Artifacts of Research

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The focus of my current research and art production has been the contemporary culture of obsolescence. This topic has a specific relevance to recent transformations in photographic education as well as the emerging research environment in art production. Language and technology, cognition and consciousness and the sense of experience that is constituted by subjects and objects are inherent to this research. The very notion of obsolescence imposes an anxiety of loss that can conjure feelings of melancholy and nostalgia. Obsolescence stimulates rituals of collecting artifacts that acquire value through their scarcity or quality of production, a form of material nostalgia that endeavors to arrest the state of longing and seeks a uniquely human experience that is perceived as authentic. Through this research, I continue to explore the difference between *obsolescence*, frequently understood as a culture of consumerism and material waste, and the *obsolete*, artifacts from the past that have been superceded or lost and which retain personal and critical value to our understanding of the past and the future of art making. This context addresses the importance of memory, oblivion and the embodied intimacy of things. Although these differences assist with some directions in research, the two categories of obsolescence and the obsolete are also inherently connected through cultural and historical formations.

As a photographer and media artist, the origins and developments of lens based technology continues to be a primary source of inspiration and examination in my research. The technology of photography originates as an artifact of research and experimentation. The certified histories of photography begin with a narrative on the

applied research into the optical and chemical origins of lens based reproduction. Optics originates with the Greeks. Functional optical devices used to determine the physical characteristics of light in the 10th century by Ibn Al-Haithamand as well as the research of Galileo and Descartes in Western science all contribute to defining an epistemology of the viewing apparatus known as the *camera obscura.* Although the optical and chemical components required to produce a photograph predate the realization of this technology, the historical reasons for the delay in inventing the first photograph are provisional. The fact that both Daguerre and Fox-Talbot announced their respective inventions to communities of scientists is not incidental and attests to the rise in research techniques during the nineteenth century that were economically advantageous in the expansion of Capitalism throughout the European markets.

> "Independent entrepreneurs and business people started to believe that their investments in research might be rewarded. Much of the history of early experiments in photography shows cultural attitudes prompting resourceful individuals to resolve technical puzzles. Not every inventor sought financial gain and acclaim, but each of the originators whose stories we know believed in tinkering with devices and testing formulas. In 1839, when the medium was disclosed, the industrializing world was ready to apply it to portraiture, record-keeping, political persuasion, academic investigation, and travel accounts. "[1]

In this context, the use of the term *research*, defined as a form of entrepreneurship, is understood. The mythical, cultural and epistemological effects of this invention, however, have often been rendered supplementary to the technological origins and have only recently been given adequate historical attention as a subject worthy of cultural research. The economic, scientific and industrial applications that photographic technology would have was anticipated by those who pursued the technical research and experimentation that resulted in commercially viable photographic processes; in short, the instrumental applications of product development were guaranteed by an emergent 19th century commerce while the qualitative scope of photographic applications in art, communications and science, continues to be redefined and reinvented within the cultural history of the medium.

> "As a new scientific and technological order emerged in the nineteenth century, the old ways began to wobble and fail from the pressure of new experiences, and innovative theories were needed to contain them. The invention of photography resulted from the application of quantifiable knowledge to fulfill a capitalistic cultural demand for a practical, automatic picturemaking system, based on light and optics. Its invention marked the establishment of aesthetic, professional, and social practices governing how these pictures would be used, understood, and accepted."[2]

In a phenomenological variation on history and desire, Roland Barthes claims that it was the chemist alone that invented photography "[f]or the *noeme* 'That-has-been' was possible only on the day when a scientific circumstance (the discovery that silver halogens were sensitive to light) made it possible to recover and print directly the luminous rays emitted by a variously lighted object".[3] For Barthes, it was the photographic fixer, Sodium Thiosulphate, discovered by Sir John Herschel, and not the *camera obscura,* that was the essential element to a phenomenological understanding of what a photograph is. As a non-relativist scientific equation, Barthes statement about photographic desire would appear as:

$$2\ S_2O_3^{2-} + AgBr \rightarrow [Ag(S_2O_3)_2]^{3-}) + Br^-$$ [4]

