Show Me the Truth:
The Conditions of Possibility
for the Invention of Photography

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Abstract

The popularization of science during the eighteenth century generated, toward the end of the century, an epistemological anxiety that reached all levels of the population from the most literate scientist to the poorest peasant, the expert in differential calculus like the witness of the flights of M*ontgolfières*. Books, periodicals, schooling, private *salons,* and public demonstrations contributed to this quasi-universal anguish. Toward the end of the century, spectacles appeared that were at once expressions and tentatives to remedy the period's epistemic malaise; among those spectacles the phantasmagoria, the panorama, and the diorama, all connected to the history of photography, figure prominently.

In this dissertation I focus on the progressive build-up through the eighteenth century of the yearning for an accurate and truthful representation of the natural world that culminated in the 1839 invention of photography. Rather than seeing photography as the inevitable result of improved knowledge in the specific sciences of optics and chemistry, I consider that what else was needed to create the conditions of possibility for photography's invention was the 18th century's crisis of knowledge. A crisis that intensified as the Enlightenment's new order built on the strength of reason both threatened the traditional understanding of nature based on theology and introduced a new understanding of the fragility of the human mind and the uncertainty of perception, and hence anxiety around the question, "How do we trust what we see? How can we be certain of what we know?"

If problems linked to the nature of knowledge drove the invention of photography, as soon as it was invented, photography split in a variety of practices sometime opposed to each others. Scientists forged ahead with using "objective" photography on one side, and artists coerced the medium for their own creative needs on the other. Thus, on its way to what it has become today, photography practices cancel or at least complicate the original intent; what some historians have perceived as photography's second invention.

This "second invention" of photography is one we can understand if we consider that the 18th century was not only characterized by Reason's reign but also by philosophical speculation, the popularization of science, and mass entertainments that together exposed a wide segment of urban society to the unsettling tension between truth and skepticism. My dissertation thus seeks to reconnect 19th-century photographic practices with photography's pre-history, which was also very much concerned with the question of how to apprehend the world of solid objects given a growing understanding of a reflexive subject.

Sommaire

La vulgarisation de la science au cours du dix-huitième siècle créa, vers la fin du siècle, une anxiété épistémologique qui toucha toute les couches de la population depuis les savants les plus instruits jusqu'aux paysans les plus pauvres, depuis les adeptes des équations différentielles jusqu'aux témoins des vols de montgolfières. Livres, magasines, écoles, salons privés, et démonstrations publiques contribuent à cette angoisse quasi-universelle. Vers la fin du siècle apparaissent des spectacles qui sont simultanément des expressions et des tentatives de remèdes à ce malaise. Parmi eux on citera la fantasmagorie, le panorama, et le diorama, tous associés à la photographie.

Dans cette thèse j'examine la montée progressive, au cours du dix-huitième siècle, d'un désir d'une représentation précise et véridique du monde naturel qui aboutira à l'invention de la photographie en 1839. Plutôt que considérer la photo comme l'inévitable résultat du progrès des sciences de l'optique et de la chimie je considère les conditions additionnelles nécessaires a l'invention de la photographie. Ces conditions incluent une crise de la connaissance qui s'amplifie au cours du 18ème siècle quand un ordre bâtit sur la solidité de la raison menace un système de connaissance de la nature fondé sur la théologie et introduit la notion de la fragilité de la pensée humaine et l'incertitude de l'observation ; ainsi une inquiétude s'attache aux questions, « pouvons-nous nous fier à ce que nous savons ? Comment être sûr de savoir ce que nous savons ?»

Mais dès lors de son invention, la photographie se fragmente en pratiques parfois opposées l'une à l'autre. Si, d'un coté, les scientifiques s'engagent dans la photographie «objective», de l'autre, les artistes détournent cette invention pour leur propres besoins créatifs. De ce fait la pratique de la photographie annule, ou au moins complique, son intention originale ; ce que certains historiens ont perçu comme la deuxième invention de la photographie.

Nous pouvons comprendre cette deuxième invention de la photographie si l'on considère que le 18ème siècle n'est pas seulement caractérisé par le règne de la Raison mais aussi par la spéculation philosophique, la vulgarisation des sciences, et les spectacles de masse qui se combinent pour exposer les questions concernant la vérité et le doute à un large segment de la population urbaine. Ainsi, le public du 19ème siècle devient très préoccupée par la question de la compréhension du monde physique. Ma thèse essaie de reconnecter la pratique de la photographie avec sa pré-histoire.

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Introduction

In an address to a joint session of the *Académie des Sciences* and *Académie des Beaux-Arts* held at the *Institut de France* on the 19th of August 1839, François Arago, speaking on behalf of Jacque-Louis-Mandé Daguerre introduced an eager international crowd of curious to the highly anticipated daguerreotype—one of the first practical photographic processes.[1] In his announcement Arago couldn't help but hint that the photographic process should have been discovered much earlier:

> Ces applications de la si curieuse propriété du chlorure d'argent, découverte par les anciens alchimistes, sembleraient devoir s'être présentées d'elles-mêmes et de bonne heure; mais ce n'est pas ainsi que procède l'esprit humain. Il nous faudra descendre jusqu'aux premières années du XIX_e siècle pour trouver les premières traces de l'art photographique.[2] (467)

It is probable that Arago understood "l'esprit humain" ("the human mind") to proceed according to his contemporaries' idea of the teleological, rather than contingent, evolution of human genius towards a remote but finite perfection.

The question of the timing of the invention of photography has been asked many times since, and the answer has been consistently vague and unsubstantiated. It is a question that comes easily even to the minimally informed when one learns that the photographic camera is identical in all aspects but one

1 It was a repeat of the presentation he did on July 3 of the same year in front of the Chambre des Députés.

2 "These applications of the very curious properties of silver chloride, discovered by the ancient alchemists, seem to have been presented of their own accord, and long ago; but this is not how the human mind proceeds. It will be necessary to refer to the first years of the 19th century to find the first traces of the photographic art."

(the use of sensitive material) to the *camera obscura*[3] that was commonly operated by artists and scientists in the three centuries preceding the invention of photography. As for the chemistry it doesn't involve any complicated or mysterious substance. The sensitivity of silver salt to light was well known even before chlorate of silver had been found in its natural state in the salt mines of Germany as early as the sixteenth century (Eder 22-24). The use of sodium thiosulfate[4] that dissolves the unexposed silver salt— Sir John Frederick William Herschel's discovery—followed by a thorough washing renders the photographic image permanent. But stabilizing the image so it can be seen in full daylight only requires a strong solution made with common table salt as both Talbot and Daguerre soon discovered[5] (Ware et al.; Daguerre 68).

Toward mid-twentieth century, in one of their many books on the history of photography, it was Alison and Helmut Gernsheim's turn to gloss over the timing of the invention of photography which, it seemed, was destined to remain a mystery:[6]

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3 According to Josef Maria Eder, the principle of the *camera obscura*, had been known since the antiquity. But it is Leonardo da Vinci who left us the first written description of what is commonly known as a pinhole camera (Eder 36,38).

4 It is still used to fix photographs in modern darkroom and is better known of photographer as hyposulfite or "hypo".

5 Larry Schaaf points out the distinction between stabilizing the image by rendering the unexposed silver chlorate ineffective with a salt bath as was Talbot's practice, and "fixing" it by dissolving the remaining silver chlorate in a bath of hyposulfite as recommended by Herschel (95). Talbot practiced stabilization with salt for some time even after he knew how to fix photographic images with thiosulfate. Talbot's photogenic drawing, stabilized with salt. are still held in the archives of the National Museum of Film and Television, in Bradford, England.

6 The Gernsheims' history seems to be deeply indebted to Josef Maria Eder's very thorough historical research.

> Considering that knowledge of the chemical as well as the optical principles of photography was fairly widespread following Schulze's experiments [1725]—which found its way not only into serious scientific treatises but also into popular books of amusing parlour tricks—the circumstances that photography was not invented earlier remains the greatest mystery in its history (Gernsheim and Gernsheim. *L.J.M. Daguerre; the History of the Diorama and the Daguerreotype*. New York: Dover Publications, 1968. 6).

The Gernsheims' quick dismissal suggests a lack of interest in a social history to the profit of a history based on the evolution of *techné*—a mix of art and technology—as it became more fashionable when photography made a timid and partial entrance in the Museum of Modern Art.

Closer to us, and bearing a more social look on the history of photography, Geoffrey Batchen introduces *Burning with Desire* by telling us of a letter Daguerre sent to Nicéphore Niépce in which the former expresses his eagerness to see the results of Niépce's experiments in producing a photographic image (Preface). Batchen points out that around 1839, at least three more inventors besides Daguerre demonstrated viable photographic processes. They were Henry Fox Talbot in collaboration with Sir John Hershel,[7] on the English speaking side

7 See Schaaf, Larry J. *Out of the Shadows : Herschel, Talbot & the Invention of Photography*. New Haven: Yale University Press, 1992.

of the Channel, and Hippolyte Bayard in France.[8] In addition Helmut Gernsheim mentions Lassaigne and Verignon claims that each was the inventor of a direct positive processes (69). Gernsheim even dedicates a whole chapter of *The Origins of Photography* to the "Other independent inventor of photography" listing many names that cross-reference with Pierre Harmant's list compiled for "Apropos: Anno Lucis 1839" (71). Besides their shared aspiration to be able to retain the images of the *camera obscura* the individuals mentioned have little in common. Daguerre was an artist, Talbot a scientist, and Bayard a bureaucrat at the ministry of finance, other claimants come from even more varied backgrounds and level of education. It seems that the burning desire expressed in Daguerre's 1828 letter was far from unique, which makes of such a longing a social phenomenon as much as an individual sentiment.[9]

Therefore, the absence of discourse prior to the early-nineteenth century, about "a burning desire" to see photographs, pointed out by Batchen, is

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8 Batchen citing Pierre Harmant's "Apropos:Anno Lucis 1839," unearths an even more extensive list of famous and forgotten names associated with some stage of the invention of a photographic process: Henry Brougham (England, 1794), Elizabeth Fulhame (England, 1794), Tom Wedgwood (England, c.1800), Anthony Carlisle (England, 1800), Humphry Davy (England, c.1800-2), Nicéphore and Claude Niépce (France, 1814), Samuel Morse (United States, 1821), Louis Daguerre (France, 1824), Eugéne Hubert (France, c. 1828), James Wattles (United States, 1828), Hercules Florence (France/Brazil, 1832), Richard Habersham (United States, 1832), Henry Talbot (England, 1833), Philipp Hoffmeister (Germany, 1834), Freidrick Gerber (Switzerland, 1836), John Draper (United States, 1836), Vernon Heath (England, 1837), Hyppolite Bayard (France, 1837), and José Ramos Zapetti (Spain, 1837((35).

9 The phenomenon of "duplicate inventions" as Robert King Merton calls them is not unique to photography. Merton invokes Engels and Marx in their assertion of the social origin of inventions; see note 28 p21 of Merton, Robert King. *The Sociology of Science : Theoretical and Empirical Investigations.* Chicago: University of Chicago Press, 1973. The occurrence of multiple simultaneous inventions is further discussed in chapter IV.

remarkable. Batchen, who uses the appearance of such a discourse as the early indication of the need to invent photography, defers to Michel Foucault's work, and in particular to the arguments developed in *The Order of Things* and *Power/Knowledge* to evince the period of epistemic uncertainty that seized the late-eighteenth and early-nineteenth centuries. Foucault maintains that the object of historic investigation should be the consequences of that shift rather than a search for its genesis. Therefore, for Batchen, the new knowledge system to which photography belongs, or is about to belong, remains autonomous of the preceding one. Rupture affected by desire or desire affected by rupture marks the boundary between the existence of photography and its absence despite the technical continuum elaborated by Eder and the evolution of the epistemological upheaval discussed in the present dissertation.

I do not subscribe to the notion of the sudden emergence of photography as Batchen seems to do, or of the long progress of science as Eder, but instead to the progressive build-up of the yearning for an accurate and truthful representation of the natural world. In this dissertation I pursue the argument that rather than the improved knowledge in the specific sciences of optics and chemistry the conditions of possibility of a discourse hinting at the feasibility of photography that led to its actual implementation was the consequence of the rise of the sciences of "man"—medicine, anthropology, psychology, and sociology. The epistemic crisis of the late-Enlightenment was expressed in the other crises that presented themselves during the same period notably that of gender and

identity that begin "the making of the modern self" (Wahrman). Ultimately, the eighteenth-century need for a new order built on the strength of reason, whether it was induced by philosophy, economy, politics, or all three, was being complicated by the scientific discoveries of the time, especially by a new understanding of the nature of human nature. The science of the age of reason concerned the individual as well as the whole of society. It revealed the fragility of the human mind and implied the social consequences of such. The knowledge of the uncertainty of knowledge threatened the traditional understanding of nature based on theology fostering scientific curiosity (as well as political instability). By the end of the eighteenth century, the contradiction revealed by the disclosure of a potentially chaotic human nature—which the Romantics embraced and set out to explore—set in opposition to the scientific (and political) requirement to rest reason and knowledge on a stable foundation demanded some kind of resolution. I contend that the longing for stability amid a crisis of reason generated within the scientific, cultural, and political fields led to the invention of photography as a response to that insecurity. Once released into the world, however, photography took a life of its own. The appearance of photography modified the very condition conducive to its invention. Invented as a means to explore environmental nature "objectively," photography turned to observing the subjective nature of society. Some historians of photography, such as Mary Warner Marien and Paul Brunet, for instance, see photography being "reinvented"—that is put to uses well beyond those foreseen by its original inventors—almost as soon as it became a widely adopted practice.

What I see as a reversal in combination with the outmoded search for scientific origin help to explain the ease with which historians were able to sever the pre-photographic history from the history of photography. This dissertation is an attempt to reconcile these two phases of history one with and one without photography.

Science, History, Philosophy, and Photography.

Paul Valérie on the occasion of a speech given on January 7, 1939, to celebrate photography's 100th anniversary, pointed out the coincidental decline of romanticism and concurrent rise of literary realism. Valérie was careful not to draw a cause and effect relationship between photography and realism; nevertheless by highlighting the parallel between the advent of photography and the progressive substitution of romanticism by realism at the very least Valérie brings to mind the notion of a trend conducive to the invention of photography. My investigation of photography begins in the 1600's, not in a futile attempt to find an origin (*à la* Eder) but because this century also marks the beginning of important developments in the aforementioned sciences of "man."

The reinvention of photography turns out to be in tune with Valérie's observation. It happens that the romantic and realist movements, not surprisingly, overlap precisely at the moment of the invention and rapid progress of photography—both in the technical and artistic domains. Photography, touted as both an art and a science, inherited its characteristics from both artistic movements at once. It is a set of characteristics particularly ostensible in the

history of photography in America, which itself is unambiguous in its relation to philosophy and social history. The desire to explore the interpenetration of the objective and subjective worlds is the hallmark of the romantic period and has remained a strong feature of photography long after romanticism ceased to be a consequential movement. The link between romanticism, realism, and photography is neither fortuitous nor one of cause and effect as Valérie rightly indicates throughout his discourse. Romanticism faded away, realism emerged, and photography was invented in the maelstrom of an ever evolving conception of the self and the other. My work is based on the analyses of several concurrent events: first the intellectual, then the scientific, and finally the social sources of a late-Enlightenment crisis of reason which confronted rationality with the viability of the human observer. Supported by qualitative and quantitative data on literacy, education, and publishing it is an examination of the rise of what Emile Durkheim, bringing together individual psychology and the organization of society, called "*une representation collective*": a belief shared across so many people that it ends up shaping the social environment in very concrete ways. Collective representations create or redefine institutions, traditions and even individual behavior. According to Durkheim, psychology and sociology are much closely associated than say, sociology and biology—the analogy that prompted him to develop the notion of *representations collectives*.

This encroaching of individual psychology and behavior into social dynamic is exactly the phenomenon which this dissertation examines. The

collective representations of the eighteenth century changed the social environment of an increasingly literate public's appreciation for science. It instigated the organization, or reorganization, of scientific associations from the most formal to the most casual, from scientific academies to public entertainment; and raised questions, never asked before, about the reliability of a human observer made of the very flesh that belongs to the natural order. Micheal Schudson reminds us in the introduction of *Discovering the news: A social history of American newspapers* that:

> Philosophy, the history of science, psychoanalysis, and the social sciences have taken great pains to demonstrate that human beings are cultural animals who know and see and hear the world through socially constructed filters. From the 1920s on, the idea that human beings individually and collectively construct the reality they deal with has held a central position in social thought. (6)

Schudson's social constructivism is not the only idea that informs the methodology used in this dissertation; but it is well-heeded as a warning to pay attention to a larger context, one that includes people (individually or in group), rather than a history limited to its most obvious manifestations, which in the case of photography are either the progress of the sciences of optic and chemistry or that of aesthetics. This dissertation is a cross between the history of ideas and social history; but what-it-is-not is a simple narrative of the human drama

troubling society during a narrowly defined period. Already in 1940 Arthur O. Lovejoy in an article published in the first issue of *The Journal of the History of Ideas* remarked that:

> The processes of the human mind, in the individual or the group, which manifest themselves in history, do not run in enclosed channels corresponding to the officially established divisions of university faculties; even where these processes, or their modes of expression, or the objects to which they are applied, are logically discriminable into fairly distinct types, they are in perpetual interplay. (4)

Schudson's and Lovejoy's observations if not my guides in writing this dissertation—they were discovered *a posteriory*—are, in combination, a fitting summary of my motivation.

Although it has been thoroughly examined in its quality of technological breakthrough (Eder; Gernsheim and Gernsheim *L.J.M. Daguerre; the History of the Diorama and the Daguerreotype*) the pre-history of photography has never been the object of a thorough cultural analysis. The many investigations into the technological genesis of photography conducted since the mid-1800s have masked the impact of the social and cultural driving forces that made of 1839 such a pivotal year. The twentieth-century push, initiated by Beaumont Newhall, for an aesthetic history of photography, while taking over from the technical aspect, further obscured the social factors and overemphasized photography as a

mode of artistic expression. The socio-cultural histories of photography that exist today find their source in the practice of photography and the viewing of photographs—*L'acte photographique* as Philippe Dubois describes it—and mostly ignore the influence of pre-photographic conditions. The "re-invention" of photography, that is from shortly after 1839 onward, is where art and social historians have staked their territory. It is a ground fertile with images which lend themselves to the in-depth analysis of photographs as cultural objects. But aesthetic and even social investigations of photography that take the late-nineteenth century as their point of departure do not place photography in its full historical context. It is Lovejoy again who cautions us that:

> It has even sometimes happened that a conception of major historic influence and importance has long gone unrecognized, because its various manifestations, the parts which make up the whole story, are so widely dispersed among different fields of historical study, that no specialist in any one of these fields became distinctly aware of it at all. Historiography, in short, for excellent practical reasons, is divided, but the historic process is not; and this discrepancy between the procedure and the subject-matter has tended, at best, to produce serious lacunae in the study of the history of man, and at worst, sheer errors and distortions. (4)

This work can be conceived as filling the historiographical lacunae left in between Eder's and Newhall's histories of photography. It is a gap that remained undisturbed, rather than repaired, by subsequent historians who have preferred to jump from the world of the *camera obscura* to that of the photographic camera without interrogating the transformation itself. Writing from his experience in the literary field, Lovejoy asserts that:

> Most contemporary historians of any national literature, for example, or of science or a particular science, recognize in principle—though many still recognize too little—that ideas derived from philosophical systems have had a wide, and sometimes a profound and decisive, influence upon the minds and the writings of the authors whose works they study; and they are constrained, therefore, to deal with these systems and to expound these ideas for their readers. (6)

Lovejoy's multiple appeals to transdisciplinarity do not seem to have been heard very loudly at the time of his writing. Fortunately today the incursion of historians into other disciplines has become *de rigueur*. More than a half-century after Lovejoy's article was published the crossing of disciplinary boundary has become acceptable and even recommended. My work calls upon some philosophers' writings, but it is not the product of some philosophical rumination about photography or a compilation of such. That would, indeed, be an exercise suitable

for a dissertation as, despite valiant attempts by Vilém Flusser, Henri Van Lier, Susan Sontag, and Roland Barthes, meditations on the nature of photography are few and far between. What those talented writers have been able to show is that, when concerned with philosophy, photography proves to be a vast and elusive topic. Therefore, my objective is not to elaborate a philosophy of photography or to attach one or an other philosophical system to the medium. As Paget Henry, who believes in a somewhat more involved role of philosophy than I do, writes "[p]hilosophy is embedded in the cultural system, which is a multi-discursive order for the production of knowledge and vision of existence" (131).

If I rely on eighteenth- and nineteenth-centuries philosophical writings it is not for their spiritual message or the concepts they develop, but because, like Henry, I believe that philosophy can be read as a summary of a given period's intellectual environment. I do not offer an exegesis of the work of the various philosophers I call upon: instead, I resolve to exploit their work mostly for their historiographical character. The work of philosophers advances the opportunity to build an intellectual skeleton which is fleshed out by some of the "low-brow" ideas and practices offered by their contemporaries.

Despite their respective attempts to put an end to the discourse of philosophy Immanuel Kant (1724-1804), Georg Wilhelm Friedrich Hegel (1770-1831), and Karl Marx (1818-1883) perpetuate the never-ending conversation of humankind about itself.[10] As Hegel himself saw fit to write: "It is just as absurd to think that a philosophy can transcend its contemporary world as it is to fancy that

10 For more on that topic see Rorty.

an individual can overlap his own age, jump over Rhodes" (xxviii). Already in a publication dated of 1752, Lord Bolingbroke reported to have read in Dionysius of Halicarnassus that "history is philosophy teaching by example" (14). I take that to mean that, conversely, the speculations of philosophy are also the writing of history.

