression of this fluctuation is largely dependent on how one defines these geneses, which, as pointed out by Simondon, can prove to be quite tricky when taking changes of individuality into account.

Throughout this progression, humans and economic considerations have also had a considerable effect. Wolkenberg, for example, stopped producing wine due in part to it no longer being cost-effective and because the local population started to favor other beverages. The industrial mining of lignite that took place after was also considerably driven by economic factors, as pointed out. Similarly, the subsequent decision to recultivate the land with grapevines was naturally also a human decision, allowing the land to be used for economic gain through wine production once again. However, the role of humans in these cycles is not always intentional. Some effects, such as the change of climate in Lower Lusatia – as well as global climate change for that matter – happen as a byproduct of other technological cycles.

Most important, though, is that while the two locations discussed can be seen as having places "disappear," they never entirely disappeared as key elements were always passed on to help make possible the new ensembles that have taken form. The prior ensembles may have ceased to exist in a functional state, but the new ensembles incorporated elements from previous geneses. That being said, the complex histories of Teufelsberg and Wolkenberg undoubtedly offer themselves up for more in-depth analyses on the topic. Had the assignment not required a location in Brandenburg, I would likely also have focused my entire efforts on examining Teufelsberg more closely. Here it would have been interesting to delve deeper on the concept

of art, specifically how Simondon defines it in relation to religion, and how this fits together with technology. Furthermore, I would like to have tied in the concepts of individualization and naturalization as begun during my second presentation (*Präsentation zum Blockseminar*), as well as discuss the radome at Teufelsberg in terms of hyperteley. Perhaps these would be interesting points to consider if one were to do further research on the subject.

6. Bibliography

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7. Appendix

Figure 1: [Wehrtechnische Fakultät building plan]. (n.d.). Retrieved 10 Jun. 2020 from http://forst-grunewald.de/?page_id=3802

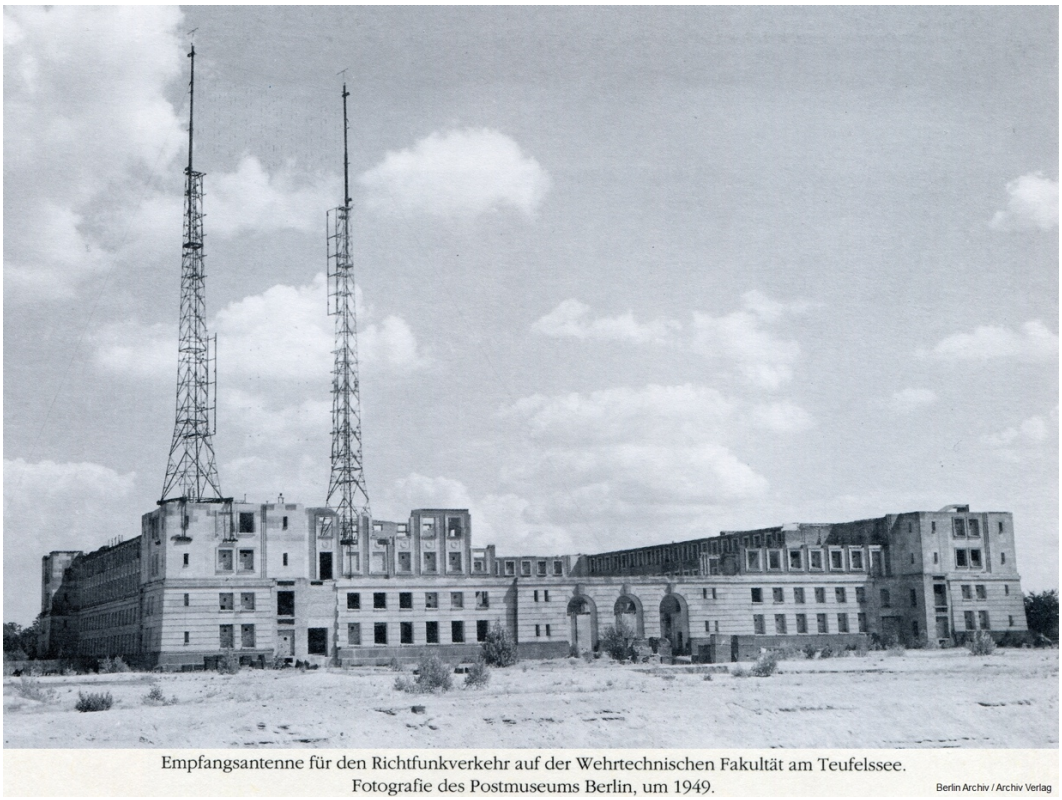

Figure 2: "Empfangsantenne für den Richtfunkverkehr auf der Wehrtechnischen Fakultät am Teufelssee." (1949). Retrieved 10 Jun. 2020 from http://forst-grunewald.de/?page_id=3802