Barthes pronouncement, however, does not contest the historical script without implication. If photography was the creation of the chemist rather then the offspring of the perspectival logic of Renaissance painting and the camera obscura, this observation is intended to affirm Barthes thesis that the essence of the photograph resides with the desire of the spectator rather then the techniques of the operator. In short, an ontological desire that has precedence over the historical narrative that has defined photography and for which the technology of photography has provided the material evidence. By the end of the nineteenth century, the evidential role of the photographic document in archives of science, medicine, history, prisons and paranormal phenomena provided another example of cultural evidence concerning the meta-applications of photography. The "certificate of presence" that Barthes claims for photography is premised on the temporal absence that the chemist has assured with the fix bath. For Jacques Lacan, the relativist *matheme* for fantasy

in psychoanalysis appears as the barred or unconscious subject who desires the *objet petit a* - the object that defies attainment and consequently sets desire in motion. This relativist and unscientific equation appears as:

$ ◊ (a)[5]

I have drawn attention to the relativist/non-relativist debate in relation to the interpretation of photographic history as it illustrates the contemporary debates concerning the relativist conception of truth in art and theory and the non-relativist truth attributed to a conception of universal knowledge in science. When we discuss art making as a process of research, this boundary, or obstacle to knowledge, provides a critical and misunderstood debate between the empirical data commonly associated with standard research methodology and the intuitive role that the imagination has in the creative process. At the same time, to deny art an empirical wisdom or to deny that science also relies on intuitive insight seems highly problematic in the contemporary culture of computing, bioinformatics and cognitive technology.

As Carol Armstrong has inferred, "…early thinking about the photograph was as magical and anti-industrial as it was positivistic"[6]. Her resistance to reduce the invention of photography to the values of scientific and positivist histories of the early nineteenth century alludes to the discursive and qualitative research that was concurrent with the emergence of photographic practice and is of historical significance to photography and digital media today. Armstrong affirms Barthes observation that it is the "chemistry" of photography that privileges the spectator over the operator, authentication rather then precision.

Alluding to Barthes and Foucault, Geoffrey Batchen shifts the emphasis of investigation from the facts of the founding moment of 1839 to an earlier period that predates the moment of inception: "to the appearance of a regular discursive practice for which photography is the desired object."[7] Like Barthes, Batchen wants to know what photography "is" rather then when it began. He describes this as a *mythopoetic* desire as opposed to a linear and literal set of technical facts. Batchen cites the names of many "protophotographers" whose research and activities he believes desired the existence

of photography and whose aspirations were consequential to the inevitable invention of a photographic technology. The inevitable question in this circumstance is how can desire be allied with research?

Concurrent with the invention of photography is the rise of a discourse concerning *objectivity.* In a study of the history of representation in scientific atlases, Lorraine Daston and Peter Galison have shown that the emergence of a discourse of objectivity does not appear until the mid-nineteenth century (c.1860).[8] Citing *objectivity* as an epistemic virtue in representation, they note how objectivity was a transition from the previous epistemic virtue of *truth-to-nature* to a process of *trained judgement* in twentieth century scientific illustration. Although these were transitional stages, none of the epistemic virtues in representation were ever rendered obsolete. In this development, they note how subjectivity, situated values and collaboration between artist and scientist were and continue to be a "precondition for knowledge" to become visible. The representation of the artifact, specimen or object of study was also a representation of "the scientists who sees and the artist who depicts" and who formed a "collective way of knowing".[9]