Philosophy offers the added benefit of keeping a well documented history of itself—if not always accurate. Therefore, the philosophers I chose to turn to figure here not in their quality as concept creators but as people of their time, that is as the witnesses rather than perpetrators of a timely thought process. In the celebratory discourse cited above Valérie remarks as well that:

> [e]ntre celle-ci [photography] et la Philosophie, existent d'autres relations, très intimes et des plus anciennes. Les philosophes de tout temps, les théoriciens de la connaissance, comme les auteurs mystiques, ont montré une dilection bien remarquable pour les phénomènes les plus connus de l'optique, qu'ils ont si souvent exploités, – parfois de la manière la plus subtile, – pour figurer les relations de la conscience et de ses objets, ou décrire les illusions ou les illuminations de nos esprits. Il en demeure dans le langage plus d'un terme témoin. Nous parlons au figuré de *clarté*, de *réflexion*, de *spéculation*, de *lucidité* et d'*idées* ; et nous disposons de toute une rhétorique visuelle

> à l'usage de la pensée abstraite.[11] (94 emphasis in the original)

The language of philosophy and that of photography have much in common indeed, and to that litany of common words Valérie could have added the naming of Talbot's positive-negative process which is not, as some have argued, linked to the vocabulary of electricity but whose idea, I argue, originated in seventeenth-century British philosophy.

Larry Schaaf tells us that Herschel borrowed the terms negative and positive from the language of electricity (95). Geoffrey Batchen reiterates Schaaf's interpretation (155) while sustaining his thesis by expounding on the intersection between researches in photography and electromagnetism. Electricity, Batchen demonstrates, was a popular topic of investigation at the turn of the eighteenth and nineteenth centuries. But Batchen exposes only the circumstantial evidence that may have lead to the negative and positive monikers, and neither he, nor Schaaf, offer a quote from Herschel or Talbot that links the positive-negative denomination to electricity. Schaaf and Batchen advance a plausible explanation but in the absence of a clear indication that the electrical phenomenon was the inspiration for the naming process historians' options are limited to conjecture. Joining the fray, I would like to put forward a theory of my own.

11 "Between it [photography] and Philosophy are found other relations, more intimate and older. Philosophers in all time, theorists of knowledge and mystic writers alike, demonstrated a remarkable predilection for the most well known phenomena of optics, that they exploited often—sometime in the most subtle manner—to express the relation between consciousness and its objects, or describe the illusions or insights of our minds. More than one term has been left in language as a witness. We speak figuratively of brightness, reflection, speculation, lucidity, and ideas; and we use an entire visual rhetoric to express abstract thought."

Without contest, it is to Hershel that the naming of the negative-positive process is attributed. The words positive and negative to refer to electrical charges were in common use in the early-nineteenth century. And Herschel had employed those terms in a papers relevant to his experiments with electricity more than a decade-and-a-half before applying them to photography ("The Bakerian Lecture: On Certain Motions Produced in Fluid Conductors When Transmitting the Electric Current"). Concerning photography Herschel first mentioned the positive-negative designation publicly in a paper published in the *Philosophical Transactions* of the Royal Society in 1840 ("On the Chemical Action of the Rays of the Solar Spectrum on Preparations of Silver and Other Substances, Both Metallic and Non-Metallic, and on Some Photographic Processes"). However, just a year earlier, in a letter to Talbot dated from February 1839, Herschel used the words reverse and re-reverse despite his familiarity with the terms negative and positive (*Letter to W.H.F. Talbot*). In contrast, in a later communication Herschel wrote, “To avoid much circumlocution, it may be allowed me to employ the terms *positive* and *negative*, to express respectively, pictures in which the lights and shades are as in nature, or as in the original model, and in which they are the opposite, i.e. light representing shade, and shade light” ("On the Chemical Action of the Rays of the Solar Spectrum on Preparations of Silver and Other Substances, Both Metallic and Non-Metallic, and on Some Photographic Processes" 3 my emphasis). The terms negative and positive have the further benefit to avoid confusion with the notion of “reverse ” and “re-reverse” which was thereafter

exclusively used to indicate the left-to-right inversion of the image on a negative or in a daguerreotype, as in a mirror.

It turns out that Herschel's 1840 communication on photography is a closer evocation of one of John Locke's commentaries on everyday occurrences than of the state of electricity as the following passage from Locke's *An Essay Concerning Humane Understanding* indicates:

> [w]hether the shadow of a Man, though it consists of nothing but the absence of Light (and the more the absence of Light is, the more discernible is the shadow) does not, when a Man looks on it, cause as clear and positive an *Idea* in his mind, as a Man himself, though covered over with clear Sunshine? And the picture of a shadow, is a positive thing. (Book II, ch.VIII, §5)

The negative image of the shadow of a man in the physical world produces a positive image of a man in the mind of the observer. Locke goes so far—or so close to photography—as to describe knowledge and imagination like the images forming in the *camera obscura*.

> For, methinks, the understanding is not much unlike a closet wholly shut from light, with only some little openings left, to let in external visible resemblances, or *Ideas* of things without; which would they but stay there, and lie so orderly as to be found upon occasion, it would

> very much resemble the understanding of a Man, in reference to all Objects of sights, and the *Ideas* of them. (Book II, Ch.XI, §17)

Throughout his essay Locke uses the word "picture" more than thirty times, positive more than forty times, and negative eleven times to refer to either ideas or memories which indeed, like the pictures of the *camera obscura*, may linger for a while but, by nature, are fleeting and temporal. Unlike Descartes's strictly geometrical process of vision, Locke's depiction is that of a binary relationship similar to the structure of language. The shadow, a signifier, points to a sunlit man, the signified. The inside world reconstructs the outside world from the generic perceptual clue that is the featureless shadow. Thus the pictures that stand for the twin concepts of idea and memory are not just images or representations; they are elemental fragments of knowledge similar to the thought articulated by language.[12] I submit that Locke's words are more likely than electricity to have induced Herschel to qualify his and Talbot's process of negative and positive thus establishing at the onset a relation between photography and philosophy.

Finally I should mention Pierre Bourdieu's identification of one of the most generic connections between philosophy and photography:

> One might say of photography what Hegel said of philosophy: "No other art or science is subjected to this lasting degree of scorn, to the supposition that we are

12 Not only did Locke inspire the naming of the British photographic process but the passages quoted here hint at the affinity between photography and language as well. An affinity that will be made much of in the following centuries.

> masters of it without ado." Unlike more demanding activities such as drawing, painting or playing a musical instrument, unlike even going to museums or concerts, photography proposes neither academically communicated culture, nor the apprenticeship of the "profession" which confer their value on the cultural consumptions and practices ordinarily held to be the most noble, by withholding them from the man in the street. (5)

The absence of certification and the limited skill requirements of photography[13] are precisely what makes it such a flexible and quasi-universal instrument of exploration of the life-world even in the hands of the less literate. Thus the connection between photography and philosophy exhibits deeper roots than even the common meta-language Valérie's speech highlights. Daguerre's and Talbot's inventions bridge the world of solid objects with that of the reflexive subject.

This dissertation thus includes, but is not limited to, an examination of the relation between photography and philosophy. I have chosen to take for evidence of that relationship the works of philosophers, scientists, writers, and certain enterprising entertainers of the eighteenth and nineteenth centuries. Those represent, in my opinion, a spectrum of activities from the most theoretical to the most practical—activities that expose contradictions unsettling to almost everyone in contact with the energy of the city circa 1800.

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13 Kodak's motto "You press the button, we do the rest" has been the operating mode of amateur as well as commercial photography since the introduction of the Kodak #1 in 1888.

My method does not preclude some level of clarification of complex philosophical notions. I isolate from the sometime impenetrable thoughts of philosophers what, I believe, was the expression of a certain popular anxiety. I argue that some elements of the theories expounded by philosophers did find their expression in the popular realm, or maybe it was the other way around. It is not that theory generates practice—if anything I believe the reverse to be true—but that the thoughts of philosophers are no stranger to the thoughts of their more common contemporaries, just more elaborate, more concentrated, and fashioned by a discursive style specific to their discipline. The language of philosophy is an evolving one with changing terms and changing definitions. The historicity of philosophy's vocabulary, the transformation of meaning of the concepts philosophers invoke, belongs itself to the language of social history. For a long time philosophers have developed concepts to explain the essence of the relationship between humans and various definitions of nature. Among those concepts two in particular play pivotal roles in my analysis. Those two related concepts belong at once to the high order of philosophy and the low order of practical life: they fashion opposite sides of the same coin: they are truth and skepticism. My intent is not to explain the validity of those concepts but to point out their relevance to the invention and early practice of photography. It is the premise of this dissertation that the theories advanced by philosophers in writing —the way philosophers leave a trace—were concurrently and independently enacted in the larger urban community by making, collecting, manipulating,

displaying, and viewing photographs, and other images before photography became a reality. Photography, I maintain, in addition to being linked to scientific discoveries, technical progress, and taste, as it has been widely explained, is also the expression of series of historically situated philosophical problems articulated in philosophical theories and acted upon by common people.

Photography and the Written Word

Histories of photography that take Victorian literature as their object abound as the analyses of Jennifer GreenLewis, Gus Macdonald, Jennifer Tucker, Daniel Novak, and others testify. I do not intend to duplicate their investigative work. Instead I find my material in social history and in the writings of the three towering figures of philosophy whom I have already mentioned. Those celebrated authors were not the only philosophers of their time; their fellow intellectuals (whom I occasionally invoke) were similarly inspired by the events around them; they may even have been better writers, or have drawn different conclusions; many were easier to read and understand. Whether by some judgment they were right or wrong the philosophers I selected have left deep marks in the aesthetics, political, and economic theories that followed their own.

The mid-twentieth century idea that philosophy is a way to think apart from science or art (Deleuze et Guattari) was not shared by eighteenth- and nineteenth-century philosophers. Hegel did argue that philosophy required special skills and knowledge but but he also argued that there were means and even a necessity to share its reasoning with a wider public (125, 127). For my part, I

believe that philosophers, like everyone else, form, invent, or fabricate their concepts (Deleuze et Guattari 2) from what they see from the time and place where they live. I will argue that Kant's, Hegel's, and Marx's times belong to the history of photography for the mere fact that the idea of photography (and in Marx's case its practice) unfolded at the time when they formed their own ideas. Along with their concepts philosophers provide something that other type of literature rarely provides: an explicit discursive continuity mostly due to the elaborate critique of one's predecessor—in many ways a back-handed compliment.

Using the succession of transcendentalism, romanticism, idealism, and materialism[14] to sustain an argument about the invention of photography appears to be a stretch. But the three philosophers mentioned above, as well as their contemporaries, were most explicitly the philosophers of the dialogue between subjectivity and objectivity[15] however those concepts were understood by each of them. My goal is not to provide yet another interpretation of their works, but to use those works as written testimonies. I see philosophers as privileged observers of the intellectual prospects of a specific period. The period under scrutiny begins at the time when questioning the separation of the mind and the body became part

14 Not to mention rationalism, empiricism, and American transcendentalism. The succession of philosophical movements is actually more complicated than that when, as I will aim to do throughout my argument, we take into account the difference between German and American transcendentalism for instance, or the various national flavors of romanticism. Those subtleties are being taken into account throughout my argument.

15 "Objectivity" here and throughout the rest of this dissertation is taken in a broader sense that that given by Daston, Lorraine, and Peter Galison (*Objectivity*. New York, Cambridge, Mass.: Zone Books; Distributed by the MIT Press, 2007).

of the public debate; passes by the first attempts at creating tools designed with the intent of reconciling objective representation and subjective perception in the late eighteenth century; and ends shortly after the invention of photography, its subsequent reversal from an epistemological to an ontological instrument of inquiry, and its transformation (for better and for worse) from artisanal practice to industrial commodity.

I place the work of philosophers in parallel with the social events of the time not in a causal relation but as testimonies of the state of thought at a given time in history. None of the philosophers I depend on wrote specifically about photography (outside a handful of casual references in correspondence by Marx to family and friends)—although Marx could have since photography was a reality by 1839, when he was a young man of 21. Each of the bodies of work produced by those philosophers has an uncanny relation to the historical evolution of photography as a science, an art, a political instrument, or an economic force.

Problems and Opportunities of Technological Determinism

Technological determinism has plagued the history of photography from the very beginning. It is a line of thought that subsisted even after the development of the medium entered the domain of art history with Beaumont Newhall's catalog of the 1937 exhibition organized by the Museum of Contemporary Art in New York celebrating 100 years of photography (Museum of Modern Art (New York N.Y.) and Newhall). It has persisted in the work of Alison and Helmut Gernsheim (*The History of Photography from the Earliest Use of the*

Camera Obscura in the Eleventh Century up to 1914) and subsequent historians well into the 1980s. Histories of photography have long operated on the premise of technological (Eder), or techno-aesthetic determinism (Newhall).[16] Lately this approach has been mitigated by a more socially and culturally oriented history which propounds that our eye—that is our brain really—has been trained to see a certain way out of the habit of looking at photographs. This thinking once again suggests that technology determines our way of seeing. In reality the only evidence we have is that photography has taught us to represent differently. A famous example is Eadweard Muybridge's series of photographs of a galloping horse. One of those photographs shows all of the horses's hoofs off the ground at the moment they are retracted under the animal's stomach. This photograph is often put side by side with Gericault's *Course de Chevaux a Epsom, Le Derby en 1821,* which shows the horses with the hoofs off the ground but the legs extended outward. Muybridge's photograph proves without a doubt that Gericault was wrong. But, was the painter wrong on the basis of what he saw or what he represented? Neither Gericault nor Muybridge could see at what point the horse's legs weren't touching the ground. Those who quickly jump to the conclusion that Muybridge's photograph taught us to see differently are just using the evidence to suit the need of their argument.

The same could be said from the unusual angles that are the characteristics of some pictures produced from the mid-1800s to the 1930s, from the

16 More recently, politics (Brunet;Tagg), socio-economics (Freund), culture (Marien), and psychology (Batchen) have provided the frameworks for newer narratives of the history of photography.

Impressionist painters to the modernist photographers. Some of those pictures, such as Monet's *Boulevard des Capucines*, (1873), were drawn, or taken, from the upper floors of Parisian buildings looking down. The most audacious photograph, like Lazlo Moholy-Nagy's *From the Radio Tower, Berlin,*(1928), shows a view straight down from a vertiginous hight. Nadar is known for having taken aerial photographs from a hydrogen balloon as early as 1858 (Aber 39). In this last case iron works and lighter-than-air aerostats have as much to do as enabling technologies as photography. My point is that it is not photography in itself that makes us see from high or low but the multiplication of opportunities to represent the world from those points of view that makes us take notice of them. It is not that we didn't see from high or low before photography was a wide practice—there are enough medieval watch towers and Gothic churches to make that clear—it is that seeing from high became a mundane activity in the nineteenth century. Before that time, artists did not feel compelled to represent the world observed from what was then a points of view restricted to very few people; and the significance of a vast landscape was to display someone's property or show the location of an historical event—a battle or the signature of an important treaty. The confusion between teaching to see and teaching to represent brings us to discussing the enduring concept of "technological determinism" which closely parallels the argument that the invention of photography was principally the result of technological innovation rather than social dynamics.

In 1949 Leslie White, author of *The Science of Culture: A Study of Man and Civilization*, developed an exemplary argument in favor of technological determinism. In the following decades all manners of determinisms gave the word a bad connotation. But the demotion, even banning, of the word determinism did not prevent deterministic theories from flourishing until recently.[17]

Most of us evolve concurrently as consumers and producers of photographic images. The way our eye is being taught to see is the way we taught the camera to photograph. In other words the eye and the camera are in a dialectical relationship. Not only technological determinism privileges the camera side of this dynamic but it emphasizes photography's history from the camera rather than the human point of view. Granted, photography incites us to look for unusual angles instead of being stuck with the common view from human height. But most photographs are taken from a standard human height and the subject of most photographs is rather mundane. At different times elite groups did demonstrate the more sophisticated potential of photography as a means of representation but those celebrated groups, from the pictorialists to the postmodernists, make neither the bulk nor the "essence" of photography.[18]

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17 A 2005 reprint of the second edition (1969) of *The Science of Culture* is still available in paper back. And remains influential in the field of anthropology.

18 If any famous photographer is a representative of what photography may be for most casual practitioners it appears that Nan Golden fits the bill. Golden's favorite subject was her junky and drag-queen friends in the neo-bohemia of New York City, in the early 1980s. Although accomplished in their framing and choice of intimate moments, her photographs are technically straight forward—as far as I can tell she uses an electronic flash bouncing on the ceiling or a wall—their aesthetics is unpretentious much like that of most snapshots made by amateurs who just want a record of their friends' antics.

While arguing his vision of technological determinism, White provides us with a graphic description of what he considers to be the organization of the life-world:

> We may view social systems as a series of three horizontal strata: the technological layer at the bottom, the philosophical at the top, the sociological stratum in between... The technological system is basic and primary. Social systems are functions of technologies; and philosophies express technological forces and reflect social systems (366).

White's scheme caught my attention because it gives philosophy a significant place though in the wrong hierarchical order. The direction of White's dynamics goes from the technological base to the philosophical top. A more socially oriented analysis, one inspired by Jean-Jacques Rousseau or Karl Marx, for instance, would scramble White's scheme by putting the sociological stratum at the base, technology at the top, and philosophy in between. In this position philosophy is more of a mediator than the result of intellectual cogitations prompted by the social environment itself refashioned by technology as White sustains. White may be the most graphically explicit of the technological determinist alternatively Marshall McLuhan may be one of the most influential, in and out of academia.

McLuhan begins the introduction to the second edition of *Understanding Media The Extensions of Man*[19] with a discussion of the change of the meanings of the words "hot" and "cool." In that process McLuhan explains that slang, that is the language of the street, is a good indicator of the change in "human outlook" (viii). With this thought, McLuhan, despite his technological determinism, offers us the opportunity to notice that social predicaments do find expressions in popular culture. We will see in the course of this dissertation that the language of the street, at the juncture of the eighteenth and nineteenth centuries, expressing itself in a mix of utterances and spectacles, resonated loud and clear within the newly minted urban middle class. The hot and cool labels—oscillating between metaphors and physical states—when applied to media, as McLuhan endeavors in his popular book, are, rather simplistically, based on a limited aspect of the technological characteristic of a given medium; what Raymond Williams, McLuhan's most articulate critic, observes is a formal rather than a meaningful

19 One can read in a chapter of *Understanding Media* concerning photography that lenses were invented to turn the upside-down image forming in the *camera obscura* right-side up; this is factually incorrect. The lens does not turn the image so it can be seen properly as McLuhan states. Lenses were not invented to redress what McLuhan sees as a fault but to allow for a larger opening (larger diaphragm, or focal stop, in photographic parlance). Circa 1568, a Venetian nobleman, Daniel Barbaro. was the first person to use a biconvex lens instead of a small hole on the front on the camera allowing for more light to enter the dark chamber (Eder, Josef Maria. *History of Photography*. Trans. Edward Epstean. New York: Columbia University Press, 1945. 43). More than one hundred year later 1685, a German catholic priest, Johann Zahn, built a portable *camera obscura* sporting a lens and a 45 degree mirror projecting the image on a frosted glass mounted on top of the camera. This type of *camera obscura* was in common use among artists as an aid to drawing until the invention of photography. (Eder, Josef Maria. *History of Photography*. Trans. Edward Epstean. New York: Columbia University Press, 1945. 43). The mirror makes the image appear right-side up on the ground glass inserted on the top of the box-like camera. This arrangement is the same as that of modern medium format reflex cameras (i.e. Hasselblad, Mamya, Rolleiflex, etc.) used by professional photographers.

characteristic of media. McLuhan like White places technology (in his case the technologies of media) at the base of a pyramid that pertains to represent the organization of the life-world. Williams contradicts McLuhan technological determinism by arguing for content rather than form; and placing the substantial reality of social dynamics at the base of technological progress (Jones). In what can be considered an answer to McLuhan technological determinism, *Television: Technology and Cultural Form* first published in 1975, Williams examines not just the social impact of television (McLuhan's entire focus) but also the arising social need for television as well as the conditions necessary for its appearance as a means of communication. I contend that photographic technology was the expression of a philosophy itself issued from social interaction, and collective desires and worries—a domain explored by Williams in his study of television. All things much closer to the human experience and its accompanying metaphysical speculations than technology alone will ever be. Without necessarily adopting political undertones this dissertation makes an argument in favor of the alternative order mentioned above.

The evidence seems to indicate that, in the eighteenth century, the social, philosophical, and scientific fields enjoyed a much closer relationship than they do today. It is important to remember that this was an age of reflexion, including self-reflexion, which put a premium on rationality. It is not so far fetched to think that the eighteenth-century relation between society and philosophy—as much as philosophy was then preoccupied with explaining nature—was very similar to

today's relation between society and technology. I am not suggesting that philosophy is the agent of the development of technology but simply that technology is, among other things, the concrete expression of metaphysical and abstract anxieties that happen to be revealed first in the social order then (or concurrently) in philosophical writing, and finally in the products of technology. Technological determinism highlights the after-effects of technology while it neglects its prior-motivations. I do not advocate a switch from the extreme of technological determinism to that of idealism, but I wish to give self-reflection some credit in the making of the human environment, at least in the cases of the invention and subsequent practice of photography.