Figure 3: [Rubble heaps that formed Teufelsberg]. (n.d.). Retrieved 10 Jun. 2020 from http://forst-grunewald.de/?page_id=3802

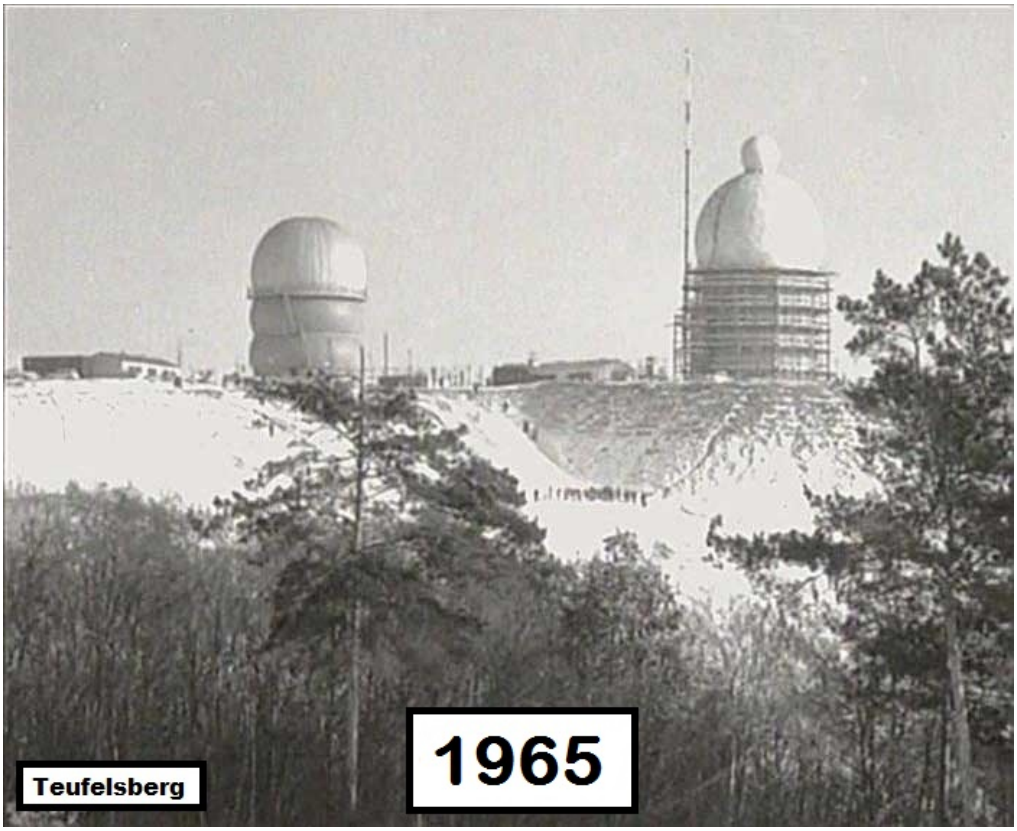

Figure 4: [First few buildings of the NSA spy station on top of Teufelsberg]. (1965). Retrieved 20 Aug. 2020 from http://www.brendanjamison.com/teufelsbergphotography.html

Figure 5: [Teufelsberg in current state]. (2020). Retrieved 10 Jun. 2020 from https://abandonedberlin.com/teufelsberg/