> "… our claim is that the history of objectivity is only a subset, albeit an extremely important one, of the much longer and larger history of epistemology – the philosophical examination of obstacles to knowledge. Not every philosophical diagnosis of error is an exercise in objectivity, because not all errors stem from subjectivity. There were other ways to go astray in the natural philosophy of the seventeenth century, just as there are other ways to fail in the science of the twentieth century and early twenty-first centuries".[10]

The authors state that it was not the rise of photography and the veracity of the silver halide image that resulted in a discourse of objectivity in the nineteenth century. Photography contributed but did not determine an exploration in the understanding of interpretation, human error, embodiment and subjectivity in the process of scientific representation. It was however, important to the notion of *mechanical objectivity*, a form of machine illustration that led to an idealized notion that the machine endorsed authenticity by being exempt from human error. That the observer could also aspire to be a machine

was an extension of a desire for authenticity, a misnomer that recalls the *mythopoetic* history of the invention of photography itself.

> "Far from being the unmoved prime mover in the history of objectivity, the photographic image did not fall whole into the status of objective sight; on the contrary, the photograph was also criticized, transformed, cut, pasted, touched up, and enhanced. From the very first, the relationship of scientific objectivity to photography was anything but simple determinism. Not all objective images were photographs; nor were all photographs considered *ipso facto* objective."[11] 125

I have chosen these observations on history, photography, machines, embodiment and desire to foreground a discussion on research that has been inhibited and misunderstood by certain methodologies of objectivity and verifiable fact finding that ignore or discount the relevance of tacit knowledge. If research is guided by questions posed of a subject or idea, then an interdisciplinary approach that acknowledges the stance and subjectivity of readers as well as the blind spots of traditional methodology merits further consideration. In this context, there is an affinity with artistic objects and process and other kinds of scholarly and scientific research in this approach.

In 2007 I received a Research/Creation grant from the Social Sciences and Humanities Research Council to explore art making in relation to the subject of "Obsolescence and the Culture of Human Invention". This research initiative extends my former practice and interest of technology, language and obsolescence within an interdisciplinary context involving other artists and cultural researchers. The project will be situated within a discussion of how computing language and code are influencing our creative directions and use of digital tools for creative exploration. The co-applicant for the project is Ilan Sandler, a sculptor and media artist working with similar concerns of material culture, language and aesthetic computing.

The project will be realized through the research/creation category established by the Social Sciences and Humanities Research Council of Canada (SSHRC) for interdisciplinary and multidisciplinary research in fine arts. This area of research is new to the SSHRC

program of research options and is defined as:

> **Research/creation** (specific to the Research/Creation Grants in Fine Arts program): any research activity or approach to research that forms an essential part of a creative process or artistic discipline and that directly fosters the creation of literary/artistic works. The research must address clear research questions, offer theoretical contextualization within the relevant field or fields of literary/artistic inquiry, and present a well considered methodological approach. Both the research and the resulting literary/artistic works must meet peer standards of excellence and be suitable for publication, public performance or viewing.[12]

I have drawn attention to this definition from SSHRC as it represents a significant change in the way that research is reconfigured as creativity and art making. It is responsive to the contemporary practice of artists and offers an opportunity for experimental methodologies that will encourage diverse paradigms of research and creativity. This process has merit for other research disciplines as well.

There is an apparent contradiction in naming obsolescence as the subject of an extensive research project into creativity. Research methodology is traditionally associated with progress, development, definable questions with definable answers and innovation that reports on the brand new. Consequently, researching the imaginative and productive potentiality of outmoded culture and technology advances an inverse relationship that may appear obsolete to the conventional language of research. This is a critical paradox of our time as well as a principle question to investigate during the research/creation project. How are we as artists and producers affected by the experiences of obsolescence at this moment in time? How does this situation influence our perception, intuition, sensorial experience and our creative activities?

