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POST-DIGITAL IS POST-SCREEN: ARNHEIM'S VISUAL THINKING APPLIED TO ART IN THE EXPANDED DIGITAL MEDIA FIELD

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1. Introduction

If the interest in the post-digital seems to point at anything, it is that the usefulness of the digital as a discursive element in analyzing the impact of technology in society and culture is waning. Digital technologies on the other hand only grow and proliferate. This raises the question: why do we need or want to discuss matters in terms of a post-digital condition if digital media do not seem to lose ground but rather expand? I suggest we use the term post-digital to establish new points of perspective to refine the analysis of digital media and digital technologies. I look at this issue in the context of art. Here, the digital realm tends to be perceived as screen-based. This tendency is validated by popular approaches in media art, most notably in Lev Manovich's *The Language of New Media*. To examine and understand art practices in which screens are not at the center of a work a screen-based analysis does not seem to make much sense. I try to show the limitations of the screen-based approach of the digital through Alexander Galloway's analysis of this problem in his book *The Interface Effect*.

What is not directly visible is also less likely to be seen. Additional issues for art in the context of digital media seem to be the visual impermeability or the spatial dispersion of specific works and practices. What I mean with visual impermeability is the presence of somehow 'hidden' structures, like network technologies, code and software processes, and even indirect influences of the Internet or of computer technology, in specific works of art. The perception of such works is mostly limited to traces and elements of the work our vision, hearing, and touch *can* detect. The interpretation of physical objects or 'artifacts' is part of the appreciation and perception of a work of art (Dickie 431). Works of art whose structures or processes mostly escape the line of sight present a challenge for interpretation that has been explored from different perspectives.

Earlier approaches for example suggest using Jack Burnham's 'Systems Aesthetics' (Shanken, *Art and Electronic Media*) or Callon and Latour's 'Actor Network Theory' (ANT) (Lichty) as a basis for analysis of complex works of art in a technological environment. What these approaches lack however is a strategy to develop new visual models. The prevalence of the visual arts in contemporary art seems to suggest developing a view beyond the screen may ask for an alternative visual approach, rather than a predominantly conceptual or actor network approach. Rudolph Arnheim offers a possible basis for such visualization in his book *Visual Thinking* (274). He explains how visualizations are an intrinsic part of thought and understanding (257). He uses examples from science, where the awareness of processes, structures, and objects often precedes or even constitutes their visibility. This inner mind visualization is created through the observation and analysis of physical objects or effects, which Arnheim calls "patterns of forces", which the observer inevitably interprets based on prior knowledge of the world (276). For art this means that perception of an individual work will still depend on an audience member's experience and knowledge of art, but this time in a post-digital context, a context whose possibilities and limitations are still largely unknown to the general audience. Such an experience and knowledge will therefore take time to develop.

The development of experience and knowledge largely depends on existing research, criticism, and theory in the field. Despite a widespread tendency to approach digital technologies as screen-based, practices and works that exist beyond the screen have been documented and analyzed,

mainly from within the media cultural field (Blais and Ippolito 17; Cramer 8; Popper 89; Bazzichelli 26; Holmes 14; Galloway 96). Their examples and mine show a diversity in practice and form in art in the context of digital technologies that remains largely obscured in the many screen-based approaches. To round up my proposal to take Arnheim's notion of models of theory as a basis for a new visual approach to art, I attempt to describe a few possible uses of Arnheim's theory in this particular context. Since the visualizations he proposes all depart from specific areas of research, I combine his notion of models of thought with approaches of critics and theorists from the field of media art and media culture. The new perspectives on the effects of digital technologies on art developed this way could, through their radical break away from the screen and their move into the darkness of the unseen, serve the critical potential of the post-digital.