Social dynamics are animated by the ever changing relationships of humans with nature, including social and human natures. Beyond the political economy that defines class hierarchy, the social order, I believe, is motivated by the more personal understanding of the relation of Self to Other. Human relationships are dissected in all types of literature whether fiction, philosophy, psychoanalysis, or science; but they also find expression outside the written or spoken word, notably in the visual media and technology that occupy us here. I do not pretend to be speaking for all technologies and all media I will only argue about the invention and early uses of photography. And my argument will be that photography went through several periods of invention each tailored as a response to a series of philosophical problems. First photography was a technical invention that pertained to bypass human subjectivity in order to discern the factuality of

nature. As soon as it was released to the public, it began to test the two dominant conceptions of truth—one of scientific objectivity, the other of artistic subjectivity—setting in motion a series of reinventions of photography up to photography as we know it today. Photography which was later used to inquire into human (as the collaboration of Charcot and Duchenne de Boulogne, and the resulting photographs of the insane of the Salpetriere most clearly testifies) was first turned towards the ground that included both flesh and spirit—the series of photographs of the people in the fishing village of Newheaven by David Octavius Hill and Robert Adamson was taken in the early-1840s. This ground was the very human society which demanded the impartial observer it thought photography personified.

From epistemological assistant photography was transformed into to an ontological device used to figure out what modern life could possibly be about. It is a move that we can see as a reversal of the motive for the invention of photography. This transformation was mirrored by the evolution of philosophy as well. We can find its progression in the words of Descartes, Locke, Hume, Rousseau, Diderot (more of a literary figure than a philosopher), Kant, Hegel, and Marx to only mention those who provide the most convincing theories to this study. This study also considers the works of other figures important in their time, but almost forgotten today, among them, De la Mettrie, d'Holbach, Helvetius, Cabanis, and others. The parallel development of photography and philosophy is

more than a coincidence; it is the evidence that the spiritual has a way of becoming the physical and vice-versa.

Chapter I is an introduction to the recognition of the fundamental problem of the dissociation of self and other and one of its earlier and most enduring expression: the separation of the mind from the body. It is a concept which, following the seventeenth century, had to submit to increasingly pressing questioning. This initial chapter examines the causes and the consequences of the slow secularization of society due the progress of medicine and other sciences. I rely on the writing of some of the most popular philosopher at the time, René Descartes and John Locke in particular, and on some "state-of-the-art" medical findings of the seventeenth and early-eighteenth centuries. Those writing and findings, in one form or the other, were well publicized and left a deep mark on the social elite of their time. Urbanization, industrialization, and the rise of a middle class brought the scientific and philosophical problems raised by the elite to the heart of a public sphere in formation (Habermas; Wood).

In chapter II I examine the mechanism of the popularization of science which paradoxically created more uncertainty about the reliability of the human observer in a public increasingly fascinated by the exploration of the natural world. Printing presses throughout Europe were busy producing a wide array of scientific literature; from books and periodical addressing specialists to publications of scientific popularization geared to groups of men and women amateur scientists all over Europe. From public lectures to private salons, a

variety of social networks catered to the curiosity of an upper- and middle-class educated public. The historical vogue for science has been well documented by researchers who surveyed private libraries and official records dating from the eighteenth century. It is my contention that new scientific discoveries, such as electricity and the anatomy of the nervous system, broadcasted by the popular scientific literature, participated in the destabilization of a traditional system of knowledge—based on religion—that revealed itself to be wholly inadequate to explain the nascent modern world. Searching for a reliable foundation of knowledge professional and amateur scientists alike turned toward the truth of nature. These subtle social pressures inspired philosophers to devise theories that expressed a new understanding of the gap between mind and body while some clever enterprisers devised public spectacles—discussed in the following chapter —designed to address the anxiety caused by a new understanding of the place of humans within nature.

Chapter III includes a summary of the most influential philosophical though of the seventeenth through the nineteenth-centuries. While some time difficult to understand and subject to interpretation, philosophy, I believe, devotes itself to explaining, in its specialized language, the dominant mind-set of a given period of history. This chapter is, in many ways, an examination of the evolution of theories—exemplified by cogitations on aesthetics, for instance—that are reflected in the visual practices of a given period of history. I proceed by discussing a series of visual spectacles— phantasmagoria, panorama painting, and

diorama—that aimed to intervene in the crisis of the reliability of knowledge by masking the subjectivity of the artist in order to focus the attention of the spectator on the truth of nature. Panorama paintings, phantasmagorias, and dioramas have a long acknowledged historical relation to photographic and cinematic media for their common visual character. The title of Stephan Oettermann's thorough investigation of panorama paintings, *The Panorama: History of a Mass Medium,* indicates that there was more to that phenomenon than its appeal to the eye. Offering different thrills, but similarly ocular-centric, the phantasmagoria and the diorama fulfilled functions that were complimentary to those of the panorama. I explore these and other forms of popular "edutainment" that flourished circa 1800. I consider intermediary steps in the quest to invent photography, not because of any technical resemblance but because they thrive to accomplish the same epistemic function for which photography was invented.

In Chapter IV I focus on the moment of the discovery of photography and the discourse surrounding it. I examine the reception of the medium in America for its special status as a new artistic practice free of European tradition, a symbol of democratic truth, and an instrument in the shaping of the American society. I discuss the genesis of photography as the quintessential American art. The history of photography in America is archetypal of its evolving relation with philosophy, the economy and politics worldwide.

I conclude by paying special attention to the stealth transformation of photography from an artisanal practice to industrial commodity engineered by

American entrepreneurs. I maintain that this last transformation can be considered as yet a third invention of photography. I show how, after a period of aestheticizing, photography seems to be returning to its immediate post-invention roots.

Arago's presentation of the Daguerrotype to the public serves as the hinge that articulates the prehistory and the history of photography. Arago's introduction already contains much of what defines photography. Arago's anticipation of the many scientific applications of photography combined with its drawing like appearances prompted him to describe the medium as at once an art and a science. Indeed photography generated a scientific discourse as well as a virulent artistic debate from the onset, but beyond verbal rhetoric it was also put to use by enterprising practitioners in a series of fads that reveal a wealth of hidden meanings. Along with the fashions cited above, photographic fads include the mid-1800s passion for the photographic carte-de-visite, the stereograph, the stereoscope, the obsession with war photography, the longevity of the daguerreotype technology in North America, and composite photographs. Photographic vogues have been investigated as social phenomena moved by a less cultured public in search of novelty. But the various crazes sparked by those early applications of photographic processes signify more than a general enthusiasm for a new activity. I endeavor to demonstrate that those collective manias were the displaced articulations of a search for meaning rather than just the enterprising exploitation of a new technique of representation by some astute entrepreneurs. If

the invention of photography can be described in technical terms once ushered into the social flow by an imaginative public photography demonstrated early its potential for continuous reinvention. The interpretation of photography by a variety of practitioners makes it difficult if not impossible to conceive of a unified definition and a single philosophy of photography. However, the study of this interpretive medium makes it easier to research the connection between a number of cultural practices and the social order.

Chapter One

Body, Soul, and Other Problems

In the seventeenth century, the question of the mortal body link to the immaterial and eternal soul was debated in increasing large circles of interested observers as it touched religion, science, and politics. The discussion at first was mostly limited to the states of the body and that of the soul after death and before judgment day. Did the soul die with the body to be resurrected as a pair on the final day? Or did the soul wait somewhere for the body to be resurrected? What shape would the body be at the time of resurrection? Those are some of the questions that filled the speculations of the day. These various discussions had in common the acknowledgement of a gap between mind and body, believed then to be two different kinds of substances—one flesh, the other spirit. The dualism of mind and body reduced by too crude a science and philosophy to a simple problem of mixing substances would show itself to be more intractable than previously imagined. During the following century, in a time describing itself as the age of reason, the debate would slowly drift toward questions concerning the influence of the mind hosted by the living flesh and vice-versa (Porter). This conversation was encouraged by new discoveries in medicine and physics.

The mind-body dualism first articulated by Plato is still active in today's popular imagination. It is best expressed by the famous dictum which peppers René Descartes's (1596-1650) writings: "*Je pense donc je suis*". Whether it perpetuates a myth or a reality, the common-sense attribute of Descartes's dualist construction may account for its persistence. Had it been uttered in the age of

radio and television, Descartes' *mot juste* would have qualified as a clever sound bite. Although stripped of its metaphysical meaning—we do not believe in the notion of two separate substances anymore, one spiritual the other physical[20]—Descartes' enduring pronouncement is still the symbol of a separation of the mind from the body.[21] But the gap between mind and body for which Descartes is thought to have found an elegant and definitive definition would appear increasingly narrower as the eighteenth century progressed. By the end of the Enlightenment, the progressive tightening of the mind to the body generated a crisis of the reliability of knowledge whose solution, it was believed, called for the erasure of a potentially flawed subject.

Descartes did insist that the mind, or soul—those terms were then interchangeable—was not a physical entity but recognized that one could have an effect on the other. While Descartes first addressed the problem in his *Sixth Meditation* a few years later, he returned to it in his correspondence with Princess Elizabeth. In his May 28, 1643, letter to the Princess, Descartes insisted that "For there are two things about the human soul on which all the knowledge we can have of its nature depends one of which is that it thinks, and the other is that, being united to the body, it can act on and be acted upon by it" (Elisabeth, Shapiro

20 The character of the material substance was easy enough to define by its extensions, that is its weight, volume, shape, and movement, all things quantifiable; but it was questionable whether or not spiritual substance was extended.

21 An example of the endurance of Descartes is the 1982 science fiction film directed by Ridley Scott,*Blade Runner.* In this film the "replicant" Pris (Daryl Hannah) is fond of quoting Descartes "I think therefore I am" to J.F. Sebastian (William Sanderson). In addition, the name of the main protagonist, played by Harrison Ford, is Rick Deckard (suspiciously close to René Descartes own name).

and Descartes 63). In his next letter to the Princess Descartes admitted that to think of the union of the soul with the body was to think of the soul as material and immaterial at the same time: “I ought to have made clear that, even though one might want to conceive of the soul as material (which, strictly speaking, is what is to conceive its union with the body), one would not cease to know, after that, that the soul is separable from it” (Elisabeth, Shapiro and Descartes 69).

Thus, the Cartesian dualism of utterly dissimilar substances—spirit vs. flesh—nevertheless made manifest the interdependence of mind and body, notwithstanding Descartes's own confusion and inconsistency in describing the body-mind relation. Descartes’s dualism was a reorganization of the life-world from the vertical, hierarchical structure Aristotle proposed of a multi-plane soul to a simpler two-plane configuration: *res extansa* and *res cogitans*—“the one mechanical and the other spiritual” (Oliver W. Holmes 383). Descartes isolated thinking from all other functions which remained the province of the body. Cartesian dualism purified the soul of all the activities that could be attributed to the body including perception, but it made clear nevertheless that one depended on the other and vice-versa. The Cartesian dualism was (still is) a popular concept not because it was new but because it was expressed in simple categorical terms that still make sense today. Descartes may not have been at the origin of the idea of a mind distinct from the body but his pronouncements participated to the beginning of a particular way of thinking about the self and its relation to nature. Most importantly, in Sylvana Tomaselli's words, “ [D]escartes may be said to

have posed the self as the rock on which reason would build philosophy. Philosophy being then, if not now, a critical practice aimed at edification, he implicitly posed the self as a problem, as epistemological and an ontological problem" (196). Rather than making the split between mind and body a sure thing Descartes took a step toward their integration, integration which less than a century later proved so problematic for so many people. Fortunately, at the beginning of the nineteenth century, the interpretation of the epistemological-ontological problem would have the felicitous consequence of photography's invention.

Shortly after the Descartes decades, in the name of bringing the human flesh closer to the divine, Thomas Willis (1621-1675)—medical doctor, professor of natural philosophy at Oxford, and anatomist of the brain—devised his own theory of the composition of the soul. For Willis as for Plato, Aristotle, and their scholastic successors up to Descartes, the soul was made of multiple parts: the vital and sensitive soul together making the animal soul, principle of life, found in both human and animals, and the rational soul that only humans possessed (O'Connor 142; Frank 130). But Willis's motivation for the fragmentation, in opposition to Descartes's unification, of the soul seems to have been of an ambiguous nature despite some materialistic tendency. As an anatomist familiar with brain pathology, and as a medical practitioner, Willis knew that many of the body's ailments begin in the brain, presumed site of the soul. For Willis, hysteria, for instance, affecting men as well as women, originated in the nervous system

rather than in the uterus (Frank 133-34). As a devout churchman Willis couldn't accommodate the thought that the immutable, immortal Christian soul could be subjected to the vagaries of the body. Hence a two-partite soul made of a fragile element linked to the body as well as an immortal divine one (Frank 131). As Frank explains:

> [W]illis systematically attempted to convert diseases that had long been thought to be caused by the blood, viscera, or even supernatural agents, into diseases of the nervous system. Hysteria, hypochondria, headaches, lethargy, somnolence, coma, nightmare, vertigo, apoplexy, paralysis, delirium, phrenzy, melancholy, mania, foolishness, epilepsy and a wide array of convulsive diseases, even gout, scurvy, and colic—all were seen by Willis as diseases of the nervous system (141) .

In Willis's system, the rational soul could come under the influence of the animal soul; thus, albeit indirectly, the rational soul could be affected by the state of the body.

A 1669 French book pertaining to medical instruction summarizes Willis's and other medical doctors' beliefs:

> L'Esprit ou l'ame êt le sujet de la partie de Philosophie qu'on apéle Teologie naturéle. Ici c'êt asses d'en aprendre deus choses: l'une que l'Esprit à parler proprement n'êt

> jamais malade , & que toûjours il raisone en la méme façon, & toûjours conforment a ses conéssances , ou ses perceptions. Mais parcequ'ils les a à l'ocasion du côrs , quelquefois mal disposé & malade, il semble mal dispoé ou malade lui-méme. On en voit des exemples dans les insensés , dont le cerveau & non pas l'ame , êt autrement qu'il ne fadroit. Car enfin , je croi qu'un fol qui a dans la tête une fausse impresion de la Roiauté , ou de la divinité qu'il s'atribuë , raisone sagement de comander que châcun soit dans le respect & dans le devoir. Ainsi son mal ne consiste pas au discours qui vient de l' Esprit, il consiste en l'impression qui ne dépend que du cors.[22] (de Rouvière et al. 43-44)

Despite Willis's and his peers' Christian belief, the rationalization of the link between body and mind promoted what Weber later qualified of the disenchantment of the world (Weber and Swedberg). It was the erasure of the magic of life that Geneviéve Bolléme—who nevertheless insists on the permanence of a certain belief in the marvelous— finds parsed throughout the

22 "The Spirit or soul is the subject of the part of Philosophy called natural Theology. It's enough to learn two things: one is that the Spirit properly named is never sick, and that it always reasons in the same manner, and always in accordance with its knowledge, or its perceptions. But because they are [knowledge and perceptions] depending on the body sometime indisposed and sick, it seems indisposed or sick itself. One sees some examples in the insane, of whom the brain and not the soul, is abnormal. Because, I believe that a fool who has, in his head, a false sense of royalty, or of divinity that he gives to himself, gives the wise command that everyone be respectful and loyal. In consequence his sickness is not made up of a discourse that comes from the Spirit, it is made up of a perception that only relies on the body."

eighteenth-century popular literature (88). Unwillingly, Willis was Descartes' companion in a century-long march toward narrowing the gap separating the mind from the body. It is a conflation that will authorize the Romantic nineteenth century to endow nature with a mind often identical to that of humans. The association of Romanticism with Willis comes via the philosophy of Jean-Jacques Rousseau.

> Romanticism, for Rousseau, grew out of a revolutionary philosophical and scientific approach to mind, emphasizing its interrelatedness with the body through the nervous system and giving nearly unprecedented importance to the brain (and not a disembodied spirit) as the seat of thought. [...] The idealizing tendencies of certain Romantic-era authors and texts exist in a dynamic state of tension with opposing tendencies that locate the mind in the body and the thinking principle in the brain, anti-dualistic in tenor and materialist in implication. (Richardson 4)

As Richardson's quote indicates the narrowing of the gap between mind and body initiated by Willis wouldn't be contained in the domain of medicine but had far reaching consequences in the fields of philosophy, politics, science, and art.

The Secularization of the Soul and the Rise of Materialism

John Locke (1632-1704) had been one of Willis's students at Oxford in the mid-1600s. In Locke's famous *Essay Concerning Human Understanding* the

tearing apart of the soul begins with the determination of what is useful versus what is useless thinking. Dreams are classified as the intimate thinking of the soul alone but can seldom if at all be remembered, and what can be remembered is often irrational and has no impact on the body. The soul may think then, but it is a useless thinking. On the contrary, useful thinking is that of the self-conscious man when fully awake; it is thinking that leaves its trace on the body in the form of memories that can be recalled when necessary. For Locke the thinking process goes something like this: the body receives sensations which in turn provokes thinking whose result is stored in memory which may be called back and further associated with other ideas (43-44). By the time Locke wrote *An Essay* most natural philosophers acknowledged that for its nervous connections to the brain, sense perception was a corporeal function. Intellection, that is the formation of ideas—a concept with its own history[23]—and knowledge however happened in the immaterial mind in which ideas formed as a consequence of sensory perception. Descartes, Locke, and others borrowed the Platonic metaphor of a seal stamping soft wax to explain the process of retaining a memory. To further establish the relation between the body's sensorial apparatus and the mind, Locke used another connection, that between perception and the immaterial phenomenon of generating ideas: “To ask, *at what time a Man has first any* Ideas, is to ask, when he begins to perceive, having *Ideas* and Perception being the same thing” (39 emphasis in the original). But Locke was even more explicit when he

23 See Emily Michael and Fred S. Michael, "Corporeal Ideas in Seventeenth-Century Psychology," Journal of the History of Ideas 50.1 (1989): 8.

suggested later in the *Essay* that it was possible, although we can't be sure, that God gave matter the power of thinking (270). Locke's uncompromising empiricism brought the immaterial mind ever closer to corporeality, while his notion of the useless versus useful thinking of the soul took a decisive step toward the expansion of the notion of self-consciousness in which Hegel founded his philosophy. The materiality of the thinking process was a suggestion that was vigorously debated to the end of the eighteenth century.

Against Locke's insinuation were the immaterialists who believed in the impenetrability, passivity, and inertia of matter and the parallel existence of an immaterial and immortal substance of the soul distinct from the worldly substance of the flesh. God was the force behind all that was active and this force was not material. For the immaterialists, the danger presented by a theory of thinking matter was that it turned human beings in no more than clockwork mechanisms devoid of free will and sentiment. Among the immaterialists were those who believed matter to be porous as to accommodate the intermixing of two completely different substances—matter and spirit. Thus matter, inert but porous, could receive an impetus from the spiritual forces residing in its pores. Matter itself existed in very small quantity; most of the world was in fact made of empty space. Those denied the possibility of vacuum and concurred with the Newtonian concept of forces transmitted from body to body by a subtle fluid. Despite their immaterialist stance, those advocates opened the door to a new definition of matter. Rather than being made of solid, impenetrable particulates, matter became

an arrangement of forces—mostly attraction and repulsion. This new kind of materialism put forward a theory inspired by Newton's theory of gravitation and certain Newtonian extrapolations of the notion of force at a distance. Its most famous promoter was the renown scientist and theologian Joseph Priestley (Yolton 109). Notwithstanding Priestley's explanations and the denials of some of his thesis' proponents, it was a theory that made it easier to dispense with the spiritual component of the soul. In the introductory essay of his re-edition of *Hartley's Theory of the Human Mind*, Priestley wrote:

> I am rather inclined to think that, though the subject is beyond our comprehension at present, man does not consist of two principles, so essentially different from one another as *matter* and *spirit*, […] I rather think that the whole man is of some *uniform composition*, and that the property of *perception*, as well as the other powers that are termed *mental*, is the result (whether necessary or not) of such an organical structure as that of the brain. (*Hartley's Theory of the Human Mind* xx emphasis in the original)

A couple of years later, Priestley admitted to have been surprised by the negative reaction elicited by such an assertion; he was especially dismayed by the questioning of his religious credentials. Nevertheless, Priestley forged ahead, further exposing his theory in his *Disquisitions Relating to Matter and Spirit* where he reaffirmed that "[w]e could not but have concluded, that in man it [the

seat of thought] is a property of the *nervous system*, or rather of the *brain.*" As proof of his contention, Priestley continues in affirming that "There is no instance of any man retaining the faculty of thinking, when his brain was destroyed…" (*Disquisitions Relating to Matter and Spirit* 47, emphasis in the original).

Out of the many opponents to Priestley's thesis, John W. Yolton cites the following defenders of immateriality and the date of their diatribe, Humphrey Ditton (1714), Samuel Colliber (1718), John Clarke (1723), Andrew Baxter (1733, 1750), Thomas Morgan (1741), Robert Clayton (1750), William Porterfield (1759), Richard Price (1766), and a 1760 anonymous tract asserting the inertness of matter (94-99). The battle between the immaterialist and materialists unfolded in books and periodicals which reached the literate public at large. Yolton tells us that "The attacks on Priestley began in 1775 in the pages of the *London Review,*" a journal which published reviews of philosophical and medical books judged important at the time (115). The reviewer himself was rather positive about Priestley's work but his readers were soon to contest the famous scientist's theory in their letters to the publisher. The *Monthly Review*, a competitor to the *London Review*—accused to be biased toward Priestley—defended the opposition's side. The interest communicated by those two journals testifies to the reach of the debate throughout the reading public (Yolton 117-18) and of the extension of the Habermassian public sphere to the domain of science. As well as deliberating the particulars of the problem—can matter think?—it was a discussion that occasioned grand declarations on philosophy and science that shaped, in the mind

of the educated section of the public at least, the notion of a vast system of nature. Appeals to the works of famous scientists and philosophers past and present—Locke, Kepler, Newton, Wollaston, etc.—lent that much more credibility to the various injunctions affirming this or that principle of philosophy or science. The controversy that began with Priestly—not to discount Hobbes's and Spinoza's materialism—lasted well into the end of the eighteenth century.