The research project we have defined will profile the ingenuity and resourcefulness that artists bring to the contingencies of material and cultural obsolescence in an era of unprecedented technological advancement. We will research and document the obsolescence that we create. The research and creation associated with “Obsolescence and the Culture of Human Invention” is informed

by the fact that material obsolescence in industrial culture is also the product of research methodologies. From as early as 1932, manufacturers from industrial economies have been actively researching and implementing the failure of design and technology into our lived experience. By scientifically quantifying and perfecting obsolescence in products, the continuous and accelerating consumption of manufactured products has been assured. The consequences of this development are considerable. Obsolescence, whether material or experiential, becomes one of the most relevant developments of our time. The research associated with poetic and artistic creation may not share the methodologies of research formed by instrumental objectives. Culture, myth and metaphor are familiar to the process of creative and poetic research. How will artistic creation and research based in new technologies provide a renewed insight into the predicaments of obsolete things and experiences and how can this shape and influence the insight, future and wellbeing of our culture?[13]

Research is an awkward subject for artists. The word often signifies traditions of positivist investigation traditionally associated with the instrumental reason of capitalism. In Western culture, we have historically reduced the understanding and knowledge of science to quantitative and measurable data – explicit knowledge. The recent economic trends that favour hegemonic accountability as social and economical imperatives would only seem to conflate this condition. How do artists and other relativist practitioners contend with this hegemony? How will science and art redefine their affinities?

In an era characterized by sample surveys and polling, where democratic values are determined by telemarketing and consumer trends, can we assess the role of cultural production and art making as research? How can lived experience expressed through critical realism or expressive and poetic explorations of materials and sensorial knowledge be considered a form of research? For Martin Heidegger, technology is a way of revealing how the world is organized, structured and used as a resource. Heidegger claimed that the question concerning technology was not technological. Rather it was historical. Framed by metaphysics, Heidegger maintained that technology, as a means of revealing was also instrumental in concealing the truth of that revealing. The term “unfolds” is pervasive throughout Heidegger’s description of the condition that defines our

relation to science and technology.

> "The rigor of mathematical physical science is exactitude."[14]

Heidegger contends that research is an obligation. What does this mean? Basically that research transforms the essence of what we do and how we approach knowledge. Heidegger states that what can be known is a condition of what can be represented. In this respect, the relationship that science has to research in the modern era is assessed through the relationship that truth acquires when it is "… transformed into the certainty of representation".[15] It is this observation that allows the world to be "conceived and grasped as a picture".[16] Finally Heidegger observed that research was becoming information gathering rather than scholarship. "The scholar disappears"[17] into a fragmented procedure of meetings, data collecting, negotiations, congresses and publishing contracts. In contrast to this pattern of information gathering and fact-finding, we are reminded of the value of relativist or inexact investigations in the human sciences of history, literature, poetry and art.

> "The humanistic sciences, in contrast, indeed all the sciences concerned with life, must necessarily be inexact just in order to remain rigorous…. The inexactitude of the historical sciences is not a deficiency, but is only the fulfillment of a demand essential to this type of research."[18]

Certain forms of obsolescence that are generated by technology and economic trends are defined by Heidegger as *enframing.*[19] Heidegger identifies enframing as the preeminent danger that technology and science posed during the twentieth century. The quantitative research that physical science had established required critical attention from the qualitative and poetic attributes of the artist. The threat posed by technology is not the technology itself, but rather the enframing or systematization of human experience that conceals the danger that we face with contemporary technology. By addressing the question concerning technology, Heidegger notes that because "… the essence of technology is nothing technological, essential reflection upon technology and decisive confrontation with it must happen in a realm that is, on the one hand, akin to the essence of technology and, on the other, fundamentally different from it."[20] Heidegger identifies this site of questioning to be the realm

of art. When discussing the *saving power of art*, Heidegger does not mean that art will literally save us from the danger that is revealed and concealed by science and technology. Rather, he is speaking of a form of knowledge and stewardship that art offers. One reason is the fact that art does not rely on the reduction that is common to quantitative investigations of rational truth. The relativist truth of art is poetic, expansive and experiential. As Miguel de Beistegui has noted,