2. The bright and blinding screen

In her book *Where Art Belongs* the art writer Chris Kraus puts what she calls "digital forms" in the same realm as video (119). She is but one of many critics and theorists that describe art in the digital realm in terms of the image and the screen (Bourriaud 69; Foster 105; Jameson 110; Krauss 87; Virilio 14; Rancière 9). The manner in which it is described is almost always negative. Computers are described as the present day epitome of Guy Debord's *The Society of the Spectacle*, or as problematic because prolific image copy machines. Virilio, in all his poetic paranoia, expresses this feeling by equalizing all screens, from the screen of the networked computer to the surveillance monitor: "What was still only on the drawing board with the industrial reproduction of images analysed by Walter Benjamin, literally explodes with the 'Large-Scale Optics' on the Internet, since telesurveillance extends to telesurveillance of art." (14)

This superficial view of the computer and digital media in general is supported or at least barely countered by influential writers from the media art field. Lev Manovich's bestseller *The Language of New Media* describes the computer almost entirely in terms of cinema. Even the chapter called "The Operations," after a chapter on screens, solely focuses on image editing and image sequencing (117). In his book *The Interface Effect* Alexander Galloway starts off with a respectful yet also critical analysis of Manovich's cinematic approach of new media. Galloway takes his criticism of this approach further by continuing his criticism to a related approach, that of remediation (20). The theory of remediation draws a straight line from medieval illustrated manuscripts to linear perspective painting to cinema to television and lastly to digital media (Bolter and Grusin 34). The radical transformations brought on by digital technology are explained only by stating it "can be more aggressive in its remediation" (Bolter and Grusin 46). Galloway however puts a radical new twist on remediation in digital media. He observes that, far from remediating a visual language like that of cinema, the computer "remediates the very conditions of being itself" (21). In terms of art practice this means that digital media remediate art as is, with all its complexities and contradictions. Digital media however do so from their own form of 'Dasein', which comes to be through their design and application.

The focus on the screen therefore is not a problem produced by digital technologies per se. To find a possible cause and solution for this problem it seems more appropriate to

approach it as a continuation of issues in art criticism and cultural theory at large. Though a variety of approaches to discuss art involving digital technologies exists (Blais and Ippolito 17; Cramer 8; Popper 89; Bazzichelli 26; Holmes 14), "no clearly defined method exists for analyzing the role of science and technology in the history of art" as a whole (Shanken, "Historizing Art and Technology" 44). Edward Shanken notes how after the heydays of modern art historians stopped describing technological developments in art (45). In this time period especially digital technologies have prospered exponentially. This change in art historical method seems to have created a lack of analytical tools to grasp the realities of art in the age of digital media. What the ongoing screen-based analysis of digital media shows is that this causes the variability and techno-political issues of the digital in art and culture to go largely unnoticed.

3. What is visual thinking?

To bridge the gap in knowledge about art and technology it seems first of al necessary to look at the role of technology in art in another way. The term post-digital seems to suggest we take a certain distance from the digital, or that we at least question what the term has come to stand for. This distance and questioning may provoke a necessary re-assessment of the effects of the rise of digital technologies, also in art practice. Galloway and others (Castells 355; Fuller 21; Campanelli 144) point to how the content and events of digital media do not exist on-screen primarily by far, and thus largely happen beyond a straightforward, retinal view. Developing ways to see beyond the screen therefore seems one of the main goals of a post-digital analysis of art. The merging of machine spaces and art practices asks for a visualization method that is at the same time applicable to both science and art.

In his book *Visual Thinking* the psychologist and art theorist Rudolf Arnheim describes various forms of visualization, one of which happens largely in the mind. It boils down to 'seeing' things you know are there but which cannot or can barely be seen by the naked eye. It is not a form of imaginative construction of unreal events or phenomena. Arnheim speaks of "models for theory" (274). He describes examples of how such models appear in nature sciences and geometry, especially in their early days. Even if he uses examples from the hard sciences, his approach of scientific visualizations is largely psychological (275). He explains how every scientific model of an unseeable event or object is never static or stable, as it is based on a mixture of theory, observation, experience, and psychology. In other words, these visualizations are as much subjective as they are objective views of events, phenomena, or objects that exist beyond the reach of the human eye.