On the continental side, earlier in the century, Julien Offray de La Mettrie explored a form of mechanical vitalism that rejected Descartes's substantial dualism and prompted its share of scandals and misery for its advocate. Mostly known for *L'homme machine* published in 1748, while he was in exile in Holland, de la Mettrie's problems began earlier in France, with the publication of *L'histoire naturelle de l'âme,* in 1745, while in the service of the Duke of Gramond (Lange 370). In *L'histoire naturelle de l'âme* de la Mettrie takes Locke's concept of *tabula rasa* one step farther: it is not education that makes humans what they are but the senses. The soul, that life principle, is simply shaped by the body. De la Mettrie writes: "1º Point d'éducation, point d'idées. 2º Point de sens, point d'idées. 3º Moins on a de sens, moins on a d'idées"[24] (*L'histoire Naturelle de L'âme* 392). It was a reversal of the Cartesian principle of "I think therefore I am," a reversal already explicitly conveyed by Voltaire in his *Lettres philosophiques* when he wrote, in 1734, "Je suis corps et je pense" ("I am flesh and I think") (Beuchot 182). *L'histoire naturelle de l'âme* was the materialist pioneering work

24 "1º No education, no ideas. 2º No senses, no ideas. 3º The less senses we have, the less ideas we have."

that earned de la Mettrie exile in Holland where he promptly started writing *L'homme machine* that subsequently forced him to leave Leyden for Berlin. Thus materialists ideas were not just confined to Great Britain where they found a strong foothold (Locke and then Priestley unwillingly being their proponents) but also had an early start in the rest of Europe. De la Mettrie's work triggered a flood of protestations that were expressed through the periodicals of the time and in several books of rebuttal. No one took a position in favor of de la Mettrie openly but the mild critique his work was subjected to in periodicals, as opposed to the overreaction of the authorities, seems to demonstrate that his theory may not have been so repulsive to many of his contemporaries. Rather, what precipitated his downfall was the promotion of the sexual license implied by his proposition of a sensual-driven human beings.

Despite de la Mettrie's ill reputation, the cause of materialism kept progressing in France and elsewhere in Europe. Representative of materialism were numerous and of a high intellectual stature in the society of their time, which did not shield them from political persecution. In France, Diderot was imprisoned at Vincenne, Voltaire at La Bastille—and later had to seek refuge in England for more than two years then to Geneva after a dispute with Frederick the Great in Postdam, where he had been invited. Descartes', de la Mettrie's, Voltaire's, and others' peripateticism, whether forced or voluntary, meant that the controversies each elicited found audiences to scandalize almost everywhere in Europe and caused much ink to flow across borders. The victimization of intellectuals at the

hands of one European royalty heightened the awareness and interest of another. An enlightened monarch in one country would extend his/her protection to the disgraced philosophers of another, thus creating a sort of international intellectual economy. And, as Lange puts it after describing the reaction to materialism in Germany, "Malgré toutes les réfutations faites par des hommes compétents, le matérialisme continuait à vivre et peut-être gagnait-il d'autant plus de terrain qu'il se constituait en système d'une manière moins exclusive"[25] (442). The controversy of materialism versus immaterialism initiated the epistemic uncertainty that would be enhanced by further scientific discoveries as the seventeenth and eighteenth centuries unfolded, ultimately participating in the creation of the conditions of possibility for photography's invention.

Madness and the Civilizing Process

The mechanistic conception of the body in favor in the late seventeenth and eighteenth centuries raised more issues especially in the areas of trustworthiness and dependability that photography' invention would hope to resolve. Cartesian dualism participated in the destabilization of empiricist and rationalist understandings as much as it undergirded them. By the dawn of the Enlightenment, the connection between mind and body suggested by natural philosophers was further confirmed by doctors and physiologists. A little more than a hundred years after Descartes' declaration, circa 1749, David Hartley, physician and philosopher, could acknowledge the interpenetration of mind and

25 "Despite all the denial coming from competent men, materialism continued to live and maybe won that much more ground that it made itself a less exclusive system."

body in the first chapter of his major contribution to medical science, *Observations on Man, His Frame, His Duty, and His Expectations*—chapter which he titled, "Observations on the frame of the human body and mind, and their mutual connections and influences" (1). Despite Hartley's observations, the belief that the ills of the body had limited effects on the functioning of the mind lasted almost to the end of the eighteenth century, but with a twist. Madness, which in the early 1700s was considered to be an affliction of the body that could be cured by doctors' pharmacopeia, by the end of the century had retrieved its semi-autonomy as a thing-in-itself (Porter 314-16).

Foucault's *Madness and Civilization*, a study of the changing definition and treatment of madness from the Renaissance to Modernity, provides a thorough explanation of the transformations of the relation of human with nature and the conception of the self. Foucault's description of the evolution of how madness was reckoned with can serve as a roadmap of the development of the late eighteenth-century epistemic crisis. Foucault sees the "evolution of the theme [of madness], in three stages: 1) a dynamics of organic and moral penetration; 2) a physiology of corporeal continuity; 3) an ethic of nervous sensibility" (146). It is a taxonomy that echoes that proposed in 1798 by Alexander Crichton. In his *Inquiry into the Nature and Origin of Mental Derangement*, Crichton writes "I make four classes of causes [of mental illness]. 1st, Physical or corporeal causes; 2dly, over-exertion of the mental faculties; 3dly, A disproportionate activity of some of said faculties; and lastly, The passions, or their influence" (xiii).[26] While

26 By the time he wrote, Crichton still hanged onto the tenacious but doubtful notion of

he defined the states of mental illness, Crichton also specified the path toward mental imbalance, a path so broad that it could affect just about anyone. The "ethic of nervous sensibility," which specifies the domain of madness in Foucauldian terms, transcends the problem of mental afflictions; it is a sign of the eighteenth-century increased anxiety about the human subjective makeup. The eighteenth-century understanding of madness as a form of out-of-control passions suggests a continuum from composure to insanity. The Lockean conception of madness came back to haunt society. As Porter puts it, "If, as Locke argued, right thinking hinged on something so potentially tenuous as habitual associations of ideas composed of atomized sensations, then wrong thinking lay but a step away, in their mismatch" (298). In extreme cases where symptoms are evident, even to the untrained eye, recognizing madness is, as we say today "a no-brainer," but in the more subtle case of scientific investigation, for instance, the questions arise: How are we to judge? Where does the truth lie? Is the observer absolutely reliable? Fortunately, Crichton suggests a solution. In criticizing the work of Dr. Arnold, one of his predecessors, Crichton, after enumerating Arnold's "various species of Notional Insanity," writes "But I would observe, in general, on this grand division of insanity, that it is not founded in nature,…" (xxii). In that remark Crichton implies that nature is immune from insanity, therefore nature, as both science and popular beliefs will try to confirm in the following decades, is where unfailing reason is to be found. Articulated here is the suggestion of an idea

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hollow nerves which distribute some sort of fluid imbued of the animal spirit that animates muscles and carries sensations to the brain.

that will grow in prominence: find a way to let nature, stable and true, reveal itself.

Le Système de la Nature

A philosopher and political figure forgotten today but a celebrity in his time, Paul-Henri Thiry, Baron d'Holbach is the author of a famously scandalous treatise which advances a materialist and anti-religious understanding of society. Published in 1770, *Le Système de la Nature, ou Des Lois du Monde Physique et du Monde Moral* is an extreme example of the type of provocative argument dribbling from the conversations of the intellectual elite down to the literate public. As Max Pearson Cushing notes, "No book of a philosophic or scientific character has ever caused such a sensation at the time of its publication, excepting perhaps Darwin's *Origin of Species*, the thesis of which is more than hinted at by Holbach" (54).

The debate of whether the soul was an immaterial spirit or a material organ of the body that began in the seventeen century turned into a vituperative (anti-)religious argument within a hundred years. In *Le Système de la nature* Holbach pits science against religion. His thesis is uncomplicated: "Men" can free themselves from the power of the superstition cultivated by the church only if they increase their knowledge of the functions of nature. For Holbach and many of his contemporaries freedom and truth reside in nature (rather than in religion). The diffusion of the ideas held by Holbach and his hosts may illustrate the case that bad publicity is better than no publicity.[27] Holbach's most famous publication

27 The same can be said of mesmerism and phrenology discussed in a later chapter.

was attacked immediately and was promptly condemned by the *Parlement de Paris.* The large number of responses to *Le Système de la Nature* disseminated across Europe shows that even in a time when systems of communication were limited to epistles, printed material, or face-to-face conversation ideas would circulate far across borders. As Voltaire wrote in his own response to *Le Système de la Nature,* "[d]ans l'immensité des livres dont l'Europe est surchargée, ce qui ne parvient pas à un lecteur dans une brochure, lui parvient dans une autre, et qu'il y a des choses dont il est nécessaire que tout le monde soit instruit"[28] (§6). Fifty years after its first publication and thirty years after the French revolution, *Le Système de la Nature* was still a moving force when it was translated in English. Samuel Wilkinson, the translator, even wrote what for the time was a rare positive critique of Holbach's work (Cushing 64).

Paradoxically, Holbach's detractors constructed their argument on the foundation of nature as well; "Comment y'aurait-it une intelligence dans nous, s'il n'y en avait pas dans la nature?"[29] Voltaire asked (§12). Throughout his response, Voltaire put the mechanics of humans on the same level as the mechanics of nature: both are too complex not to have been created by a superior intelligence.[30] Delisle de Sales, while not responding to Holbach directly, in his defense of theism affirmed that religion is human nature and that religious impostors are

28 "With the immeasurable number of books that burden Europe, what does not reach a reader in one pamphlet, reaches him in an other, and there are things that everyone should know."

29 "How could there be intelligence in us, if there wasn't any in nature?"

30 We will recognize here the argument repeated today by the proponents of "intelligent design."

those not marked with the stamp of nature (382). Whether a proponent of secularism or a defender of religion, what one needs is only the proof laying there, in nature. Like Crichton's assessment of sanity, the belief shared by proponents and opponents alike, once again, points in the direction of nature as the repository of a universal truth.

Metaphysical and Other Doubts

The uncertainty disclosed by the mechanistic conception of the body was compounded by a skepticism inherited from a distant past. While the study of skepticism is a vast subject that has largely been contained by the history of philosophy I maintain that in the eighteenth century some constructions of skepticism did suffuse a growing literate urban middle class where it had a profound influence on the conception of truth. It was, for sure, a variance restricted to a kind of epistemic skepticism rather than the wide, and oft discussed, problem of pyrrhonism that Descartes, a skeptic in his own right, dismissed as doubting for its own sake. The kind of skepticism that seized the eighteenth-century educated public did not amount to a comprehensive philosophical system. Nevertheless, this general, ill defined skepticism had a profound impact on the modes of representation at the end of the eighteenth century. It is not my intention to summarize the history of skepticism, or give an account of all its subtle varieties. What I intend to do is produce an account of the state of skepticism in the eighteenth century.

According to Richard H. Popkin, David Hume was the last remaining true skeptic in the pyrrhonian tradition (1).[31] While Hume's brand of "true" skepticism may have been shied away from by his contemporaries, modern historians have shown that other forms of skepticism still had a grip on the Enlightenment (Popkin, Olaso and Tonelli). While defending the skeptics' philosophy Hume hints at a solution to across-the-board doubting, "Philosophy would render us entirely pyrrhonian," he writes, "were not nature too strong for it" (24). Hume's remark, that Popkin didn't neglect to notice (7), was an indication of the things to come: nature was soon to be thought the unique repository of truth by just everyone, skeptics, materialists, and believers alike. This increased prominence of nature, rather than the progress of technology, as we will see, will later urge photography's invention.

The eighteenth century had opened with a revival of ancient pyrrhonism in large part due to the publication of Pierre Bayle's *Dictionnaire Historique*. But by the end of the 1700s there was no evidence that Bayle's version of skepticism had much impact in the public sphere. In the newly literate public, skepticism was not the result of a comprehensive knowledge of philosophy but rather the effect of the publicity enjoyed by the scientific, political, and recreational environments of the day. Whether widespread philosophical skepticism was a characteristic of the eighteenth century is debatable, but Giorgio Tonelli reminds us that the drive toward anti-skepticism was a definitive preoccupation of late-eighteenth-century

31 Pyrrhonism exhibits several subtle variations but in a few words it is the philosophical doctrine of doubting everything irremediably.

intellectuals ("The 'Weakness' of Reason in the Age of Enlightenment" 35). Thus the skepticism in favor toward the end of the century was not that of skeptic philosophy but rather a critical method (Tonelli "Kant and the Ancient Sceptics" 72). Toward the end of the century the consensus was that while human knowledge may have some limits, within those limits knowledge was possible. The question then was not “What can we know? but “How are we certain of what we know?” It is the main question that underpinned Descartes' philosophical enquiries; and it is a question that preoccupied philosophers and a large segment of the urban literate public for a while.

The Electrification of the Body

The consolidation of the mind and the body first found an ideal medium in electricity, a mysterious substance that seemed to conjure the combination of spirit and matter. Where previous materialists relied on Hartley’s theory of the vibration of the nerves to transmit information from the sensing organs to the brain, certain medical doctors put forward the theory of animal electricity as the vital element of the nervous system: “L’expérience de Galvani porte a croire que le système nerveux est une espèce de bouteille de Leyde, et que la différence du métal qui touche le nerf et celui qui touche le muscle représente la différence de la surface interne et de la surface extérieure de la bouteille”[32] (Cabanis and Peisse 270). It is with these words that the celebrated French physician Pierre-Jean-

32 “Galvani's experiment suggest that the nervous system is some kind of Leyde jar, and that the difference of the metal in contact with the nerve and that in contact with the muscle is similar to the difference between the internal and the external surfaces of the jar.”

Georges Cabanis summarized Luigi Galvani's experiment in his *Rapport du physique et du moral de l'homme*. Published in 1802, *Les rapports w*as a memoir that included the lectures given at the *Institut de France,* between 1796 and 1797, where he addressed an international scientific elite (Cabanis and Peisse xxij). The electrification of the body provided Cabanis and others with the evidence of the mechanism that liked psychology and physiology.

Luigi Galvani (1732-1798) was an active practicing medical doctor and professor of anatomy at the University of Bologna. Galvani introduced the concept of animal electricity in a 1791 paper titled "*De viribus electricitatis in motu musculari Commentariusî*" ("*Commentary on the effect of electricity on muscular motion, essay"*) in which he advocated the use of electricity as a therapeutic strategy for curing certain illnesses (Focaccia and Simili 145-46). Galvani concluded his 1791 essay with a quite remarkable hypothesis for the age, he wrote "For what pertains to voluntary motions, perhaps the mind, with its marvelous power, might make some impetus either into the cerebrum, as is very easy to believe, or outside the same, into whatever nerve it pleases, ..." (72). Galvani's experiment was repeated in scientific venues and in private salons throughout Italy.

> Entre 1791 et 1800, entre la publication du Commentarius de Luigi Galvani et l'invention de la pile par Alessandro Volta il se déroula en Europe une vraie révolution scientifique. Cette révolution commencée en médecine

> produisit ses effets les plus visibles et les plus importants en physique quand, grâce à Volta, une nouvelle source d'énergie fut disponible pour l'humanité: l'énergie chimique produite par le contact des métaux. [33](Bernardi 55)

Producing an electric current with a static voltaic pile, when previously it had to be produced by friction, was a revolution that made possible Galvani's discovery. The discovery of animal electricity shouldn't be attributed to Galvani alone. About a decade before Galvani published the *Commentarius*, the Academy of Lyon rewarded Pierre Bartholon and Giuseppe Gardini for their research on medical electricity. Galvani even granted Bertholon the paternity of the words *animalis electricitas.* "Both Bartholon and Gardini claimed the existence of an electricity proper to animal and human bodies, and affirm the identity of nervous and electrical fluids" (Bresadola 373). But Bartholon's and Gardini's hypotheses were too conjectural to be a definite answer the counter-arguments coming from all sides, especially those of the partisans of the irritability theory. In 1797 Alexander von Humboldt published a book, soon translated in French, on his experiments with electricity in the nerves confirming Galvani's conclusions (Kettenmann; von Humboldt). In the early 1780s and 90s, experiments in electricity were not new. In 1769 already Priestley was taking stock of the shape of electrical research with

33 "Between 1791 and 1800, the publication of Luigi Galvani's *Commentarius* and Alessandro Volta's invention of the battery throughout Europe unfolded a real scientific revolution. This revolution that began in medicine had its most visible and most important effect in physics when, thanks to Volta, a new source of energy was put at the disposal of humanity: the chemical energy produced by the contact of metals."

The History and Present State of Electricity. Directed at serious scientists, it was followed the same year by a work of popularization of the same topic, *A Familiar Introduction to the Study of Electricity,* in which Priestley described the Leyden jar—which transformed a common household item into a battery that could store the electricity produced by any generating apparatus—and several experiments that could be conducted with it.

Galvani's discovery was not without detractors, and the argument it motivated was not limited to a select group of elite scientists. One disagreement, which made the round of medical circles, came from the defenders of the irritability of muscles. It was a theory propounded by Albrecht Von Haller since the mid-1700s. Irritability (contractibility), Haller maintained, was a characteristic unique to the muscles while the function of the nerves was to transmit sensitivity from the senses to the soul (Frixione). This dual system rejected the traditional role of the nervous system as conductor of the animal fluid that activated the muscles—animal electricity was a substitute for the old-fashioned animal fluid. For Hallerians there was no interaction between muscles and nerves and thus no animal or other kind of fluid. But the most sensational and publicized disagreement was brought forward by Galvani's compatriot and electricity maven, the physicist Alessandro Volta. Volta denied that the nervous system generated its own electricity and maintained that the muscle contractions demonstrated in Galvani's experiment were just a reaction to stimulation by an external source of electricity such as that generated by the contact between zinc and copper—Volta's

own discovery. The fact that the biological nature of electricity had been long recognized by the research concerning the electric eel and the torpedo should have persuaded Volta and his followers of the validity of Galvani's finding (Mauro 143-44). Nevertheless the dispute lasted well into the nineteenth century and spilled over the Italian border to taunt the interest of scientists and the curiosity of the educated public in the rest of Europe. It was Galvani's nephew Giovanni Aldini who endeavored to vindicate his uncle's finding in offering the demonstrative proof to various gatherings of scientists and amateurs throughout Europe. In Paris he organized a demonstration at the Salpêtrière where he met the French psychiatrist Philippe Pinel. He travelled to London and Oxford where he presented "highly theatrical demonstrations" (Parent 581). Aldini's French and British peregrinations were detailed in a two-volume publication dedicated to Bonaparte, *Essai théorique et expérimental sur le galvanism*. Throughout his *Essai théorique* Aldini describes many of the places and eminent people who witnessed his experiments. The spectacles set-up by Aldini were part of a general practice of experimentation at a time when human witnesses were the only reliable and reputed impartial "recording instruments"—a method that was not without its own set of problems.

Electricity was an invisible but powerful substance; the revelation of its effects could only participate in the destabilization of a system of knowledge that was based on the dependability of observation. As an example we can follow the transformation of the public's mood. *The Times* of February 04, 1803 announces

with some humor that “Since the above [galvanic experiment] has been made public in Paris, thousands of young Anatomists are searching for the joint which contains the principle of life, and millions of unfortunate snails have been decapitated. Another Naturalist and Anatomist has begun to behead frogs, but the secret of his experiment is not yet known” ("Resuscitation by Means of the Galvanic Fluid"). Shortly after the publication of Mary Shelley's *Frankenstein* in 1818, anxiety in the face of scientific experiments with electricity finally found a concrete expression in the general press. Sixteen years later, the same newspaper titled one of its articles reporting “various experiments [that] were made on the body of the murderer *Clydesdale,* by Dr. Ure of Glasgow with a voltaic battery of 270 pairs of 4-inch plates.” with the all caps headline, “HORRIBLE PHENOMENA!-GALVANISM” (The Scotsman). In a little less than two decades electricity had come from an ironic curiosity to a frightening phenomena generated by the body itself. While it resolved the problem of the transmission of information between brain and muscles, experiments in electricity intensified the epistemic crisis: How can we be sure of what we know? Can we trust our own senses? Those are questions that drove the research in the external (to humans) system of verification provided by photography.

Errors of Perception Versus Errors of Judgement

The late-eighteenth and early-nineteenth centuries are rich in medical and popular treatises opposing hallucination to apparitions. In her inquiry into what she terms “the Metaphorics of Modern Reverie” Terry Castle singles out nine of

the most important[34] all of which, she points out, have the common objective to demonstrate the fallacy of apparitions. But neither the word nor the notion of hallucination were new to the late-Enlightenment period. Theodore Sarbin and Joseph Juhasz have traced its usage to a 1572 English translation of the Latin *"allucinacio"* meaning "a wandering of the mind, idle talk, prating" (345). As Sarbin and Juhasz put it, already in the last third of the sixteenth century, "It [hallucination] is thus, in Galenic terms, an erroneous image, a sign of insanity, of illness, melancholy, an excess of black bile, and not of good or evil, of sainthood or deviltry" (345).