> "Unlike technology, art, and poetry especially, signals the site of a true dwelling on earth. Why? Precisely because art begins with the world as this unfamiliar, uncanny phenomenon, which it does not seek to reduce, but to deepen, to 'understand' in a way that is radically different from its rational-scientific conquest."[21]

Giles Slade in his book "Made to Break: Technology and Obsolesce in America"[22] has identified three forms of industrial obsolescence that emerged during the twentieth century. The first is *technological obsolescence* - the fact that innovative product design and products supercede the efficiency of previous technological designs. The typewriter is obsolete because more efficient and effective forms of mechanized writing and organizational techniques have replaced it. The second form is *dynamic obsolescence*. This form is related to our desire for newer products and is, in effect, the psychological attribute that advertising exploits through marketing. The dawn of the annual design changes in the automobile industry is a cited example. This obsolescence is also intrinsic to computer technology, cell phones and iPod upgrading where an individual's prosperity can be measured through the fetish value associated with the visible consumption of technology. The third and perhaps most ethically repugnant and environmentally challenging form of obsolescence is *planned obsolescence* – manufacturing products that are designed to fail within a given time frame, thus ensuring repetitive consumption and gratuitous waste. This manifestation of industrial obsolescence is tethered to the previous forms cited by Slade and has a direct relationship to the *enframing* that Heidegger discusses in his assessment of research, science and technology in modernity.

In addition to the obsolescence cited by Giles Slade, I would add *planning for obsolescence* – the fact that we expect certain products

such as computers, software, cell phones and iPods to have a limited and quantifiable period of use and consequently are required to plan the point at which technological upgrades and resales must occur in order to evade the accelerated depreciation associated with these technologies. The last form of obsolescence I would add is *experiential obsolescence*. This form has a relationship to the ontological nihilism explored by Nietzsche but addresses the social and psychological contingencies of technology and technoscience in contemporary culture. The digital gaming industry would be a dominant example.

> "The essence of what we today call science is research."[23]

By 1938, Heidegger acknowledged that science was the essence of research in the Modern age. By 1950, in the wake of the atomic bombs that destroyed Hiroshima and Nagasaki and the emerging horizon of the Cold War, Heidegger returns to the question of research, science and technology to explore the danger of alienation, distancing, forgetting and *enframing* that science and technology bring to existence. For Heidegger, the decision to create and drop the atomic bomb was prepared centuries before the historical event as a consequence of the human forgetfulness of Being:

> "Man stares at what the explosion of the atom bomb could bring with it. He does not see that the atom bomb and its explosion are the mere final emission of what has long since taken place, has already happened. Not to mention the single hydrogen bomb, whose triggering, thought through to its utmost potential, might be enough to snuff out all life on earth. What is this helpless anxiety still waiting for, if the terrible has already happened?[24]

This is a philosophically nostalgic view of crisis and human experience. Although Walter Benjamin and Theodor Adorno rejected Heidegger's archaic and essentialist longing for Being, their observations and warnings about science and technology in the early twentieth century retain some affinity. It is not within the scope of this essay to outline the disdain that Adorno held for Heidegger's writing, particularly after the war when Heidegger's silence about his collaboration with the Third Reich became an irreconcilable mistake for many Marxist philosophers. At the same time, Adorno