Arnheim gives an example of how psychological or cultural influences can affect visual thinking: Gallileo not only had to battle church dogmas. He also had to constantly challenge his own, learned modes of perception, and in the end he did not completely succeed. Gallileo refused to accept planets rotated around the sun in ellipses rather than in circles. His refusal was based on cultural notions of his day in which religious beliefs suggested an underlying perfection existing in all of God's creation. Ellipses were considered imperfect. Arnheim quotes Erwin Panofsky pointing out that the ellipse, the distorted circle, "was as emphatically rejected by High renaissance art as it was cherished in mannerism" (278). Yet, even if Gallileo's vision of how the earth moves through the universe was not entirely correct, his model

of the universe did change our view of our planet radically, and gave the work of other scientists an important new direction. A shift of perspective can apparently enrich the way we approach things, even if not every detail of this new view is in line with the reality it reveals.

A visualization such as meant in Arnheim's theory is flexible, and is not meant to prescribe how works of art should be interpreted or valued. Works of art can still be explored from different perspectives, for the development of which intuition, theory, and physical experience are combined. What a development of this form of visualization may add is an experience of seemingly scattered or elusive works as relatively concrete, graspable objects or processes. In other words, rather than depending on a few visible markers the view of a work could entail shapes ungraspable by the eye alone, but deductible or knowable to the mind, to serve as the basis for a possible interpretation. According to Arnheim, "all shapes are experienced as patterns of forces and are relevant only as patterns of forces" (276). In this sense an art object in a gallery and a networked installation are not that different. Pictures, models, or visualizations developed from interpreting these patterns of forces however depend on former experiences and intellectual, cultural, or emotional preconceptions of the beholder.

To illustrate how this can play out: whereas Jacques Rancière describes the future of the image and representation in terms of "machines of reproduction" (9), Galloway looks at the same surface and sees what he calls 'The Interface Effect', which is an effect "of other things, and thus tells the story of the larger forces that engender them" (preface). One sees a copy and editing tool, the other a change of the forces beyond the screen that the images represent. Rancière's example reveals a limited perception of the digital as screen-based, while Galloway puts forward a view of the digital as a complex structure of forces obscured by a focus on the screen. These two divergent approaches of the digital each offer a radically different view. The first limits a view of the digital to what is directly visible, while the second firmly places the construction of the screen within larger systems and barely or non-visible practices. By breaking away from the screen Galloway seems closest to a post-digital approach.

4. Applying visual thinking

Arnheim's notion of models of theory describes a general way in which the mind's eye can see things, and how this way of seeing can help us make sense of things or situations. Contemporary art contains a highly varied field of practices, ranging from visual to performance to conceptual, and the interdisciplinary practices and works produced between them. Not one model for theory will fit to grasp the shape of all individual works of art. In the context of digital technologies art shows the same variety of practices and forms (Popper 23; Weiß 89-90). Individual works and practices need an approach that enables a view of their specific form and/or process, a specificity Arnheim's concept of models for theory does not offer on its own. Arnheim himself uses examples from cosmogony, geometry, and physics to illustrate how these models work (274-293). The notion of models of theory therefore describes a way of seeing that arises from various disciplines or practices in which direct, retinal views of specific forms or processes cannot occur, can only be established partially, or are not available yet. Research on post-screen works and practices therefore needs to be a departure point from which to develop visualizations for these works and practices.

Arnheim also describes boundaries to visual thinking. A mental image is not a photographic image of reality, but an approximate, subjective view of a form or event. The creation of models of thought is influenced by "the psychological tendency towards simplest structure" (282), or a combination of an intuition or deduction of the shape we envision and the shapes we are already familiar with. Models of thought can make the shape of objects, processes, and events beyond the line of sight easier to grasp, but they also tend to be simplified versions of these objects, processes, and events. A model for theory is nothing more than an attempt to see structure beyond the line of sight. Applying this type of visualization to works of art therefore means balancing an attempt to be accurate with the reality of inherent failure.