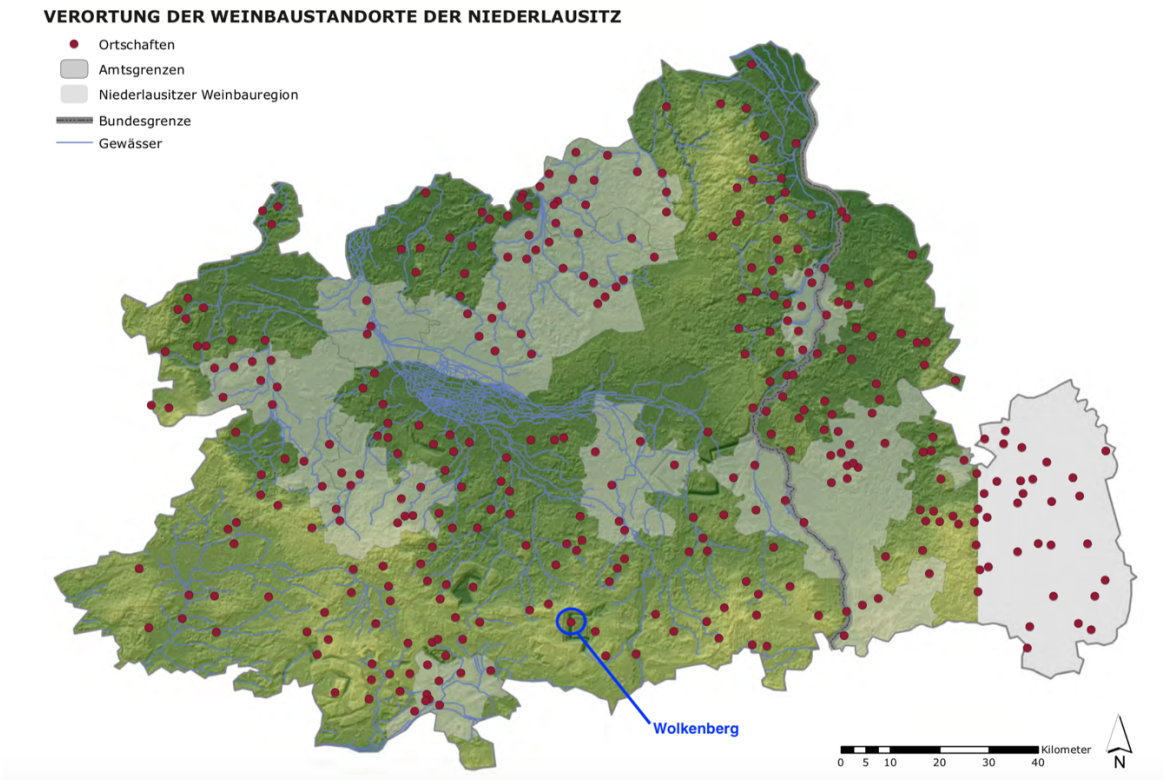

Figure 6: "VERORTUNG DER WEINBAUSTANDORTE DER NIEDERLAUSITZ." (2015). Retrieved 9 Aug. 2020, *from Geoinformationssysteme GIS-Anwendung in Der Stadt- Und Regionalplanung, Lehrstuhl Für Vermessungskunde*, BTU Cottbus-Senftenberg, p. 16.

Figure 7: "Wolkenberg Kléšnik - Ausschnitt Meßtischblatt Drebkau." (1919). Retrieved 10 Jun. 2020 from https://de.wikipedia.org/wiki/Wolkenberg#/media/Dat

Figure 8: "Braunkohletagebau Welzow Süd." (2014). Retrieved 10 Jun. 2020 from https://reisezoom.com/tagebau-welzow-sued-vom-aussichtspunkt-aus/

Monatswerte

Zeitraum		Temperatur		Niederschlag		
		Mittel	Abw.	Summe		% v.l.M.*
1990 / 12		1,1	-0,1	53,5		114%
1990 / 11		5,3	+0,7	58,3		124%
1990 / 10		10,8	+1,1	37,2		106%
1990 / 09		12,8	-1,5	63,4		141%
1990 / 08	Avg = 16,8C	19,6	+0,9	53,3		82%
1990 / 07		17,9	-1,5	13,2		19%
1990 / 06		17,2	+0,1	90,0		180%
1990 / 05	Avg = 13,7C	15,0	+0,6	16,5	139,3mm	28%
1990 / 04		8,9	-0,4	32,8		89%
1990 / 03		8,3	+3,6	18,3		44%
1990 / 02		6,9	+5,8	39,9		117%
1990 / 01		3,4	+3,1	21,9		55%