was making comparable analogies about research terms, science and the cultural humanities. The very notion that culture could be treated as a quantifiable entity and defined by "… standardization, the transformation of artistic creations into consumer goods, [and] calculated pseudo-individualism"[25] was a response to his academic experience in America in 1938 working on the "Princeton Radio Project", an initiative that his friend Max Horkheimer had assisted in getting Adorno assigned to. At a later date, reflecting on this experience, Adorno describes the reification of the research methods that he experienced at that time by claiming, "… culture is precisely the very condition that excludes a mentality that would wish to measure it. In general I was hostile to the undifferentiated application of the principle *science is measurement,* which at the time was little criticized even in the social sciences. The primacy granted to quantitative methods of data collection, in relation to which theory as well as individual qualitative studies were to be at best supplementary, implied that one had to undertake just this paradox. The task of translating my deliberations into *research terms* resembled squaring the circle."[26] It is interesting to note that Adorno is strategically claiming that critical theory, as a form of sociology, is not reducible to the quantitative research terms of that time. Today, no one would question the scholarly legitimacy of Adorno's qualitative research. The fact that contemporary Adorno scholarship is institutionalized as a legitimate field of scholarly research could be read as a reifying tendency of a non-reflexive dialectic that Adorno would also need to critique.

The association of modern research with science is a common perception of the late twentieth century. In relation to this statement, it is necessary to ask how art making is knowledge, an investigation of knowing and also a legitimate form of research? How does art making distinguish itself from other forms of scholarly and scientific research and why is this vital to the contemporary debates about research in general?

As Henk Borgdorff has indicated, art making is treated as a hybrid concern with respect to established trends in scientific and scholarly research. Art, when it is assessed from a theoretical distance, becomes the object of scholarly research without question. However, when the subject and the object of investigation are intrinsically related, the question of methodology and interpretation becomes

more complex. Citing a previously published article by Christopher Frayling,[27] Borgdorff describes three methodologies in art and research. *Research on the arts* (art history, visual and cultural studies, media studies etc.) where valid conclusions about an object of study are completed from a theoretical distance and the object of research is not altered. *Research for the arts,* refers to research into applied techniques, materials and tools used in the creation of art. The last method is referred to as *Research in the arts,* or practice-based research, where the "…research does not assume the separation of subject and object, and does not observe a distance between the researcher and the practice of art. This approach is based on the understanding that no fundamental separation exists between theory and practice in the arts".[28] Not surprisingly, it is this definition and approach to research that has created both enthusiasm and debate within the annals of traditional scholarly research. It is also a radical intervention into the more traditional and limiting research methodologies that do not seek to critique or challenge the held assumptions of the scientific and scholarly research practice in the academy. In an attempt to provide analysis and clarification to this question, Borgdorff follows a path of questioning that includes ontological, epistemological and methodological assessment on the nature of practice-based research in art. At the end of his analysis he concludes that:

> "Art practice qualifies as research if its purpose is to expand our knowledge and understanding by conducting an original investigation in and through art objects and creative processes. Art research begins by addressing questions that are pertinent in the research context and in the art world. Researchers employ experimental and hermeneutic methods that reveal and articulate the tacit knowledge that is situated and embodied in specific artworks and artistic processes. Research processes and outcomes are documented and disseminated in an appropriate manner to the research community and the wider public."[29]

Borgdorff acknowledges that this definition is formative and does not adequately explain how we determine what is or is not appropriate for study and documentation. The primary purpose of the statement, however, is to provide "a *negative* criterion that we can use to distinguish art practice-in-itself … from art practice intended-

as research."[30] From this perspective, Borgdorff looks at principles and policies recently established by Research Councils in Europe where art would be intended as research, has a stated methodology, would provide original insight, knowledge and understanding and is documented and disseminated. These criteria are comparatively analogous to the SSHRC criteria stated above.

In Canada, recent changes in government funding that privilege the commercialization of research through direct academic and industry partnerships has led to a suspicion within the academies that the integrity of research will, and has, been compromised. In certain areas of scientific and scholarly research, the potential for ethical misappropriation is considerable. For many, this form of funding may compromise the integrity that is assumed by an arms-length relationship between the university and private models of economic self-interest and development. Although private corporations may conduct their own research at their own expense, the academic/commercial partnerships that are partially funded by the government have been at the expense of publicly funded research that is not tied directly to economic development. It is not surprising that in this debate concerning the changing nature of research that the description, future and question of art making as research would find itself marginalized and subject to intellectual uncertainty. Similarly, the fact that art schools and university art departments are adopting the term research to describe artistic activity is contingent on this shift in the research funding apparatus. It is for this reason that the terms and methods used in practice-based research and art making need to be approached with open and meticulous attention. At the same time, the reductive and critically uniformed opinion that often accompanies this debate needs to be challenged as well.