Shedding the religious undertones was well and fine as long as the mind (now replacing the soul) remained a separate entity from the body—as a strict interpretation of Cartesian dualism would permit—even if it was recognized that the ailments of the body had an impact on the wandering of the mind and vice-versa. But along the eighteenth century, the interpretation of Cartesian dualism as absolute separation was slowly being replaced by a materialism that bridged the gap between soul and body. The nervous system—with the brain at one end and the sensorial apparatus at the other—was now considered to be the interface between body and mind, an interface that had as much in common with the physical as the spiritual world. Thus differences in perception were attributable to

34 Among them, Joseph Taylor's *Apparitions; or, The Mystery of Ghosts, Hobgoblins, and Haunted Houses, Developed* (1815), Samuel Hibbert's *Philosophy of Apparitions* (1825), John Abercrombie's *Inquiries Concerning the Intellectual Powers* (1830), William Newnham's *Essay on Superstition* (1830), Brewster's *Letters on Natural Magic* (1833), Walter Cooper Dendy's *Philosophy of Mystery* (1841), and Charles Ollier's *Fallacy of Ghosts, Dreams, and Omens* (1848).Alexandre Brierre de Boismont's *Des Hallucinations: ou, Histoire raisonnée des apparitions, des visions, des songes, de l'extase, des rêves, du magnétisme et du somnambulisme* (1845).

differences in the physical constitution that characterizes individuals. As Alexander Crichton puts it in 1798, “[i]t may be observed, that no two persons, perhaps, have exactly similar and corresponding perceptions of any external object whatever” (300). This is an assessment that underscores the problem of the unreliability of the human sensorial apparatus and justifies a workaround: repetition and witnessing of scientific experimentations; but even that may not have been enough as Crichton also insisted that the mind needs time to complete the observation of an external object (305-07)—a problem that would be easily solved by photography. But what drove photography's invention wasn't just the desire for prolonging the contemplation of an object. What proved to be a greater problem was that even “men of genius” could be the subjects of illusions (Crichton 313). Along with the physical grounding of the mind in the brain, it was recognized by Crichton and other physicians, or at least debated, that hallucinations and illusions could happen in the most normal of circumstances as a consequence of the slightest change in nervous condition such as exaltation or exhaustion. Complicating the problem, the faculty for judgment could be good but the perception on which that judgement was based could be faulty. “The defects of judgment do not arise, then from any fault in the faculty itself, but from the material on which that faculty has to operate” (Crichton 402). In other words, bodily function can fail rationality. To make sure the potential problem was not underestimated, Crichton made an ever-finer distinction between erroneous and incorrect judgments. Unlike erroneous judgments, which are occasioned by

disease, incorrect judgements can simply be made because of insufficient evidence, haste, faulty memory, or prejudice. Thus, “Every person, even of the soundest mind, is liable to incorrect judgment...” (Crichton 403); there lays a quintessentially human problem made especially acute by the parameters of empirical science.

Viewing Things

Whether in England, France, or Germany, scientists came across more evidence of the lack of reliability of human perception from the wide ranging observation of self-generated visual phantasms. They did so in the course of their investigation to uncover the mechanism of optical illusions in the hope that that special insight may help them correct their errors. Even Michael Faraday, better known for his work on electromagnetism, could not but investigate the peculiar optical illusions generated by a pair of spoked wheels rotating in front of each other in various combinations. Faraday communicated his findings in an influential paper he gave to the Royal Institution of Great Britain. In the issue of *The Journal of the Royal Institution of Great Britain* in which Faraday's paper was published, an anonymous article titled “Contribution to the Physiology of Vision” cites the names of many of the contributors to the research on optics throughout Europe, starting way back:

> Metaphysicians, physiologists, natural philosophers, and artists, have equally made it an object of their study; and the names of Baptista Porta, Leonardo da Vinci, Kepler,

> Descartes. Newton, Berkeley, Reid. Buffon, Darwin, Wells, Brown, Young. &c., are among those who have advanced the inquiry by their investigations and discoveries [. . .] To render some assistance towards forming a more complete theory of vision, we shall successively give an account of the discoveries of Purkinje, Goethe, Mile, Müller, Plateau, &c. (101)

Surprisingly absent from this list of illustrious names is a Scottish pioneer of this type of investigations, Sir David Brewster,[35] inventor of the kaleidoscope—a device that generates an hallucination-like optical illusion.

The article, reviewing one of the Czech anatomist and physiologist Jan-Evangelista Purkinje's book,[36] mildly objects to the use of the term "subjective" to describe optical illusions as, according to the author, the subjective as well as the objective occurs in the mind,

> [i]t will, however, on consideration, be perceived, that the term is not strictly proper, as, correctly speaking, all phenomena, *as such,* are subjective, *i. e.* in the mind; and were we, without qualification, to admit the classification of phenomena into objective and subjective, we should be

35 Possibly because Brewster, a member of the institution, wrote the anonymous article himself, his name is mentioned in "Contribution to the Physiology of Vision No. II," signed C. W., later in the same volume "Contribution to the Physiology of Vision," *The Journal of the Royal Institution of Great Britain* 1 (1831): 534.

36 *Beitrträge* zur *Kenntniss. des Schens in subjectiver Hinsicht, etc.* (Essay on the Subjective Phenomena of Vision, by Dr. J. Purkinje, Professor of Physiology at the University of Breslau, Prague, 1823).

> unable to determine, with any degree of accuracy, where the objective ends or the subjective begins (101, italics in the original).

This statement shows how much confusion reigned even among the scientific elite in what is objective and what is subjective. No such uncertainty existed in contemporaneous German philosophy where objective referred to the object perceived or the object of the senses (what the author of the article takes to be subjective) and subjective referred to the feeling of pleasure or displeasure elicited by the perception (Kant and Friedrich 317). Kant's concept of objective straddle the medieval and the modern definitions. But subjectivity is clearly a purely idealistic abstraction.[37] The preceding quote was an expression of the epistemic ambiguity that was running through the scientific community at the time. It was an equivocation shared by an increasingly numerous and influential literate middle-class.

The experiments conducted by Purkinje and Johannes Müller in Germany, those of Brewster in England, and Pinel and Esquirol in France were part of a wave of inquiry into optical phenomena, and in particular illusions and hallucinations. They have to be understood, each in its own way, as projects designed to clarify the separation of the normal (illusion) from the pathological (hallucination); the former needing to be overcome, the latter to be cured.

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37 By the end of the nineteenth century the medieval and modern definitions of subjective and objective would be completely inverted. For a fuller explanation of the changing definition of “objectivity” see Lorraine Daston, "Objectivity and the Escape from Perspective," Social Studies of Science 22.4 (1992)..

Purkinje's experiments on himself involved a variety of external (natural) forces from pressure exerted on the eyeball by diverse means to the application of electricity to different places on the head. While German physicians claimed to be working on the subjective effects of optical phenomena, their investigations pertained to the objective, that is external, conditions for internally generated visual sensations, while the investigation of the objective conditions of optical illusions researched by British physicists should be seen as an inquiry into the subjective, that is internal, perception of natural phenomena—natural from the point of view of the generative perspective. This easy confusion of what is objective and what is subjective illustrates the ambiguous position in which a human observer finds him/herself. Sorting out that ambiguity was important to scientists, whose goal was a truthful rendition of the natural environment. That confusion was also disseminated in the larger public of amateur scientists and the curious who frequented the multitude of public lectures and read the many periodicals of scientific popularization available to them. (The eighteenth-century vogue of scientific popularization will be the object of a later chapter.)

The rather equivocal statement on the misuse of the word “subjective” that opens “Contribution to the Physiology of Vision” seems to be oddly pertinent. In a comparative study of German and British research in optical phenomena, Jutta Schickore uncovers that despite their differences in training, emphasis, and experimentation, both German and English scientists had the same goal: to acquire sufficient knowledge of the range of misperceptions in order to correct for

them. Schickore's article makes clear that "Yet both in Britain and in the German lands scholars had similar epistemological concerns. They aimed to establish the nature and reliability of knowledge acquisition in experience" (384). According to Schickore the strategy bore some fruits as a certain epistemic optimism ensued. However, French research on the problem of hallucinations in the same period may have unwittingly derailed the Germano-British train of thought.

The French psychologist Etienne Esquirol shared the belief that reason could overcome illusions (a very Cartesian thought) but followed a different path from the British and the Germans and ended up contradicting his own and his colleagues' beliefs. Esquirol's approach to the problem was to dress a psychological portrait of human nature. All humans are the potential subjects of delusion, Esquirol believed. In every normal person the imagination makes the most extravagant and bizarre associations; fortunately everyday preoccupations and reason can divert the attention from those chimerical images. The sick person is the one who cannot distract the mind and falls under the influence of his/her own phantasy. Hallucinations are just like dreams that occur while the subject is fully awake. Hallucinations, like dreams, have no, nor do they need an, external referential objects (Esquirol 66-67). Hallucinations, like dreams, are internal, self-sufficient, and self-contained products of the mind alone, they can be overcome by the will alone; thus, Esquirol reasoned, occupying the mind interrupts dreaming. But Esquirol, by investigating the psychology of hallucination, was bound to find a weaknesses in the rational mind:

> Les hallucinations peuvent dépendre encore des répétitions volontaires ou forcées des mouvements du cerveau, mouvements qui ont été souvent et nécessairement répétés pour acquérir quelque connaissance ou pour approfondir quelque sujet. L'habitude rend facile et même involontaire ces mouvements, comme elle rend plus facile et même involontaire l'action de certains organes; l'action du cerveau prévaut sur celle des sens externes, ce qui détruit l'effet des impressions actuelles, ce qui fait prendre les effets de la mémoire pour des sensations actuelles. Dès lors est brisée la marche naturelle de l'entendement humain, dès lors il y a délire. Il s'établit une sorte d'*a parte* chez ceux qui sont en délire, comme il s'en établi quelquefois chez les hommes les plus raisonnables, qui sont très occupés ou absorbés par quelque profonde méditation[38] (69-70).

With this statement Esquirol dashed the British and German expectations while spelling out the core problem. The British, German and French elites shared the same preoccupation with hallucination and illusion making it at heart an

38 "Further more, hallucinations can depend on voluntary or forced repetitions of the action of the brain, action which are often and necessarily recurrent to acquire some knowledge or to deepen some topic. Habit makes easier and even involuntary these actions, like it makes easier and sometime involuntary the action of some organs; the action of the brain overrides that of the external senses, which destroys the effect of actual sensations. At this instant, is broken the natural flow of human understanding, at this instant, there is delirium. Some kind of *a perte* befalls those who are delirious, as it happens sometime to the most reasonable men, who are very busy or preoccupied by some deep meditation."

epistemological predicament. Their research was ultimately rendered futile by Esquirol's observation made long before the end of Brewster's, Purkinje's, or Müller's thorough investigations of the sensorial system: no matter who, what, or how, the human observer turns out to be unreliable.[39]

Nevertheless, Brewster's *Letters on Natural Magic Addressed to Sir Walter Scott*, published as late as 1832, is one of the many efforts on the British side to continue the attempt to grasp the mechanisms of optical illusions. Brewster accompanies his written explanation with many graphs and annotated drawings that, in some way, emphasize the problem while demonstrating the importance of visual communication in the process of understanding: it is easier to show things than to describe them. Brewster begins by supposedly disclosing the tricks the ancient priests used to demonstrate the magical powers of the Gods. In the typical British fashion of the time, Brewster's method is that of empirical induction (experimental exploration), devising as many situations as possible in which optical illusions are observable. In his *Letters* Brewster even gestures toward the popular expression of the hallucination versus apparitions dilemma: the spectacle of the "phantasmagoria" which turned out to be a successful divertissement. Brewster addresses the auditory illusions, such as ventriloquism, that prepares the phantasmagoria crowd before entering the main event (Castle 36). After a long

39 The different methodological approaches adopted by each investigator within their national confines were strongly inflected by anatomical characteristics as well a domestic traditions. The British concentrated on the extremity of the nervous system closer to the external world in accordance with the empiricist tradition initiated by Francis Bacon and magnified by John Locke; German motivation can be found in *naturphilosophie* itself grounded in the *vis viva* theory of Gottfried Liebniz; and the French psychologist tradition, which considers the *internal* termination of the nervous system, can be traced to Descartes's rationalist argument.

exposé of the tricks achievable with a magic lantern, but in line with the self-declared phantasmagorias' goal of negating the belief in ghosts, Brewster suggests several improvements to the show. Brewster, for example, explains how to use a large prism made of a vessel fashioned out of panes of glass and filled with water (83-89). I discuss the phantasmagoria, a popular spectacle of the late-eighteenth and early nineteenth centuries, in Chapter III. The phantasmagoria combined images projected by a magic lantern with the discourse of rationality to play on the ambiguity between subjective and objective.

From the time of Descartes' statement in the early seventeenth century to the end of the eighteenth century scientific discoveries pushed the mind ever closer to the body (or vice-versa) to the point that their difference seemed to disappear. The conflation of mind and body generated much confusion within the international scientific community as to where the subjective began and the objective resided. The effort to separate the normal—illusion—from the pathological—hallucination—did more harm than good. The confusion expressed by scientists evolved into a crisis of the observer when a broader public of scientific curious became aware of the elite's disarray. In turn the social pressure generated by that crisis produced a number of temporary solutions in an effort to erase or control subjectivity until the invention of photography, a medium touted as uniquely the work of nature dispensing with human intervention. The next chapter examines the mechanisms by which the crisis of the observer expended from the restricted world of the scientific elite to become a wider social problem.

Chapter Two

Science in the Public Sphere

In an article on the eighteenth-century European cafe society Margaret C. Jacob writes:

> By the 1770s, journalists and theorists as well as everyday polite conversationalists in cafes, learned societies, salons, and Masonic lodges—whether speaking in English, French, or Dutch—routinely exhorted or appealed to public opinion. The mental category of "the public," like the "social," had become commonplace (95).

In the sentence following her observation Jacob acknowledges Jürgen Habermas's contribution to the heuristic category of the “public.” Unfortunately, Jacob, like Habermas, gives only a political history of the rise of the public of the Enlightenment. Her tale begins in England, in the mid-1600s and is mostly concerned with the modern historiography of the Enlightenment and the public sphere. However, she does recognize that modern historiography “tends to ignore science and medicine” in the republic of letters. And a few sentences later, she insists on “the universalism and cosmopolitanism of the Enlightenment, as well as the scientific spirit that enriched it” (99). It is precisely this enthusiasm for science in the Enlightenment period that will be the object of this chapter.

Science in the Air

Among the conditions Micheal Warner identifies as defining a public [40] (65-124) are those of being voluntary—Warner prefers the term "self-organized" (67)— and being addressed by discourse. The late-eighteenth and early-nineteenth centuries' taste for scientific lectures, scattered throughout the major European cities, as well as an abundance of international magazines of scientific popularization make the second of those conditions quasi-inevitable for a majority of the educated urban middle class. But the discourse of science went beyond texts (spoken or written) and its exposure trumped voluntarism.

For instance, invented in 1783, just a few years before the French Revolution, hot air and hydrogen balloons, through their flight, became a distinctive type of address. As Mi Gyung Kim puts it,

> If medicine and science made the social boundary between the Republic of Letters and the illiterate 'people' somewhat porous, the balloon ascension obliterated it. As 'news in the air' that was witnessed by nearly the entire population of Paris, the balloon became an object of universal veneration that broke down the boundary between the literary 'public' and the illiterate 'people' (or, as Jürgen Habermas put it,

40 Warner identifies seven conditions: 1) "A public is self-organized." 2) "A public is a relation among strangers." 3) "The address of public speech is both personal and impersonal." 4) "A public is constituted trough mere attention." 5) "A public is the social space created by the reflective circulation of discourse." 6) "Publics act historically according to the temporality of their circulation." 7) "A public is poetic world making." Warner, Michael. *Publics and Counterpublics*. New York Cambridge, Mass. ; London: Zone Books ; Distributed by The MIT Press, 2002. (67,74,76,87,90,96,114)

> between the bourgeois public sphere and the plebeian public sphere).(149-50)

Balloons flew from the center of cities, just about everywhere in Europe, to the countryside where they landed in fields often under the eyes of working peasants who, allegedly, reacted with anger or paralysis to the fright occasioned by the apparition of a flying object. The stories of frightened peasants were well publicized and often reported as examples of "vulgar" reactions to the surprising novelty of lighter-than-air aerostat.[41]

However, there is another interpretation of the peasants reaction: the fear that balloons evoked in peasants working the fields may have been an expression of a challenge to their religious belief as well as to their daily experience. That fear, then, was not simply the reaction of the unlearned but an extension of the epistemic anxiety to another social class. Calming the alleged peasants' fears involved a series of state and private information strategies consisting of a royal proclamation assuring that balloons were harmless and the public lecture of newspaper articles explaining the scientific principles and benefits of ballooning. The new breed of audacious experimenters who crewed the airships became celebrated heros. When Jacques-Alexandre-Cesar Charles finally manned his hydrogen balloon, in December 1783 just a few months after the random landing of his unmanned balloon triggered the peasants' ire, those working in the fields were much more welcoming; they followed the craft all the while sending their

41 The reported negative reaction of peasants to the sight of a balloon (whether accurate or fabricated) may have been a means of creating more distance between an unsophisticated underclass (of future workers) and a sophisticated urban middle class.

best wishes to the balloonists; and when the balloon finally landed Charles himself is said to have been delighted by "[l]a naïveté rustique et tendre, l'effusion de l'admiration et de l'allégresse de tous ces villageois" ("the rustic naïvety and tenderness, the explosion of admiration and joy expressed by all those villagers) (Mungin 44).

Balloon mania, as Kim calls the phenomenon, shows that the exposure to science was not restricted to those seeking it. The sight of balloons spread the general epistemic anxiety to a wider "public" than that of the literate urban dwellers created by the direct address of scientific lectures. The demonstration of an autonomous yet practical nature made understanding it in its own terms even more urgent. At the time, seeing an airships belonged to the same category of experiences as attending the phantasmagoria or visiting a panorama, two of the early visual spectacles discussed in the next chapter. Witnessing the ascension or descent of balloons uncontrollably pushed by the wind demonstrated the power of nature and its autonomy but also gave an inkling of the potential gains to be realized from scientific investigation.

This is not to say, however, that the scientific discourse propagated by lectures were not instrumental in creating a public. A quick survey of the various British newspapers collected by the Reverend Charles Burney reveals that, from 1750 to 1804, there were more than 3,600 public lectures advertised in newspapers (17th-18th Century Burney Collection Newspapers). Another survey covering a 54-year period, from 1785 to 1839—the official year of the invention

of photography—shows that more than 2,000 public presentations were advertised in the *Times of London* alone (*The Times Digital Archives*). In an endnote to the "Introduction" to *Popular Science and Public Opinion* Michael Lynn mentions that the *Journal de Paris* advertised more than 100 lectures given in Paris for 1785 (14, note 28). In the same publication Lynn writes that,

> In the period from 1735 to 1793 more than seventy individuals offered a variety of courses and demonstrations just in experimental physics. […] The practice of scientific popularization rose throughout the century, reaching its highest levels during the period from about 1775 up to the first years of the French Revolution. During that period an average of fifteen experimental physicists offered more than forty courses in Paris each year. (19)

Each of those lectures could have hundreds of attendees. The topics presented were extremely varied; they included literature, music, law, languages, mathematics, and much more, but the overwhelming majority treated of medicine or experimental physics while taking a hands-on approach to demonstrating natural phenomena.

These talks were open to the general public although in many instances the price of admission was high enough to discourage the proletarian class from attending. Some, like those of Jean-Antoine Nollet, were designed to have a high scientific value while others were geared toward entertaining the audience. For

instance, the *Oracle and Public Advertiser* of January 17, 1795 announced the seriousness of a medical lecture with the simple ad:

THEATRE IN BARTLETT-COURT, HOLBORN.
DR. MARSHALL will begin the SPRING COURSE of his ANATOMICAL and SURGICAL LECTURE, on THURSDAY NEXT, the 22d of January, at Two o'Clock.
PRACTICAL ANATOMY is continued.

(Dr Marshall Lecture).

Later that month an issue of the same newspaper advertised a spectacle by Comus—Nicolas-Philippe Ledru was his real name—that promised a mix of magic and science:

GRAND EXHIBITION.
By Desire of many distinguished Personages,
(FOR THREE NIGHTS.)
In the GREAT EXHIBITION ROOM,
No. 28, HAY-MARKET,
THIS Present EVENING, TUESDAY, Jan. 20, and the two following Evenings, viz: Wednesday, and Thursday,

THE SIEUR COMUS will add to his various other amazing Performances the following particulars:

I. He will exhibit many Operations

MIRACULOUS	STEGANOGRAPHICAL
MAGNETICAL	SYMPATHETICAL
PHILOSOPHICAL	MATHEMATICAL
OPTICAL.	ORIENTAL
PYROTECHNICAL	PYRAMIDICAL.

And many Wonderful Performances on the Grand MAGICAL LOOKING GLASSES,
Which will afford the most pleasing satisfaction the inquisitive mind can require.

Part II. He will exhibit in the grandest manner with Japanned Caskets, Letters, Numbers, Thandis, Watches, Rings, Silver Cup, Medals, Swords, Pocket Pieces, Ear-Rings, &c. &c. Also, a variety of uncommon experiments with
THAUMATURGIC MACHINERIES.

(Grand Exhibition).

The spectacle proposed by Comus was typical of the many that mixed reason and fantasy (Lynn 33-34), exchanging the reassurance extended by the watchful eye of God for a speculative understanding of nature—one that, nevertheless, made room for the marvelous.