Monatswerte

Zeitraum		Temperatur		Niederschlag		
		Mittel	Abw.	Summe		% v.l.M.*
2019 / 12		4,5	+3,3	30,4		65%
2019 / 11		6,5	+1,9	16,8		36%
2019 / 10		11,3	+1,6	39,8		114%
2019 / 09		14,9	+0,6	39,5		88%
2019 / 08	Avg = 18,7C	21,0	+2,3	27,5		42%
2019 / 07		20,2	+0,8	24,4		36%
2019 / 06		23,1	+6,0	14,7		29%
2019 / 05	Avg = 15,5C	12,5	-1,9	50,0	81,8 mm	85%
2019 / 04		11,0	+1,7	17,1		46%
2019 / 03		7,1	+2,4	49,4		118%
2019 / 02		3,8	+2,7	28,5		84%
2019 / 01		1,0	+0,7	62,1		155%

Figure 9: [Average monthly temperatures in Cottbus 1990 vs. 2019]. (2020). Self-made screenshot on 8 Jul. 2020. Info from https://www.wetterkontor.de/de/wetter/deutschland/monatswerte-station.asp

Figure 10: "A Chain Home transmitter antenna, part of one of the first comprehensive radar systems." (2006). Retrieved 19 Aug. 2020 from https://en.wikipedia.org/wiki/History_of_radar

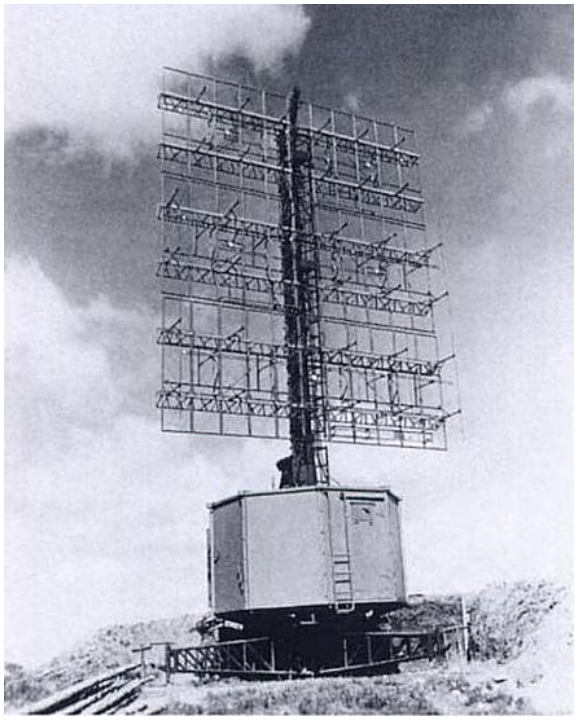

Figure 11: "The German Freya worked at higher frequencies, and was thus smaller than its Chain Home counterpart." (n.d.). Retrieved 19 Aug. 2020 from https://en.wikipedia.org/wiki/History_of_radar

Figure 12: "Lifting top cap of new 68 ft. (20.7 m) dome in place; removal of existing 22-year-old radome cap (at right) already completed." (n.d.). Retrieved 8 Jul. 2020 from https://www2.l3t.com/essco/resources/image_gallery_installation.htm

Figure 13: "Buckley's mysterious 'golf balls' uncovered." (n.d.). Retrieved 5 Jul. 2020 from https://www.buckley.af.mil/News/Photos/igphoto/2000996996/

Figure 14: [Inside one of Teufelsberg's lower radomes]. (n.d.). Retrieved 5 Jul. 2020 from https://external-preview.redd.it/J_haA8Ct-e_QT4dND9ARuuAdde85VnpV5ahu2Odhd7Y.jpg?auto=webp&s=e824ee99712e2f1753f168352484fe734c952efd

Figure 15: "In the highest radome. Amazing echo!" (2013). Retrieved 8 Jul. 2020 from https://avanthard.wordpress.com/2013/09/09/

8. Eigenhändigkeitserklärung

Der Verfasser erklärt, dass die vorliegende Arbeit selbständig, ohne fremde Hilfe und ohne Benutzung anderer als der angegebenen Hilfsmittel angefertigt wurde. Die aus fremden Quellen (einschließlich elektronischer Quellen) direkt oder indirekt übernommenen Gedanken sind ausnahmslos als solche kenntlich gemacht. Wörtlich und inhaltlich verwendete Quellen wurden entsprechend den anerkannten Regeln wissenschaftlichen Arbeitens zitiert. Die Arbeit ist nicht in gleicher oder vergleichbarer Form, auch nicht auszugsweise im Rahmen einer anderen Prüfung bei einer anderen Hochschule vorgelegt worden.

Berlin, 26.08.2020

Ort, Datum

Unterschrift des Verfassers