Still, an additional, visual layer to the way post-screen works and practices are approached already cannot harm us, but it can possibly help and enrich the way we see. A poetic use of code (Baumgärtel 11; Goriunova, Shulgin 4; Arns 194; Cramer, "Words Made Flesh" 8), a sculptural use of networks (Popper 181; Weiß 175; Shanken 140), and conceptualist practices (Greene 9; Holmes 20; Hand 10) are examples that show the heterogeneity of art beyond the screen. I treat these for the moment as separate categories, but am aware of the interdisciplinary character of each work in these areas, and of the physical and conceptual overlaps between them. In the next three sub chapters I briefly describe each category, and I try to apply visual thinking to an example in each.

4.1. Code art

Various authors have described the deep entrenchment of code in culture and society, and its defining role in new systems of power (Galloway and Thacker 30; Galloway 54; Wark [029]). Others have emphasized the generative aspect of code and its application in various art practices, and how code art at least partly escapes institutional realms (Arns 201; Goriunova, Shulgin 6). These views from the media art and media theoretical field seem to conflict with the tendency among influential art critics and cultural theorists to see and discuss the main issues of the digital in terms of the screen. The intervention of the post-digital may help here.

What is clear from all descriptions of code art is that it cannot be represented on a retinal plane in its entirety, or in its full capacity. Code as a written text, deep within a computer or presented on screen or paper, encompasses a potential activity that cannot be grasped from a literal reading or retinal observation of code as text or effect alone. To create a visualization of a work of code art we could attempt to include the potential activity inherent to code. Visualizing the work in full force would have to include movement through time and space, however minimal in the machine it runs on, as well as its relation to cultural, social, and political realms.

Let us take a work like Jaromil's *Forkbomb* for example, a highly poetic and minimal string of code designed to replicate itself endlessly. When seeing it displayed as text, like it was painted on a wall at Transmediale 2012, we could admire the simple beauty of the string of signs. Awareness of it being a piece of executable code of a very specific kind, a fork bomb virus, however could lead us beyond this relatively simple visible dimension. We could imagine a proliferation of that string of code in the shape of maybe a family tree, much like the poetic experiments Florian Cramer describes ("Words Made Flesh" 94), but constantly splitting, moving, growing. We could at the same time see the hard disc working away and filling up, its design standardized so as to allow indeterminate applications and

thus also viruses, along the observations in Matthew Fuller's *Media Ecologies* (93). We could wait to see how much time it takes for the computer it runs on to crash, placing it in the media archeological domain described by Jussi Parikka (97). We could also see a computer failing at being a productive machine in terms of expectations of what its economical, cultural, or political purpose is in ways Galloway describes (22). A visualization of *Forkbomb* in action could in this way give body to what first may have appeared as a predominantly conceptual work, by revealing its profound embedding and movement in the very physical structure that is a computer, and in the socio-technological landscape that stretches out around it.

4.2. Sculpture and performance in digital networks

The visualization of how technological networks are made part of specific works of art requires an explicit visualization of hardware as well as of the role of hardware in information flows. In network art installations hardware is essential, and most of it is far beyond sight. Any Internet connection for example quite easily runs halfway around the world (Terranova 44). The myriad of specific operations to realize an Internet connection happens almost entirely automated (Weiß 36). It runs across different national borders in ways largely beyond our control. Internet connections therefore are not neutral, straightforward couplings of machines. Yet Internet connections in works of art are mostly discussed in terms of technology, virtual spaces, and telepresence, and seldom in terms of the mixed physical and techno-political essence of the network, let alone in terms of a visualization of it (Goldberg 3; Popper 363; Shanken, *Art and Electronic Media* 32; Paul 93).