The appropriation of science for practical means provoked the first symptoms of what is, in today's world, recognized as technological anxiety. While the period under discussion is far from the new scientific revolution of the late-nineteenth and early-twentieth century which saw the revelations of quantum theory, the theory of relativity, X-rays, and the first atomic experiments, the public of the eighteenth century was much less prepared than twentieth-century individuals to receive the news propagated by scientific lectures. Learned societies such as the Royal Society in England and the *Academie Royale des Sciences,* or its successor the *Institut de France,* in Paris—homes of the professional scientific elite—were emulated by private scientific clubs and societies. Those organizations were places where subscribers could not only assist at lecture series but also exchange information with peer amateur scientists, consult scientific publications in the library, and experiment with the scientific machines and instruments collected in the association's c*abinet de physique*. Prior to the French Revolution, Paris had more than ten of those organizations (Lynn 72), each with a membership that could reach in the hundreds like the famous *Le Musée de Monsieur* that operated under various names from 1781 to 1848, well

after the death of its founder Pilâtre de Rozier. With a tiered fee structure, clubs such as *Le Musée de Monsieur* attracted members of various social classes ranging from interested lower-middle-class individuals—artisans, traders, bureaucrats—to the upper-class aristocracy. The *musées*' objective was not to devise new scientific theories but to act as a mediator between the most advanced scientific inquiries occurring in state sanctioned academies and the general public; and at that they were very successful as their proliferation testifies. National and regional academies and associations sprang up all over Europe. "Approximately seventy official academies and societies of science modeled after the Royal Society of London and the Paris Academy of science existed in the period between 1660 and 1793," writes James Edward McClellan. In addition McClellan counts some forty private scientific organizations, a number in which he doesn't include "Renaissance" type societies (1-3).[42] Even Robespierre and Marat, most famous for their role in the French Revolution, touted the teaching of science.[43] Robespierre, in 1780 a 25-year-old lawyer from Arras in Northern France, successfully argued that even the laws of man needed to submit to the laws of

42 McClellan explains that "'Renaissance' academies were kinds of great uncles and aunts to the younger societies of the eighteenth-century type... Several features distinguish 'Renaissance' academies from more typical eighteenth-century academies and societies, notably their short existences and near fundamental role played by the patron in the lives of these societies." James E. McClellan, Science Reorganized : Scientific Societies in the Eighteenth Century (New York: Columbia University Press, 1985) 2-3.

43 In addition to his political and philosophical writing Marat was the author of *Recherches physiques sur le feu* (1780), R*echerches physiques sur l'électricité* (1782), and *Mémoire sur l'électricité médicale* (1784). Marat also translated Newton's *Opticks* (1787) in two volumes, and just one year before the French revolution he published *Mémoires académiques ou nouvelles découvertes sur la lumière* (1788).

nature, or at least to the say of their respective representative, the judge and the physicist (Riskin).

Whether about science or magic, public lectures had a deep impact on the collective conscience of a "public"[44] in formation. No matter how manifest the quackery some of those demonstrators exhibited, their activity exercised a powerful influence on the imagination of the participants as "science and the attending ideology of scientism [...] came to symbolize the nature of reason itself" (P. Wood 120) and public lecturers could claim "the moral authority of nature" (Daston and Fernando Vidal). To complicate the situation, blind faith in science was an outcome denounced by many contemporaries as participating to reinforce popular superstition.

In the mid-1700s, upset dominated the theological realm which saw itself pulled in what seemed like opposite directions. In England, the animosity between Martin, a "country showman," and Freke, a respected surgeon, can be taken as representative of the conflict between the belief in natural occurrences (deism) and the belief in the supernatural (pietism). For both parties electricity was the vital fire of life, but for the former it was a power bestowed by God to the whole

44 Here "public" is understood as the agglomeration of disparate groups of literate people (Freemasons, members of gentlemen clubs, adherents to scientific organizations, salons' participants, etc.) who shared intimate convictions against the absolutism of state authority. The ostensible coherence of the "public" thus has more a political than a scientific base. But the moral authority of nature, a mix of science and theology, made its way in political debates as well; and the moral authority of the church was slowly eroded and replaced by that of science in the process of secularization. For more see Broman, Thomas. "The Habermasian Public Sphere and 'Science in the Enlightenment'" *History of science* 36 (1998): 123-50. and Daston, Lorraine., and Fernando. Vidal. *The Moral Authority of Nature*. Chicago, London: University of Chicago Press, 2004.

of nature, in this sense a force of nature, while for the later it was the restricted domain of the soul alone, a force exclusively given to man (Schaffer "The Consuming Flame" 506). It was a distinction that added to the epistemic uncertainty dominating a century in transition between tradition and modernity. Encouraging that disagreement a battle with political ramifications was also taking place within the system of public science. It linked what Simon Schaffer describes as a threat to the “social order” to the public debate concerning the physical sciences ("Natural Philosophy and Public Spectacle in the Eighteenth Century" 2):

> It was at this point that the contrast between the common understanding of nature and the elite suspicion of popular superstition became clearest. (Schaffer "Natural Philosophy and Public Spectacle in the Eighteenth Century" 24)

Despite Schaffer's observation, the difference between the uneducated and elite audiences may not have been so clear cut as lecturers of any stripe had to broaden the appeal of their ware to a large segment of the middle class (Lynn 8). If Schaffer is right to argue that witnessing the power of natural phenomena demonstrated in public lectures reinforced the belief in God ("Natural Philosophy and Public Spectacle in the Eighteenth Century"), it appears that the pull of anti-clerical materialism on one side and of superstition—of the deist or pietist varieties—on the other, all of it wrapped in a thin veil of class struggle, shaped a rather confusing cognitive environment: a system of beliefs in limbo between

religious tradition and the novelties of science. The interest in science crossed gender boundaries and despite the obstacles women found a way to participate in the century's passion for science.

Private Culture and Public Opinion

While women were encouraged to become members of the private academies, except for *Le Musée de Monsieur* they didn't enjoy the same membership benefits as men. In a manner of compensating for this restriction, upper-class women relied on a scientific and literary environment of their own making by sponsoring what was called "*salons"* in their own home. Feminine salons were not a new form of social intercourse for the elite. They had been a fixture since the early seventeenth century when aristocratic women gathered writers and poets for the enjoyment and edification of their entourage. As early as 1617 the Marquise de Rambouillet gathered philosophers, artists, and scientists in her famous Parisian hotel on rue Saint-Thomas-du-Louvre in order to escape what she perceived to be the vulgarity of the court of King Henry IV (Kale). Eighteenth-century salons didn't offer the same amenities as academies but they allowed some women to play an important role in the diffusion of science and philosophy among luminaries. Unlike the salons of the previous century the Enlightenment salons were not meant as an introduction to the manners of the nobility but participated the to the revival of a Republic of Letters often critical of the monarchy (Goodman 330). "Why did women form salons?" asks Dena Goodman (332). It wasn't to gather "fame and power," she answers, but "[t]o

satisfy the self-determined educational needs of the women who started them" (333). At a time when pedagogical opportunities for women were rare, the goal of *salonnières* was similar to that of the rest of the educated public: to be an active participant in the project of Enlightenment. According to Goodman, the salons provided a stable social base for the political debate of the *philosophes*. [45]

Judging by the expertise of many attendees, the conversations echoing through the salons were not exclusively about politics and literature, or rather those two categories were then more inclusive then than they are now; philosophy, science, and entertainment were also part of the mix. As Londa Schienbinger reminds us, "Discussion of science was fashionable at the salons of Madame Geoffrin, Madame Helvetius, and Madame Rochefoucault; Madame Lavoisier [wife of the celebrated scientist Antoine-Laurent Lavoisier] received academicians at her home. French salons of the seventeenth and eighteenth century competed with academies for the attention of the learned"[46] (30). While not strictly holding a lady's salon, the Baron d'Holbach's wealth and generally amiable character made of him a central character in the Parisian intellectual circles of his time. Among the regular visitors to his house were Diderot, La

45 The function of the salons and other private venues in the pre-revolutionary political discourse in France has been the object of much attention. Also see Jürgen Habermas, The Structural Transformation of the Public Sphere : An Inquiry into a Category of Bourgeois Society, 1st paperback ed. (Cambridge, Mass.: MIT Press, 1991), Steven D. Kale, French Salons : High Society and Political Sociability from the Old Regime to the Revolution of 1848 (Baltimore, Md.: Johns Hopkins University Press, 2004), Olivier Blanc, "Cercles Politiques et « Salons » Du Début de La Révolution (1789-1795)," Annales historiques de la Révolution française (2006).

46 I will not discuss here the struggle that women had to endure to assert themselves in the field of science, for that see Londa L. Schiebinger, *The Mind Has No Sex? : Women in the Origins of Modern Science* (Cambridge, Mass.: Harvard University Press, 1989)..

Condamine, Condillac, Condorcet, Turgot, Morellet, Raynal, Grimm, Marmontel, Colardeau, Saurin, Suard, Saint-Lambert, Thomas, Duclos, Chastellux, Boulanger, Darcet, Roux, Rouelle, Barthes, Venel, Leroy, Damilaville, Naigeon, and Lagrange, to name a few. In the English speaking world his acquaintances, and frequent visitors, included Hume, Garrick, Wilkes, Sterne, Gibbon, Horace Walpole, Adam Smith, Benjamin Franklin (then U.S. ambassador to France), and Dr. Priestley (Cushing 18). Not only does this impressive list of personalities tell us of Holbach's popularity but it is a sure bet that the ideas discussed around Holbach's dinner table resonated far and wide in international circles even if they didn't always make unanimity. Salons, whether animated by females or males, adding to the peripateticism of many intellectuals, participated in diffusing both knowledge and uncertainty about knowledge.

Whether dedicated to politics, science, or philosophy eighteenth-century salons, in one form or another, were part of a network of information that wasn't limited to France. Albeit rare in England, they were a fixture in Italy and Germany where they prompted the generation of a scientific literature that was specifically geared toward their feminine attendance. Many scientists saw *salonnières*—French, Italian, or German—as exemplary mediators in their effort to reach the extra-academic audience (Findlen "Translating the New Science: Women and the Circulation of Knowledge in Enlightenment Italy"). Paula Findlen tells us that "By the middle of the eighteenth century, almost every Italian city with some pretension to culture lay claim to at least one scientifically learned woman"

("Translating the New Science: Women and the Circulation of Knowledge in Enlightenment Italy" 169).

German salons much like French allowed women and men of different classes and status to mingle to discuss the literature, philosophy, and science current at the time. German women, however, disliked the association of the word *salons* with their own gathering for fear that it was too closely connected with the French Revolution, and also because the French model may not have been adequately defining German sociable networks (Weckel 316). In Germany *salons* were held mostly by German-Jewish women who were not in a position to offer the patronage Parisian upper-class women bestowed on meritorious French intellectuals (Weckel 319). In the conclusion of her article on German sociability network, Ulrike Weckel reiterates that if historians have focused on a few specific German *salons* held by Jewish women in Berlin, convivial gathering took place in all the German states for which unfortunately few eyewitness accounts remain (335).

Mostly organized by women but also sometime by men—Vico, Helvetius, Holbach—salons were part of an international communicative network that allowed scientists, philosophers, and lesser figures to exchange ideas and information. This sociability network even exceeded its own boundaries by prompting the publication of popular scientific treatises. Although namely addressing women—*Newtonianism for Ladies* (1737), *Philosophizing for Beauties* (1753), *Chemistry for Ladies* (1796)—those works of popularization

were accessible to all. Salons in their various forms not only contributed to the diffusion of knowledge but also to its standardization. Great cauldrons of political and scientific activity salons were also where the minds of the century's movers and shakers was being shaped; and consequently the psyches of everyone else who cared to read or listen to them. Many salons, at least in France, issued a hand-written newsletter that was peddled to an interested public by scribbling valets who found in them a new source of revenue (Hatin LIII). Whether discussed in private academies and salons, semi-private spas, or in public lectures and demonstrations, in the late-eighteenth and early-nineteenth century the interest in science, philosophy, politics (or just gossip) cut across class, gender, and even to some extend educational level to reach a wide segment of the literate population.

The Study of Ideas

"Ideology" is one of those terms that, today, are taken for granted but the word "ideology," much like the rest of language, has its own history. "*Ideologie*" is a word coined by Destutt de Tracy, a French philosopher of the late eighteenth century, from which the group he belonged to took the name of "*Les Ideologues*." Although brief—lasting just a few years—the Ideologues' notoriety had lasting consequences besides coining a new word. It is a group responsible for important structural changes in the French educational system still in place today.

After a stint in the army and a brief sojourn in prison, Destutt de Tracy was admitted as an associate member of the newly created *Institut de Fance*. The

Institut founded in 1795 was designed to replace the *Ancien Régime*'s Academies. It comprised three departments (classes) each divided in several sections: a class of physical and mathematical sciences (mathematics, mechanics, astronomy, experimental physics, chemistry, geology, botany, anatomy and zoology, medicine and surgery, rural economy and veterinary); a class of moral and political sciences (analysis of sensation and ideas, moral, social and legal sciences, political economy, history and geography); and a class of art and literature (grammar, classic languages, poetry, antiquity and monuments, painting, sculpture, architecture, music and declamation) (Picavet 69). The second class, to which de Tracy was an associate, was disbanded after only seven years and yet had been one of the most significant manifestations of the period's aspirations. It is there on June 20, 1796, that de Tracy used the word "*ideologie*"—literally the science of ideas—for the first time, in a memo to the organization (Kennedy). At that moment, language gained a word and the French nation the name of a new intellectual movement which desired to replace the metaphysics of the Enlightenment with its own brand of socio-psychology. The *ideologues* were instrumental in designing a science of humans, in "bringing to earth the whole man" as Sergio Moravia puts it (250). Not only did they persevered in uniting the soul to the body; they also committed humans to their environment. They claimed that weather, climate, geography, social hierarchy, even economic conditions were all contributing factors in making humans what they were. They thought that humans were left to their own devices figuratively and literally as they fought the

elements. At this juncture, the ideologues dismissed Descartes's dualism but embraced the rest of his philosophy.

Heirs to Descartes and above all to Locke, they believed in the primacy of the senses, the knowledge of the self, the perfectibility of human beings and of the society they form. Soon after the French revolution, they held positions of influence in the waning years of the eighteenth century (Picavet 24-32) before the Terror, and before an anti-intellectual Napoleon, who despised them, revealed his totalitarian inclination. Most importantly their interests bear on education and they presided over the creation or reform of many educational and medical institutions.[47] They pushed for the creation of the *école normale*, in Paris, that taught teachers how to teach; and their disciples staffed the *école centrales*, in the provinces (Picavet 32-68). Their position of educators enabled them to have an enormous influence in the shaping of the public opinion of the late-eighteenth and early-nineteenth centuries.[48]

In their time *les ideologues* were a famous and celebrated group that promoted a brand of materialism that is, in many ways, a precursor to modern phenomenology. Their object of analysis was the sensorial experience. "Vivre , c'est sentir. Se mouvoir, est le signe de la vitalité,"[49] wrote Cabanis's friend

47 For a more elaborated study of *les ideologues'* role in the French educational system see Pascal Duris, "L'enseignement de L'histoire Naturelle Dans Les Écoles Centrales (1795-1802)/the Teaching of Natural History in the Écoles Centrales (1795-1802)," *Revue d'histoire des sciences* 49.1 (1996)..

48 Picavet gives 1789 to 1820 as the period of the ideologues' influence For a complete history of the movement see François Joseph Picavet, Les Idéologues (New York: Arno Press, 1975).

49 "To live, is to feel. To move, is a sign of vitality."

Destutt de Tracy in the analytic table that summarizes *Les rapports du physique et du moral de l'homme* (Cabanis and Peisse 6).

Les rapports explored the connection between the states of the mind and those of the body. Its objective was to bring philosophy to medicine and medicine to philosophy (Cabanis and Peisse xii) and thus to give metaphysics a rational grounding in science and nature. Moral principles should not be dictated by religious belief but based on the natural laws that govern the preservation of the human race in its natural environment. Cabanis denied the existence of a soul and asserted that the brain was both the beginning and the end of a nervous system that was all flesh. Much like Diderot, his brand of materialism was tainted with vitalism, a theory that allied a vital principle—a concept as nebulous as that of the previous centuries' spiritual substance—to *l'homme machine*. For Cabanis the health of the body had a direct impact on the health of the mind and vice-versa. In his *Lettre sur les causes premieres* that follows the main text of *Les Rapports*, Cabanis condemned religion as on balance doing more harm than good (621). Despite all appearances of an intelligence in nature, he argued, it is not the God worshipped by the priest that is the primary mover, but a blind and mechanical nature that has overwhelmed human understanding with its awesome power and against which humans are mostly defenseless. The only certainty is to be found in mathematics and geometry, and "[c']est précisément lorsqu'on les quitte [mathematics and geometry] pour entrer dans le positif, que l'esprit humain, dirigé même sagement, devient sujet à tant d'erreurs"[50] (Cabanis and Peisse 629). It is a

50 "It is precisely when one leaves them behind to enter the positive, that the human

judgment, that far from unique to Cabanis, would permeate the minds of the educated public of the time.[51]

The Diffusion of Knowledge

Not only did *les ideologues* held positions of power, at least for a while, they were determined to publicize their philosophical concepts. To this effect they created several journals destined for the general public as well as their peers. The most important, which had an international reach, was appropriately named *La Décade philosophique,* but they founded or collaborated to many others. Picavet cites the *Journal de Paris,* the *Moniteur,* the *Journal d'instruction sociale,* the *Journal des sçavants,* the *Clefs du cabinet des souverains,* the *Conservateur, and* the *Journal de la langue française,* (85-86). It is a list to which, according to Eugene Hatin, we can add a periodical famous for its longevity, *Le Mercure Français* which appeared, in various guises, from 1672 until 1820 (24, 26).

Scientific and literary journals appeared toward the middle of the seventeenth century. The *Journal des sçavants* reputed to be the first one of the genre, and the longest surviving in France, saw its first issue on January 5, 1665, and its last appeared in 1864—defeating *Le Mercure Français* in term of longevity. The birth of the *Journal des sçavants* was soon followed by the Royal Society of London's *Philosophical Transactions*.

> [E]t le dix-septième siècle n'était pas achevé que déjà Moretti et Miletti à Venise, Cinelli à Florence, Bacchani à

mind, even cautiously directed, becomes subject to so many mistakes."

51 The counter-revolution that occurred after his death denounced materialism and condemned Cabanis to an undeserved obscurity.

> Parme, Philippe della Torre à Modène, Menkenius et Tentzel à Leipsick, Bayle, Leclerc et Basnage en Hollande, sans parler d'autres écrivains moins heureux ou moins persistants, fondaient le *Giornale de' litterati,* la *Bibliotheca volante,* les *Aeta eruditorum,* les *Nouvelles de la république des lettres,* la *Bibliothèque universelle,* l' *Histoire des ouvrages des savants*, etc., etc.[52] (Hatin LXVIII)

Hatin's investigation reveals that the proliferation of scientific journals was a phenomenon throughout Europe. Hatin names only the most famous of all the periodical publications that kept printers busy in the late-seventeenth and early-eighteenth century. There were so many, Hatin reports, that writers complained of their number. For those to be viable for their sponsors readership had to develop in proportion, which explains why (then, like now) many periodical publications were born and died in a matter of months or even weeks. In the seventeenth, eighteenth and early nineteenth centuries, technology may have been limited to printing but printing did not limit the diffusion of knowledge.

In his survey realized less than two decades after the mid-1800s, Eugène Hatin counts, for 1827, 132 journals in Paris of which 18 are dedicated to

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52 "[A]nd the seventeenth century wasn't over that, already Moretti and Miletti at Venise, Cinelli at Florence, Bacchani at Parme, Philippe della Torre at Modène, Menkenius and Tentzel at Leipsick, Bayle, Leclerc and Basnage in Holland, without mentioning other writers less lucky or persistant, launched the *Giornale de' litterati,* the *Bibliotheca volante,* the *Aeta eruditorum,* the *Nouvelles de la république des lettres,* the *Bibliothèque universelle,* the *Histoire des ouvrages des savants*, etc., etc."

medicine and 16 to science, combined, these two categories are more than double that of political newspapers which numbered 16 for the same period. The rest of the Parisian newspapers related to a variety of topics: agriculture; economy and finance; law; administration; religion; literature; fine art; music; theater; travel; fashion. Hatin notes as well that many of those newspapers were written in a language other than French (CXII).

The makeup of the publishing industry at the end of the eighteenth century was subject to change from one day to the next, however it seems that the study of political newspapers, that has attracted so much attention in academic circles, has eclipsed the importance of medical and scientific publications, most of them intended as instruments of popularization. For instance, Varin d'Ainville in a study of the French press cites a survey conducted by Marcel Bouchard in his examination of the long humanist tradition in Burgundy, *De l'humanisme à l'encyclopédie*. Bouchard's study of the venerable *Le journal des sçavants* reveals that articles treating of science numbered only 7 in 1720-21, 70 in 1750-51 (when theology and religion were the main topic of 140 articles), but 135 in 1781, almost a 50% increase over the previous period (71, note 28). Complicating his quantitative assessment of late eighteenth century publications, Hatin bundles literary and scientific periodicals together as if they belonged to a single category, but as Bouchard's limited survey shows scientific magazines could cover non-scientific topics and vice-versa. Newspapers crossed borders easily whether in their original language or in translation. *Le journal des sçavants* was promptly

imitated in Holland and Germany. And Hatin even claims that the journal of the Royal Society of London, *The Philosophical Transactions* (appearing just a few weeks after *Le journal des sçavants*), was just an imitation of the French publication. Nevertheless, *The Philosophical Transactions* in its turn was reproduced in a French translation, on and off from 1665 to 1790, as *Transactions philosophiques* and *Abrégé des transactions philosophiques* successively (33).

In Italy, exchanges with the rest of the European scientific community took a particular vigor beginning in the second part of the eighteenth century (McClellan 127-33; Findlen *Possessing Nature : Museums, Collecting, and Scientific Culture in Early Modern Italy*). Many private societies and public academies took shape at that time; and the publications by Italian scientists, written in Latin, French, or Italian, and often translated, were understood and prized by many elite scientists in the rest of Europe. In addition to the well respected intellectual level of Italian scientists, the severe political censorship that curtailed polemical publication benefited scientific and philosophical periodicals (Hatin CV).