The Canada Council for the Arts has recently adopted criteria for research and commercialization in funding for artists. Many of the grants available to individual artists now feature categories for research, funding for commercial development with private galleries or other business plans and the eligibility for certain grants may be contingent on having a professional exhibition in a public or private art gallery already confirmed prior to the application for funds.

The fact that practice-based research has entered the fine art academy is not new. The studio faculty teaching in degree granting

art schools and art departments in larger universities have had their professional art practice tacitly recognized as equivalent to scholarly activities for decades. In this relatively undefined category, the term *professional* has been utilized as an elementary equivalent. As stated above, however, this does not imply that all professional art practice qualifies as research methodology. During the late twentieth century, in the midst of minimalism and conceptual art practice, artists began to assume the roles of critics, historians and theorists of art practice. Many of these artists did not make absolute or bureaucratic distinctions between their scholarly activities and their art production. Rather, the practices were approached as mutually supporting. In so far as this was intended to gain political and intellectual control of the context and critical explanation of their practice, it did not reduce the practice of art to theory or to art history as is often alleged by essentialist misunderstandings or by faculty concerned with the academization of art practice. In this context, Borgdorff is clear that "[a]rt is thought not theory" and that it "… seeks to postpone 'theory', to re-route judgments, opinions and conclusions, and even to delay or suspend them indefinitely".[31] The fact that the word *research* in the contemporary milieu of universities with art programs is now met with skepticism and obstruction is, at best, mystifying.

> "The misgivings about the legitimacy of practice-based research degrees in the creative and performing arts arise mainly because people have trouble taking research seriously which is designed, articulated and documented with both discursive and artistic means. The difficulty lurks in the presumed impossibility of arriving at a more or less objective assessment of the quality of the research – as if a specialised art forum did not already exist alongside the academic one, and as if academic or scientific objectivity itself were an unproblematic notion. In a certain sense, a discussion is repeating itself here that has already taken place (and still continues) with respect to the emancipation of the social sciences: the prerogative of the old guard that thinks it holds the standard of quality against the rights of the newcomers who, by introducing their own field of research, actually alter the current understanding of what scholarship and objectivity are."[32]

In conclusion, I would note that art as research has much to contribute to the contemporary artistic, scientific and technological

environment. Historically, the arts have privileged the value of human invention in relation to embodiment and lived experience. Conversely, artists have much to learn from the research being conducted in science and technology. The emerging interdisciplinary options for research and collaboration are significant alterations in the contemporary definitions of knowledge and research and will provide vital direction to the critical questions that we are posing.

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8 Lorraine Daston and Peter Galison, *Objectivity* (New York: Zone Books, 2007), 27.

9 Ibid, 53.

10 Ibid, 31.

11 Ibid, 125.

12 Social Sciences and Humanities Research Council of Canada. http://www.sshrc.ca/web/apply/program_index_e.asp (accessed 2006)

13 This section of the essay is a brief summary of the research proposal that was submitted to SSHRC by Robert Bean and Ilan Sandler in September 2006.

14 Martin Heidegger, “The Age of the World Picture” in *The Question Concerning Technology and Other Essays,* translated by William Lovitt (New York: Harper & Row, Publishers, 1977), 119.

15 Ibid, 127.

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32 Henk Borgdorff, “The Debate on Research in the Arts”, Amsterdam School of the Arts, http://www.ahk.nl/ahk/lectoraten/theorie/download/The_debate_on_research_in_the_arts.pdf (accessed March 2008).