By making the Internet part of a decentralized installation or performance, happening at different places at once, a composition is created that involves the implementation of a shared, semi-public infrastructure. This implementation of the Net is time-based, because the network involvement only exists when the installation runs or a live performance takes place (Weiß 342). Though some works in this category involve smaller or private networks that are not online and have no significant political dimension, in my opinion the use of the semi-public space of the Internet as a key factor in a work deserves special attention due to its political and cultural sensitivity. A post-digital view of art could and should include a sobering view of the Internet as bringer of alleged freedom and progress by disclosing the reality of and behind its construction. The political dimension to the Internet also affects the art world. The possibilities for artists to represent themselves and have a direct connection to their audience online creates a challenge to the authority of critics, curators, gallerists, and art institutions (Stallabrass 90; Greene 11). In this sense the interests of artists and media activists seem to overlap. It must maybe be emphasized though that an inclusion of a view of the way the Internet is constructed, and how it functions within a work of art, need not be political per se. It could also be aesthetic or poetic, or a combination of all these.

Several authors have described the role of the Internet as a continuation of struggles over media access and the development of free media or of tactical media (Rifkin 232; Lovink 258; Kluitenberg 305; Holmes 61). The vulnerability of the Internet as a space for free speech and collaboration across borders has led some artists to develop alternative networks. These sometimes unpractical

and sometimes highly inventive alternative networks are works of art in themselves, and, though they are not connected to the larger Internet, through their sheer separation and rejection of the Internet they can be seen as political, activist art statements. Several works from artists that are part of Weise 7, a studio and artist collective from Berlin, could be described this way.

Netless for example, a work by Danja Vasiliev, establishes an independent network through the attachment of wirelessly communicating data storage devices to public transport vehicles such as trams. Information exchange in this network happens through manual upload to one of the devices, and an automatic exchange between two devices when the trams they are attached to pass each other. The work's shape is defined through physical, semi-physical, and conceptual elements: the trams, wireless storage devices, and the computers and phones of the users; the wifi-signals moving separately and overlapping occasionally; and the explicit separation of the Internet. Though the work is dispersed, it is still delineated by the public transport infrastructure's reach, the capacity of the wireless devices, and the network of users and their individual computers. One could maybe say it has a tentacle-like shape, whereby the ends of each tentacle dissolves in the personal network and interests of each user. By envisioning the patterns of forces involved conceptually, spatially, and physically, a relatively comprehensive and less abstract view of this installation could possibly emerge than from a description and an abstract presentation model alone.

4.3. Conceptualism and the digital sphere

In the last few years a growing awareness of the influence of the Internet in art beyond the computer has evolved through the development of so-called Post-Internet art (Olson 60; Vierkant 5). The Post-Internet art 'movement' and the post-digital have in common that they both re-examine the faulty premises common views of digital culture are based on. They also seem to share a questioning of boundaries between technological and socio-cultural domains, in particular the penetration of life and culture by concepts and practices originating in the technological domain. The reason I call certain art practices conceptualist is that they largely manifest themselves in some form outside of digital media, yet these media do inform their shape. The technology seemingly disappears in them. Maybe more than in other art practices digital media here "remediate the very conditions of being itself" (Galloway 21).

Works range from performance and activist art to sculpture, painting, video, and prints (Holmes 47; Olson 63). Works in this highly diverse group of practices seem to have three things in common: they use the Internet as an information or material resource; they use the Internet as a community space; and they use digital media for publication purposes (Bazzichelli 28; Goriunova 29; Holmes 66; Hand 47). The works in themselves largely take shape outside the computer. Some works, such as the activist art performances of the Yes Men/ rtmark, are described in books about net art and digital art (Baumgärtel 106; Stallabrass 8; Greene 92; Paul 209). More object-based work, like that associated with the 'Post-Internet' label, still largely needs to find its way into literature. Marisa Olson describes the extensive use of

found photography in Post-Internet practices in terms of a revaluation of "portraits of the Web." "Taken out of circulation and repurposed, they are ascribed with new value, like the shiny bars locked up in Fort Knox" (60).