In Great Britain, by 1792, London had 13 morning and 20 evening daily newspapers, plus 9 weekly newspapers, 70 outside London and 14 in Scotland alone (Hatin XCV). Hatin does not tell us what kind of news those papers carried but even if commercial news, politics, gossips, and classified made the bulk of the 15,005,760 pages printed that year, we can assume that science and medicine figured prominently in English language periodicals as they did in France. British

newspapers like newspapers elsewhere carried advertising for public lectures as well as reports of certain physics experiments conducted in front of an audience. Elsewhere in Europe, Germany's territorial fragmentation encouraged the production of newspapers proper to each state, each capital, or even each university that wanted to promote its particular pedagogy and its scientists. Hatin, echoing Voltaire, reminds us that "Dans cette grande quantité de feuilles périodiques celles qui occupent le plus de place et le rang le plus honorable sont sans contredit les recueils littéraires et scientifiques"[53](XCVI). Hatin thus unequivocally puts scientific publications in a privileged position compared to the rest of the periodical trade.

Russia which experienced the development of the press later than the rest of Europe saw several publications by the St. Petersburg Academy of Sciences and Art. Addressing a non-elite public, *Mesiatseslovy* was a popular almanac filled with astrological predictions and other data based on superstition, but to which the Academy added some scientific observations. Beginning in 1728 and for some fifteen years, the Academy published the monthly *Primechaniia* that was filled with articles written by Academy scientists but was geared toward a non-scientific audience (Schulze 312). The Academy's charter of 1747 specifically recommended that popularization be one of the missions of the institution, which it tried to fulfill by organizing popular lectures and subsequently publishing their content. The Russian public's lack of preparation impeded that mission but did not

53 "In this vast quantity of periodicals, that which occupy the largest space and the most honorific rank are without a doubt the literary and scientific records."

lesser the will of the Academy which, throughout its turbulent history, succeeded at publishing several periodicals intended to popularize science. From 1779 to 1781 it printed *Akademicheskiia izvestiia*, then *Novye Ezhemsiachnye sochineniia* from 1786 to 1796. Along with articles written by Russian scientists, those periodicals contained pieces taken from foreign sources such as passages from Diderot's *Encyclopédie* (Schulze 321-22).

Each European country had its own publishing system and censorship rules, but the scientific literature was for the most part of little political significance and remained largely uncensored when distributed across borders. For the longest time, there were many adepts of Descartes in England and many defenders of Newton in France each representing what was thought to be incompatible doctrines—as has been mentioned previously, *les ideologues* nevertheless were able to reconcile Descartes' rationalism with Locke's empiricism. When the law of January 17, 1800, reduced conventional Parisian newspapers to just 13, of all the remaining ones only those publishing science, art, commerce, or classified advertising exclusively were allowed to continue to exist; by 1811 only four political newspapers remained in Paris. As for the rest of the country the law of August 3, 1810, restricted political publication to a single newspaper for each department (Hatin 310). Despite this wave of censorship publications with a scientific tenor remained uncensored. Scientific publications had an international character, and their intention was primarily to make science accessible to a non-scientific audience. The prevalence and success of the many

journals of scientific popularization testify of the interest of a large portion of the literate public. In the late eighteenth century science wasn't confined to the state sanctioned academies of professional scientists but readily available to all who could afford to buy one or several of those journals.

The Publishing Trade and Scientific Books

Along with the eventful history of periodicals publishing we must account for the role of the book trade in the diffusion of scientific information. A survey of the many bibliographies listing the content of eighteenth-century private libraries shows a strengthening of interest in scientific books from the first to the last quarter of the eighteenth century. From the 1720s to the 1780s scientific books replaced books of theology, but not just any book of theology; those that disappeared pertained to the liturgy rather than to theology in general. As François Furet observes, "Mais à la fin du siècle, le secteur majoritaire de la production des livres est devenu 'les sciences et les arts'"[54] (20-21). To this shift in content must be added the substantial augmentation in the number of books published from one end of the century to the other: 13,000 demands of permission were counted for the first half of the century and 30,000, more than double, for the second half in Paris alone.[55] As Furet points out those are staggering numbers especially when

54 "But at the end of the century the majority sector of production was that of 'sciences and arts'." The concatenation of art and science is not an artificial convenience, it is rather a defining component of "classicism." Art and science share reason as a common origin but by the early-nineteenth century their meaning would have slid in opposite directions to give each a contrasting definition. Art belongs to the domain of humans while science turns to inquiring the properties of nature.

55 In the *Ancien Regime* publishers had to ask permission to print a work which had to be reviewed by official censors. There were three kinds of permissions: *privileges, permissions simples*, and *permissions tacites.* For a thorough discussion of book

compared to the 25,000 books produced by Parisian publishers in the entire sixteenth century (13; Febvre and Martin 298). Many scientific books were medical treatises that integrated humans ever more intimately in "the system of nature." It should be mentioned that political philosophy, which was part of the same category as scientific publications, sometimes aimed in the same direction as medical books and anatomical descriptions—the integration of man and nature —as Hevetius's *De l'esprit* and d'Holbach *Le système de la nature* attest.

A quantitative analysis, conducted by Jean Erhard and Jacques Roger, investigates book reviews in two competing periodicals: *Le journal des sçavants* and *Les mémoires de Trévoux,* for two periods, 1715-1719 and 1750-1754, in order to tease out trends in the interest of readers, publishers, and journalists. From the first period under consideration to mid-century, this analysis shows a large increase in the volume of titles pertinent to a variety of scientific endeavors in physics, mathematics, natural science, medicine, surgery, and pharmacy. This increase is noticeable in the following statistical categories: number of titles reviewed, length of the reviews, and demands of privilege for both journals[56] (51). To give us an idea of the evolution of *Le journal des sçavants* Ehrard and Roger

censorship in eighteenth-century France see François Furet, "La "Librarie" Du Royaume de France Au 18e Siècle," Livre et Société Dans La France Du XVIIIe Siècle, ed. Geneviève Bollème, Civilisations et Sociétés (Paris ; La Haye: Mouton et Cie, 1965), Daniel Roche, "Censorship and the Publishing Industry," Revolution in Print : The Press in France, 1775-1800, eds. Robert Darnton and Daniel Roche (Berkeley: University of California Press in collaboration with the New York Public Library, 1989)..

56 For the *Journal* Ehrard and Roger give 18 to 25.7% in requests of privileges, 29.1 to 45.3% in number of titles, and 30.9 to 39.9 in length; for the *Memoires* they give 23.8 to 39.9% for the number of titles and 24.4 to 39.5% for length. Philosophy being part of the category "sciences and arts" only justified a small amount of this augmentation (51).

compare its content for the years 1784 to 1789 to the totality of the demands of privilege and *permissions tacites*[57] for the same period. This juxtaposition discloses that *Le journal* did not follow the more general publishing trend which saw a sharp augmentation in the requests to publish scientific titles, while *Le journal* itself committed less space to their reviews. Erhard and Roger speculate however that the lack of interest for scientific volumes shown by reviewers for *Le journal des sçavants* simply reflects the fact that others more specialized periodicals such as *Observations de physique* took over the diffusion of scientific reviews instead[58] (56).

Jean Dhombres offers another quantitative analysis of the trade in scientific books for the last decade of the eighteenth and the beginning of the nineteenth century. Dhombres only counts books that today would be considered purely scientific. “Not included are technical books, those on agriculture, text on 'art and manufacture' that we would now consider industrial, nor works on the art of war, architecture, and civil engineering” (179). Dhombres makes two observations, consistent with what we should expect by now: one is the increase in the number of scientific books in the period from 1785 to 1816;[59] the other is a

57 A permission to publish was granted by the authorities when a book judged to be outside the religious norms was not dissident enough to warrant censorship.

58 *Les Mémoires de Trévoux* ceased publication in 1767.

59 In percentage the volume of books published in that period went from and average of 12 percent in the period from 1785 to 1798; but Dhombres tracks numbers more precisely for subsequent years: “1798, 14.4 percent; 1799, 14.6 percent; 1800, 14.1 percent; 1801, 14.3 percent; 1802, 14 percent; 1803, 17.7 percent; 1804, 23.2 percent; 1805, 23.3 percent; 1812, 25.1 percent; 1816, 14.5 percent” Jean Dhombres, "Books: Reshaping Science," *Revolution in Print : The Press in France, 1775-1800,* eds. Robert Darnton and Daniel Roche (Berkeley: University of California Press in collaboration with the New York Public Library, 1989) 178..

spike in this pattern of this growth. The late eighteenth and early nineteenth centuries saw an increase of interest in scientific titles that began to rise slowly in post-revolutionary France to reach a peek circa 1812 before it felt back to 1798 levels in 1816 at 14.5% of all books printed that year. Dhombres gives proportional and not absolute volumes; considering the swell in publishing activity in the later years, we can speculate that the smaller proportional number in fact indicates a larger volume output. Dhombres himself couldn't resist titling a section of his essay "Many Books, Many Scientific Books" (178). A careful examination of the years 1798 and 1799 shows the dominance of purely scientific books over political treatises and books of philosophy, "The age of the philosophers was over," Dhombres remarks (179) although this statement ignores that scientific interpretations participate in the formation of popular philosophical beliefs.

Further broken down by types, medicine occupies the largest share of scientific books (28%). Dhombres notes that it is a proportion, that by 1818, rises to include one out of every two scientific books (181)—natural history, and mathematical science and astronomy record 16% and 17% respectively (180, table 2). With the abolition of corporations, including the associations of medical doctors, surgeons, and apothecaries, in 1791, medicine became a domain open to all. Quacks and charlatans, already reputed to be numerous, felt emboldened to set up shop alongside legitimate physicians who were forbidden to form professional organizations that would defend them.[60] The two types of practices side by side,

60 For more on legitimate and illegitimate medical practice in the 1790s see Jean-Pierre

and their respective publications, highlighted a conflict linked to two visions of the world: one grounded in the facts of physics, the other in metaphysics (Goubert 922). Besides educating the public in all manners of health practices, it was an epistemic ambiguity that channeled and reinforced the public's awareness of the vagaries of physical being.

To the active market of medical and scientific publishing geared toward the general public must be added textbooks which were more specifically designed to be used in the public educational system, a system put in place and soon dominated, as we have seen by *les ideologues* and their adepts. Accordingly scientific knowledge took an important place in the curriculum of the *écoles centrales*—equivalent to high schools. The middle section of the six-year schooling regime was dedicated to mathematics, experimental physics, and chemistry. The goal was not to make scientists of all the pupils (and frequent adult auditors) admitted to those schools but to fight the double threat of superstition and authority based on divine rights respectively embodied by clerics and the monarch. Pupils were encouraged to forget about the old artificial hierarchical system of the *Ancien Régime*; it was in nature, and in the appropriate use of language to describe sensations, that humanity would find reliable truth (Duris 24).

Goubert, "L'art de Guérir. Médecine Savante et Médecine Populaire Dans La France de 1790," *Annales. Histoire, Sciences Sociales* 32.5 (1977)..

The Non-normal Sciences in the Public's Imagination

In addition to the various venues and publications of scientific popularization, and the medical free-for-all in the eighteenth and nineteenth centuries, the belief that nature was the repository of truth provided fertile grounds for the cultivation of what is called contemptuously "the pseudosciences." These ranged from the most reasonable to the most outrageous: electrotherapy, physiognomy, phrenology, and mesmerism non-normal sciences were all significant phenomena of the late eighteenth and early nineteenth centuries. The pseudosciences deserve special consideration as they were the expression of some aspects of the popular interpretation of science and the indication of a yearning for a connection with nature, the only place judged to be free of prejudice. They found at once controversy and success by pretending to be able to expose the link between outside and inside, body and spirit, nature and human nature. They typically mixed some of the facts of science with supernatural beliefs, while claiming to be all science and none magic.

Maybe the most significant, and the one which left its stamp on the modern vocabulary, was mesmerism. Mesmerism was a fad of the 1780s that, upon all appearances, looks like its founder's successful money-making scheme; but regardless of its promoter's earnest intentions, mesmerism, as it was called from the onset, took a life of its own. Anton Frantz Mesmer was an Austrian physician whose predilection for cosmology had been indulged by the Viennese medical authorities who had delivered his medical degree in 1766 (Darnton 47).

Mesmer moved to Paris in 1778 to finally settle in Creteil (near the capital) after convincing wealthy and influential people to follow him (Darnton 48). Mesmer's doctrine stipulated that a universal fluid called "magnétisme animal" (animal magnetism) could be channelled to better the health of humans. Mesmer charged a hefty fee to his wealthy adepts for his services, which by many accounts were in high demand. Soon various factions disagreeing with the self-anointed master of animal magnetism setup shop for themselves, mostly out the conviction that the benefits of the cosmic fluid shouldn't be kept in the hands of a single person. Despite its popularity, mesmerism was quickly debunked by a commission of scientists appointed by Louis XVI in 1784. This *ad ho*c investigative team included respected names such as Lavoisier, Bailly, Dr. Guillotin (of the guillotine fame) from the *Academie Royale des sciences,* and Benjamin Franklin—a respected scientist as well as the American ambassador to France. Despite the publication of the commission's negative findings, mesmerism continued to garner a following, among them some legitimate physicians and many celebrities.[61] It even managed to split the royal and parliamentarian authorities which, despite the fact that mesmerism was found to be a hoax, held off in investigating Mesmer's activity.

Animal magnetism, it was claimed, was a super-fine natural fluid capable of penetrating solid bodies, akin to electricity, earth magnetism, and gravity—which was still believed to be carried from one body to another by a material

61 Lafayette was one of Mesmer's followers,writes Robert Darnton, and when the latter threatened to move out of France it is the Queen, Marie-Antoinette who intervened to have him stay (163, 66).

substrate. Like oceans, humans were subject to “flux and reflux” (Mesmer 7, 10, 20, 75). Given to us by a superior intelligence animal magnetism was the natural element that assisted human beings in re-establishing the proper balance between inner and outer nature, between human nature and the environment. Short lived in its original form but lasting well into the mid-1800s under a variety of spiritualist guises, mesmerism, like subsequent non-normal sciences, had diverse and enduring influences notably upon French romantic literature. In the political realm the rejection of mesmerism by the official academies of science and medicine hardened its proponents against a governmental structure dominated by the aristocracy. Mesmerists faulted elite institutions for being the instruments and defenders of the scientific and political *status quo.* This position made mesmerism a *de facto* ally of the revolutionaries and rendered it vulnerable to the harassment of the authorities despite having some powerful friends and harboring members with various political inclinations from left to right. Victim of long standing internal dissensions and political pressure, Mesmer left France to travel throughout Europe soon after the *Academie* published its findings. After the French Revolution, mesmerism devolved by exchanging its profession of faith toward the natural world for the dogma of the supernatural. It is with that belief in the occult, so contrary to its original premises, that mesmerism endured well after Mesmer passed away in 1815, in his native Germany.

But what kept the belief in animal magnetism so fashionable? Was it the impressive decorum associated with Mesmer's practices? Was it faith in his (and

others') assertions that animal magnetism made people healthier? Or simply the "enlightened" varnishing of a revamped metaphysics? Consistent with all its strange material convictions, Mesmer's doctrine was in synch with beliefs common at the time. Mesmerism was a theory that combined two previously antagonistic notions: vitalism and mechanism. This reconciliation was accomplished by placing the vital fluid of life outside the human body rather than making it an internal element. Mesmer summarized that position in the latest version of his memoir, "[l]e magnétisme détermine un mouvement tonique qui pénètre toutes les parties du corps, en vivifie les nerfs, et ranime le jeu de tous les ressorts de la machine"[62] (85), thus explicitly combining the language of vitalism with that of mechanism. *Le magnétisme animal*[63] was a universal fluid that activated the muscles of the body like air sets a windmill in motion or water turns the wheel of a watermill. Humans bathed in *magnétisme animal* like fish in water (Mesmer and Pilcher Grandchamp 21-22, 85). For Mesmer like for many of his contemporaries the human body was fully integrated with nature, and animal magnetism was both the agent and the proof of this integration (Mesmer and Pilcher Grandchamp 28-29). The appeal of mesmerism may have been precisely because, in addition to its touted health benefits, it appeared to reconcile what was thought to be incompatible theories. In doing so it reunited two discrete realms: the external and the internal, the visible and the invisible, nature and human

62 "Magnetism induces a stimulating motion which penetrates all parts of the body, vivifies its nerves, and revives the play of all the springs of the machine."

63 In this case animal comes from *animus*, the soul.

nature. In an odd prescience of the characterization of photography mesmerism was, as Mesmer himself saw it, the association of art and science (Mesmer 11).

In channeling animal fluid, mesmerism substituted for social nature in its role of mediator between subject and object, humans and nature. It even recreated some of social nature's most visible aspects: mesmerist sessions were events reuniting a disparate group of people where class was of minimal importance.[64] Mesmerism's underpinning was that animal magnetism was a universal substance benefiting society as a whole. It rose to prominence at a time when the democratic spirit was in the air but most importantly it cast in a new–albeit colored—light the relation between humans and nature, mind and body. Animal magnetism bathed everyone equally regardless of class thus in addition to the invisible forces cited above animal magnetism shared the magnanimity of light. Mesmerism, in its belief of the benevolence of a universal nature needing to be understood, was one more step on a popular eighteenth-century path leading to the invention of photography.

Less cosmical but just as fantasist, physiognomy and phrenology were two other fashionable pseudosciences of the late-eighteenth and early-nineteenth centuries. They pertained to uncover the true language of nature and render it clear to everyone:

> Je ne promet point, car il y aurait de l'extravagance dans cette promesse, je ne promets pas de donner en entier

64 Mesmer had even set up a tub, seldom used, especially for the poor and indigent who couldn't afford to pay for his services.

> l'immense alphabet qui servirait à déchiffrer la langue originale de la nature, écrite sur le visage de l'homme et dans tout son extérieur; mais je me flatte d'avoir au moins tracé quelques un des caractères de cet alphabet divin, et d'une manière assez lisible pour qu'un œil sain puisse les reconnaître par-tout où il les trouvera.[65] (Lavater 8)

This quote from an issue of the French publication of Lavater's popular treatise, *L'art de connaitre les hommes par la physionomie*, realized under his direct supervision, doesn't leave any ambiguity about the objective to uncover and promote the language of nature. Physiognomy attempted to judge someone's moral attributes from the person's physical appearance. The belief propounded by physiognomy did not originate with Lavater. With *Physionomics*, a treatise attributed to Aristotle, "Physiognomy, the science of judging human character based on outward physical appearance, especially the face, was already an established science in classical Greece" (Berland 252). While physiognomy was eventually denounced as a pseudoscience in the mid-1800s it kept currency for more than a half-century with those who believed that it spoke the "language of nature."[66]

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65 "I do not promise, as such a promise would be foolish, I do not promise to give the whole immense alphabet which could be used to decipher the original language of nature written in the face of man and his whole appearance. I flatter myself to have at least traced some of the letters of this divine alphabet. And in quite a legible fashion that a sound eye can identify it where ever it is found."

66 The French edition of Lavater 's popular treatise on his attempt to codify the natural language of physical attributes was realized from the original German manuscript under his direct supervision. The five volumes making this work subsequently were translated in English under the title, *Essays on physiognomy, designed to promote the knowledge and the love of mankind* once from the French edition and again from the

The views of phrenology, which claimed a more rigorous scientific foundation, overlapped with those of physiognomy. Phrenology maintained that the bumps and depressions shaping the skull were the result of the development of particular areas of the brain.[67] It was theory based on the work Franz Joseph Gall but most strongly promoted by his associate, Johann Gaspar Spurzheim, who proselytized phrenology, a term he invented, in Britain, France, and the United State until his death in Boston in 1832.[68] Gall was a brain anatomist whose legacy has been tarnished by his close association with Spurzheim's phrenology. Gall's scientific accomplishment was to devise a system localizing brain functions that he called "organology." Organology was a geography of the brain that assigned specific tasks to designated parts of the brain. For instance, it delimited the area responsible for language or that dedicated to love (Zola-Morgan 370). Gall's research solidified the mind-body connection and so was severely critiqued from multiple perspectives—philosophical, scientific, and political because his theory challenged the mind-body dualism, the autonomy of the soul, the unity of the brain, and was thought, by Napoleon among others, to be too materialist (Zola-Morgan 372-76). But although Gall's theory continued to be contested by neuro-physicians well into the mid-nineteenth century, it found favor with the general public especially as diffused by Spurzheim's phrenology.

German.

67 Brain localization would actually be confirmed by twentieth-century science but not its effect on the structure of the skull. The term "phrenology was invented in the 1810s in England by T.I.M. Forster. Gall preferred to call his science "organology" and described it as the study of the physiology of the brain.

68 Gall and Sutzheim went their separate way in 1813 after collaborating for nearly thirteen years.

> Spurzheim's many publications and theatrical neuroanatomy helped disseminate Gall's neurobiological theories among a surprisingly broad public, and Gall would later become widely credited for establishing, once and for all, the material location of mind in the brain. Gall's "organology" proved attractive to radical political thinkers like Richard Carlile, who (rightly, though in spite of Gall and Spurzheim's careful hedging on this point) saw in it a compelling descendant of the materialist theories earlier promulgated by Priestley and Darwin. (Richardson 6)

Although Gall did hold some responsibility in elaborating the argument supporting phrenology, it is unfortunate that outside a handful of experts neuroscientists, the memory of Gall is so strongly tainted by Spurzheim's antics. Like mesmerism, phrenology never found the scientific accreditation it sought. Defeated as legitimate sciences, mesmerism, physiognomy, and phrenology nevertheless found receptive audiences among the public and among artists. Because of their effect on the masses, they participated in the definition of the late Enlightenment to a magnitude comparable with that of the official sciences.