To develop a model for theory or visualization of the indirect effects of technology at play in conceptualist works of art could be difficult. Following Arnheim's view that these visualizations always take the simplest form, the elusive and near intangible echoes of technology in these particular conceptualist practices seem to ask for a highly abstract yet familiar model. One such model for an all-pervading yet invisible machine comes from the world of popular fiction. Borrowing from the Hollywood blockbuster *The Matrix* Vito Campanelli speaks of an "aesthetic matrix" when describing the influence of the design and content of the web. He sees our current cultural situation as "a time characterized by a diffuse aesthetics and by memetic transmission", especially pertaining to "cultural elements" such as images (148). Next to media content one could however also include the subtle but defining role of tools and technologies in the development of practices in this aesthetic. The work of the Yes Men may serve as an example.

The art activism of the Yes Men consists largely of infiltration and subversion strategies. They copy the logo and communication design of a certain corporation or institution and use it as a façade for their intervention in the media presence of this corporation or institution (Greene 95; Holmes 169). The Yes Men's work is a juggling with the different dimensions of reality: the reality of physical space; the reality of media representations; and the specific historical and cultural perceptions relating to their target. They use the space between the reality of physical space and that of media representations as a theatre in which to perform alternative histories. This in-between space is a physical space, a technological space, and a conceptual space at once (Campanelli 13). We could maybe see the shapes of individual works of art in this space as explicitly virtual, even if they appear as objects, like in Post-Internet art. The virtual, in the sense of representing the potential of an event or object, here exists in ghost-like shapes and processes that consist of the ectoplasm, the leakage, or the extra-digital results of digital technologies. An analysis of this leakage seems to belong in the techno-critical exploration the post-digital approach may offer.

5. Finally

In the twenty years, I worked as a critic and observer of art in the context of digital technologies I have been confronted with a partial, but rather substantial blindness to the shapes of works and practices in this area in audiences, critics, educators, and curators. The relative inexperience with computers and related technologies seems to make it easy either to be sucked into, or to be turned away by, the movements and the glitter on the screen. Furthermore a reluctance to see the screen in a different light seems informed by pre-digital cultural theory, in which cinema and television were the main focus of analysis (Galloway 8). I have tried to show how this surface view of the digital media is distracting and misleading.

New technologies have enabled artists to make structures and processes that are too large, too small, or too elusive for us to perceive with our eyes alone. The computer and its networks seem to especially influence this tendency. A screen-based view of art in this context will not make the works in question visible. Different descriptions and analyses of these works exist, but these are mostly based on a conceptual approach. A

comprehensive visual approach to these works does not exist yet. In my search for a way to pass on my own experiences, in particular with art in networks, I stumbled upon Arnheim's *Visual Thinking*. In the chapter "Models for Theory" Arnheim describes a way of seeing in which the inner mind creates visualizations of complex or large phenomena (274). These visualizations are part of the formation of a grasp of the shape and processes of these phenomena.

Though Arnheim ascribes this visualization technique for science, I think it can just as easily be applied to the arts. Here too we have complex and large structures the shape and processes of which almost completely escape the eye. By trying to develop a visualization of a work from patterns of forces, or from those elements and effects of a work we can experience directly, it may be possible to get a more profound or full experience of a work as it expands beyond the line of sight. This visualization technique is not to replace interpretation, but I offer it as a possible additional strategy to approach and experience specific works of art. Rather than approaching complex, unstable, and/ or very large or small works as limited or, on the contrary, as dissolving into an undefined public sphere or some mysterious machinic universe, it may be possible to discern shapes, trajectories, and spheres of influence or interaction. Arnheim's "models for theory" approach comes closest to my own view and experience of art in the context of digital technologies. To hopefully clarify, but also to inspire possible new visualizations in the reader, I have added examples of possible implementations of this particular form of visualization, which no doubt should be refined.

"Post-digital is post-screen", the title of my paper, refers to the need to develop new approaches to art and culture in the context of digital technologies. Getting stuck in an endless loop of images and copied images is not how the arts of today need to be perceived. A post-digital perspective can see deeper, and further.

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