Neither Mesmer nor Lavater nor Gall were especially innovative in the idea that external bodily signs were the expression of internal characteristics. Their discoveries and their associated discourses aligned with the aspirations of several generations of artists who preceded them. In the secular realm,

fashionable since the Renaissance, the painterly portraits depicting aristocrats and rich bourgeois were meant to display the internal beauty (and wealth) of the sitters rather than their actual physical appearance. Physical beauty and the beauty of soul and spirit were linked, and still are to a surprising extent, since their relationship has been inscribed in Aristotle's work. The link between physical appearance and character continued to be extolled throughout the centuries. To name but a few of its most famous proponents: in the sixteenth century we find Della Porta,[69] followed in the seventeenth century by Charles Le Brun, and in the eighteenth century came the previously mentioned Lavater. For the artist, wrestling with likeness meant being able to let his patron be seen from the inside out and not merely to detail every concretion of the skin or every wrinkle of the neck unless these were traces of a specific inner grace. In his 1698 *Lecture on Expression,* Le Brun advised:

> The brain thus filled sends out these spirits to the other parts by means of the nerves, which are like so many little filaments or tubes which carry the spirits into the muscles, varying the amount to suit the need of the muscles in performing the action to which they are called. […]
>
> The soul being linked, as I told you, to the whole body, every part of the body can serve to express the passions …
>
> (Le Brun cited in Edwards 30)

69 Della Porta is also known for his involvement with the magic lantern and the camera obscura.

Marrying Descartes to the *Physiognomonics,* Le Brun rationalized the connection between inner states and external appearances. Portrait painters must learn to depict the soul of the sitter from the inside out. In a sign of continuity, Le Brun's lecture had been preceded by André Félibien des Avaux' s *Conférence de l'Académie de Peinture et de Sculpture* (1669) in which Félibien classified subject matter in order of status with still life at the lowest and human figures at the highest for the closeness of their form to that of God (Edwards 34-35).

Mesmerism, physiognomy, and phrenology popularized the belief of the interconnection of external physical appearances with internal moral character and brought it "down" from the realm of the aristocracy to that of the bourgeois middle class and the proletariat.[70] They democratized what was previously a privilege of the well-off.[71] Materialism, mechanism, mesmerism, physiognomy, and phrenology each in their way pushed against the socio-political function of traditional representation (of human beings). Although they had in common with portrait painting the attempt to concretize the physical link between mind and body, unlike painting, which invented a pictorial vocabulary designed for its own narrow purpose, the pseudosciences were trying to resolve a more encompassing problem: to reestablish a presumed original harmony between the human, social,

70 The competition between daguerreotype studios that sprouted all over the country brought the price of daguerreotype portraits withing reach of the lower classes within just a few years.

71 The result, as will show further in Chapter IV, would be felt more strongly in the American culture which did not have to carry the baggage of an aristocratic past. It is shown in the eagerness with which American experimented with taking daguerreotype portraits. While both Daguerre and Talbot thought that photographic portraits were out of reach because of the length required for the exposure, significantly it is Americans who, a short time after its introduction, were able to realize some of the first portraits on daguerreotypes.

and environmental natures. They believed that there existed in nature a universal language of truth, a language whose unbiased symbols were the only path to knowledge with any kind of certainty. The flourishes and imprecision of the capricious common language could be left to the imagination of writers and poets but if truth needed to be told nature would have to tell it by its own means. The first attempt to give a "voice" to the language of nature, Thomas Wedgwood and Humphry Davy's[72] experiments with photography, appeared precisely in the waning years of the eighteenth century. Alas, discouraging results, unfortunate events (Wedgwood's premature death in 1805), and changes in methodology, all of which I will discuss later, delayed the invention of photography by several decades.

72 Thomas Wedgwood was the son of the British pottery industrialist Josiah Wedgwood; Humphry Davis was a renowned chemist.

Chapter Three

The Search for Certainty

In an effort to demonstrate that photography was a French, and not a British, invention Arago published a primary witness account of the birth of the daguerreotype in Volume 7 of his *Œuvres Completes.* In this brief history Arago pointed out that, had photography been known at the time of Napoleon's Egyptian campaign in 1798, it could have been used to bring back a record of the numerous hieroglyphs that cover Egyptian monuments (492). Arago's association of photography with the ancient script was the first explicit connection of photography with (written) language. Just a few years after François Arago[73] introduced the non-reproducible, metal-based daguerreotype, William Henry Fox Talbot, the British inventor of the negative/positive photographic process on paper, produced the first publication illustrated with photographs. Sold by subscription and titled "*The Pencil of Nature,*" it was issued in six fascicles each including four salt prints[74] for a total of 24 photographic prints on paper, but only half of them would be produced.[75] Each print was paired with a descriptive commentary that contained no technical information. In the "Introduction and Remarks" to his series of albums Talbot forewarned his readers:

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73 Arago was a member of the French scientific elite and a politician. He was both a member of the Academie des sciences and an elected representative at the Chambre des députés.

74 To make a salt print paper is first brushed with a solution of common salt followed by brushing with a solution of silver nitrate. Those two chemicals combining on the paper produce light-sensitive silver chloride.

75 As we will see, the pencil held by nature was used both for writing and for drawing.

> [t]he plates of this work have been obtained by the mere action of Light upon sensitive paper. They have been formed or depicted by optical and chemical means alone, and without the aid of any one acquainted with the art of drawing. (unpaginated)

Talbot's statement echoed one made a few years earlier. In the conclusion of the 1839 prospectus promoting his invention to prospective investors Daguerre wrote what may be the best summary of what proved to be an unanimous reaction:

> In conclusion the DAGUERREOTYPE is not merely an instrument which serves to draw Nature; on the contrary it is a chemical and physical process which gives her the power to reproduced herself. (Gernsheim and Gernsheim, *L.J.M. Daguerre; the History of the Diorama and the Daguerreotyp*e 81)

This translation by Helmut and Alison Gernsheim of the only remaining copy of the prospectus[76] expresses Daguerre's unequivocal belief that the physics and chemistry of the process were executed by an autonomous nature without the help of a human subject. Witnesses and inventors alike qualified photography as a work of nature that bypassed the hand of "man," a mechanical eye whose impartiality was without doubt. Photography was a language free of both rhetorical flourishes and descriptions based on errors of perception.

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76 The copy of the prospectus is preserved in the archives of the Eastman Kodak House in Rochester, New York.

The standardization of language had been advocated by Condorcet in his *Tableau historique des progrès de l'esprit humain* published in 1793. “Une langue exacte et précise” (86), apt to describing scientific observations, highlights the importance attached to the formality of language in the objectification of nature the sciences aspired to. In the new era of scientific and political innovations that began long before the Enlightenment period, the only way to express truth were inadequate spoken words. John Locke issued this warning about the danger of the imprecision of language:

> From what has been said in the foregoing Chapters, it is easie to perceive, what imperfection there is in Language, and how the very nature of Words, makes it almost unavoidable, for many of them to be doubtful and uncertain in their significations (Book III, ch.9, §1),

Already in the 1600s, while the scientific revolution rolled forward, the expression of truth with the assistance of language increasingly appeared problematic. While Locke separated the practice of “common conversation and commerce” from philosophical theory (Book III, ch.9. §3), by the end of the 1700s the contrarian position advocated by the promoters of a new economy intersected with the natural philosophers' linguistic requirements: “By an alliance possibly unique in human record, those who sought dignity and selfish freedom in commercial enterprise found themselves arrayed against the same foe as those who sought the dignity and freedom of the human mind” (Crocker 577).

Truth and falsehood were not just a matter of commercial or philosophical integrity, they were political problems as well. The acceptance of falsehood in the conduct of the affairs of the state was hotly debated as crowned heads throughout Europe defended their privilege to use "*le mensonge officieux*" (literally the "unofficial lie" really meaning the "official lie") for the good of the state.

> In the ancient and modern world, writers, great and small, have debated the values of truth and falsehood perennially. The debate seems to have acquired renewed vitality whenever a revolutionary movement threatened the continuance of an established society. In the eighteenth century, it assumed epidemic form. (Crocker 575)

Philosophy, science, economy, and politics converged to push truth requirements to the top of almost everyone's agenda. From Marseille to Berlin and Dijon to Berne, academies, in one phrasing or another, proposed a variety of essay contests around the question: Is telling the truth always an obligation? Not surprisingly opinions were split along the line that divided conservatives—who answered negatively—from liberals—who heralded themselves as champions of the truth (Crocker 595-600). But most defenders of one point of view or the other mitigated their answer upon certain circumstances based on the utility of the "*mensonge officieux.*" Those who held steadfast on the incontestable value of truth grounded their argument in the same utilitarian premise as those who found that lying can be justified. Their pragmatism recast the problem away from the moral standpoint

where it had been previously and brought the pro and con positions close to each other (Crocker 602). On one hand, this breach in the project of the Enlightenment —to free humanity from the scourge of error—participated to the epistemic uncertainty of the late century; on the other hand, it highlighted the need for a unified and reliable doctrine of truth—setting up a series of difficult problems. As David W. Bates observes, "In fact, error turns out to be a complex and ambiguous problem for many thinkers, and the positivist idea of error as strictly negative is not a very useful framework for understanding this period" (308).

When Jean-Jacques Rousseau touted the straightforward life of the primitive human being it was not in a fit of nostalgia for a simpler time but to separate what might be the core of human nature from its corrupt contemporary manifestations. For Rousseau there was a time when nature and human nature were one, a time before the social order began to act as a wedge between them. Rousseau simply engaged in a thought experiment whose ultimate objective was to find the proper social arrangement that could harmonize human and environmental natures anew. Even Rousseau recognized his task to be a tall order:

> Car ce n'est pas une légère entreprise de démêler ce qu'il y a d'originaire et d'artificiel dans la nature actuelle de l'homme, et de bien connaitre un état qui n'existe plus, qui n'a peut être pas existé, qui probablement n'existera jamais, et dont il est pourtant nécessaire d'avoir des notions justes pour bien juger de notre état présent.[77](LVIII)

77 "It is not a small undertaking to untangle the genuine from the artificial in the nature

For Rousseau language was one of the corrupting artifices brought about by civilization. Circumventing Rousseau's chicken-and-egg type conundrum (what comes first, society or language) Diderot affirmed, in a lengthy entry on language in his *Encyclopédie, ou dictionnaire raisonné des sciences, des arts et des métiers*, that language and society came together as God's gift to humanity:

> Dieu avait fait les hommes sociables; il leur inspira la première *langue* pour être l'instrument de la communication de leurs idées, de leurs besoins, de leur devoirs réciproques, le lien de leur société, & sur-tout du commerce de charité & de bienveillance, qu'il pose comme le fondement indispensable de cette société.[78] (256)

The notion that God granted language to humans in order to foster social solidarity and enable the participants of the great human fraternity to exchange ideas had been suggested by John Locke at the very beginning of Book III of *An Essay* in a passage appropriately titled "Of Words or Language in General" (Book III, ch.1). In fact, Book III defined the core problem Diderot attempted to resolve with his encyclopedic project: how to standardize language? Supplementing the spiritual origin of language, Diderot underlined its more materialistic characteristics. On the physical side, in addition to mouth and tongue, language

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of men today, and to comprehend a condition which exists no longer, which perhaps never existed, which probably will never exist, and which it is nevertheless necessary to know to be able to assess our present condition."

78 "God created men sociable; he gave them the first *language* to be the instrument of communication of their ideas, their needs, their mutual duties, the link of their society, and above all the commerce of charity and benevolence, which he asserts as the necessary foundation of that society."

involves the eyes to see remote objects, the ears to perceive utterances; and, on the moral side, it requires intelligence to understand abstract concepts and memory to recall learned words. In what seems at first glance an odd comparison with mesmerism, language for Diderot also defined a physico-moral principle capable of maintaining its integrity in the face of social pressures. But the connection between Diderot and Mesmer is not so far fetched as they both identified a relation between nature and language.

In his entry on language Diderot revealed the motivation behind the *Encyclopédie*: to purify language; to give each word a universal and fixed meaning regardless of the sounds that generate them—the only substantial difference between idioms.[79] The *Book of Genesis* provided him with a stable historical foundation on which the edifice of language had been built much like the Tower of Babel. *The Book* told the fate of the primitive, universal language that God handed to humans, the same God who found necessary to break up language in order to force humanity to scatter throughout the world into as many linguistic communities as there were geographic locations propitious to the unity of a group. Nevertheless, "men" are everywhere the same regardless of the language they speak. Where differences exist, Diderot held, they are due to factors external to the core of human nature, among the factors his list includes the type of government, religion, culture, the opportunity to generate, develop, and combine ideas, or again familial, civic, or national affiliations. Themselves

79 Diderot was mindful to make the difference between sound and meaning just as Locke was mindfull of the difference between words and language.

subject to climatic conditions, topography, the purity of water, etc. Diderot explicitly chose to ignore what he calls *interjections* which are meant to express the internal state of the soul rather than the external reality of nature.[80] Thus language for Diderot was not just destined to be a mode of expression, it was also, and maybe most importantly a mode of description that needed to be universalized.[81] The arbitrary communication of sentiments was not part of the science of language as even those who were born mute could display their feelings in some way. For Diderot, too, there were two separate realms, that of subjective feelings (which the *Encyclopedie* refused to discuss) and that of objective nature (the *Encyclopedie*'s real concern).[82]

Diderot did take into consideration the evolution of language over time; what may be aberrant language at some point, he argues, is eventually absorbed to becomes normal usage. If an ancient Gaelic druid was to survive until modern times he wouldn't have any problem communicating, as a person would evolve in concert with the common use of language. Thus the instability brought about by inevitable changes occasioned by time become neutralized by history. Diderot made clear that the standardization of language was a necessary and sufficient condition to enabling communication between two people from different times or different places, necessary even between two individuals speaking the same language: otherwise "[i]ls n'auraient pas un terme immuable de comparaison pour

80 Romanticism will of course develop in the opposite direction.
81 We will see that the universality of an assumed photographic language will have an enduring life.
82 It is a distinction that philosophers, most memorably Immanuel Kant, will try to sort out by century's end.

y rapporter leurs procédés respectifs" ("They wouldn't have an immutable comparative term against which to compare their respective activities") (257). Diderot found a resemblance between certain dialects and the primitive language which, he assures us, is the work of nature. Therefore, providing we guarantee the legitimacy of language by resting it on the sturdy shoulders of nature (of which the *Encyclopedie* is just a mirror), neither time nor space will be able to fundamentally damage its communicative function. Diderot's strategy of stabilization of language was very much in keeping with the preoccupation of his time, but the *Encyclopedie* was only one tactic in a multifaceted plan of action.

It was believed that common language may have been adequate to assist social nature in its role of mediator but the arbitrariness of ordinary words impeded the progress of science, commerce, and politics. Hence a multi-prong attack: 1) to purify and specialize language—a task undertaken with fervor by the *ideologues*' educational program; 2) to clarify and stabilize common language as much as possible which Diderot and d'Alembert endeavored to do with their *Encyclopédie*; and 3) to discover an assumed natural, universal language—the God given primitive language—traces of which could be seen in inscriptions like Egyptian hieroglyphs.[83]

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83 In *Du contrat social* Rousseau reiterates his awareness of both the problem and the solution. Rousseau bemoans the inaccuracy of language throughout the text, and in a footnote he warns the reader to be patient for an apparent contradiction is just due to the imprecision of language (Rousseau, Jean-Jacques. *Du Contrat Social*. Paris: Félix Alcan, 1896. 55 note a). Later in the text he writes, "Il y aurait une langue universelle que la nature apprendrait a tous les hommes et qui serait le premier instrument de leur mutuelle communication." ("There could be a universal language that nature could teach to every man and that could be the primary medium in their communication.") (249).

Written in the language of nature, photographic images were to realize one of the *philosophes'* dearest dreams: to devise a universal language free of the social corruption of common language. Photography's character as a universal and transhistorical language is still with us today carried by the concept of photographic literacy developed by the Education Department of many universities, as well as by the many theories of photography inspired by linguistic be they in Saussurian (sign, signified, referent) or Percian (icon, symbol, index) perspectives. Photography as a language—universal and ahistorical—is a concept that, needless to say, is entirely contestable.

The visual entertainments of the late-eighteenth and early-nineteenth centuries were numerous and varied, from Philip James de Loutherbourg's "Eidophusikon" (some sort of mechanical theater replicating natural phenomena like wind, storm, and lightning that opened in London in 1781) to "The Invisible Woman" (often a prelude to the "Phantasmagoria"). Despite their differences and excess effects, however, one way to understand the proliferation of these entertainments is that all partook of the shared goal of epistemic stabilization. Their method was to resist the ascent of the subject, to hide or eliminate the human hand (or even the entire body as in the case of "The Invisible Woman") wherever and whenever possible. Their aim was the edification of an episteme sheltered from the destructive influence of subjectivity. Many of those strategies were based on linguistic or visual signs and all were meant to circumvent the inconsistencies that come with being human. For instance, the metric system,

devised more than a century earlier, was adopted by the French revolutionary assembly in 1795 and mandated in 1837. The metric system took the dimensions of nature to generate its measuring units—a meter is one ten-millionth the distance between the North pole and the Equator, a kilogram is the weight of one liter of water, and one liter is a cube with sides one tenth of a meter each. In contrast, the old imperial system of weights and measures—still in use in the United States—was based on the human figure—an inch is the width of a thumb, a foot is the length of a human foot etc.. It will not be surprising then to learn that Arago, Daguerre's protector and champion, was one of the scientists put in charge of measuring the meridian arc by the French government in order to determine the absolute value of the meter.

Some Prevailing Theories

Writing about the conditions of England in the eighteenth century Frederick Engels remarks that,

> The jumble of countless scientific discoveries was put into order, classified and the causal connections shown; knowledge became science, and the sciences approached their perfection, that is to say, they took philosophy on the one hand and practice on the other as their point of departure [...]
>
> The culmination of science in the eighteenth century was materialism, the first system of natural philosophy and the

> consequence of this development of the natural sciences. The struggle against the abstract subjectivity of Christianity forced the philosophy of the eighteenth century to the other extreme; it opposed subjectivity with objectivity, the mind with nature, spiritualism with materialism, the abstract individual with the abstract universal or substance. (*Karl Marx, Frederick Engels : Collected Works* 470)

Much of what Engels writes could be taken as the "point of departure" of this inquiry as well. I do not think that the connection between science and philosophy in the eighteenth century was as manifest as Engels tells us it was. But science (natural philosophy) and (speculative) philosophy were both under the influence of the prevailing collective representation of the relation of humans with nature at the time.

While modes of entertainment based on popular visual practices endeavored to secure the foundation of knowledge "on the bedrock of nature," philosophers were hard at work trying to understand the theoretical structure of the epistemological problem. More than any other representative of the Enlightenment, Immanuel Kant (1724-1804) understood the limitations of the Cartesian and Humean skepticisms. Kant's insight triggered the need for a new approach to epistemological inquiry (Kitcher). The Enlightenment ended with a conundrum; the reason of the Age of Reason had to submit to self-criticism for it risked to become what it was most suspicious of: dogmatic. The problem was that

the critique of reason could not be just a subjective evaluation of human capacities; it had to rest on an objective assessment. The natural world uncovered by more and more sophisticated physical and physiological sciences proved the unreliability of the mind despite philosophers' best efforts to base knowledge on reality. Facing the limits of reason, “Kant transformed the issue by asking not 'Is knowledge possible'? but 'How is knowledge possible?'” (Popkin, Olaso and Tonelli 28).

Kant's reframing of these epistemological questions expressed the switch from *stasis* to *praxis*, from the stillness of a potentially terminal interrogation to a matter of active procedure. Kant answered the question of the path to knowledge by discerning two realms: the sensitive (from object to sensorial data) and the supersensitive (from mind to meaning). Those spheres can respectively be defined as physical and moral, external and internal, or objective and subjective, the denomination of each pair pointing to a particular set of problems issued from a common condition. Kant's dual epistemology recast the mind-body problem presented by Descartes; the Kantian dualism of two kinds of reason—pure and practical—displaced the attention of philosophy from ontology to epistemology by replacing the Cartesian dualism of two kinds of matter—*res extensa* and *res cogitans* (Stent 582).

As Frederick Beiser notes, “The Enlightenment faith in the authority of reason rested first and foremost on the possibility to find a firm foundation. The alternative to a firm foundation seemed to be the abyss of skepticism” (23). The

concept of *a priori* knowledge was Kant's path to certainty. Patricia Kitcher enumerates the advantages of *a priori* knowledge:

> (1) *A priori* judgements are necessary and universal.
>
> (2) The paradigm cases of apparent *a priori* judgements are logic and mathematics.
>
> (3) *A priori* judgements are established independently of sensory experience.
>
> (4) *A priori* judgements are unrevisable.
>
> (5) *A priori* judgements are certain or infallible. (303)

Kant was a keen observer of the thoughts of his time; he recognized the problem of the (un)certainty of knowledge and found a solution based on what he thought was an universal psychological attribute: a *priori* knowledge. Kant's transcendental philosophy—the idea that knowledge transcends experience—posits the independence of the mind from the world of objects. Sensorial data, however, belong to both as it is the result of the engagement of the mind with the body and its environment. The status of sensorial data is that of mediator between the pure reason of nature and the practical reason of humans. Unlike Berkeley's philosophy where objects are entirely dependent on physical perception for Kant empirical information takes on the form and function of raw data:

> But although our cognition commences *with* experience, yet it does not on that account all arise *from* experience. For it could well be that our experiential cognition is a

> composite of that which we receive through impressions and that which our own cognitive faculty (merely prompted by sensible impressions) provides out of itself, which addition we cannot distinguish from that fundamental material until long practice has made us attentive to it and skilled in separating it out.
>
> It is therefore at least a question requiring closer investigation, and one not to be dismissed at first glance, whether there is any such cognition independent of all experience and even of all impressions of the senses. One calls such *cognitions* ***a priori***, and distinguishes them from empirical ones, which have their source *a posteriori*, namely in experience. (Kant, Guyer and Wood 136 emphasis in the original)

For the senses to act as trigger for synthetic *a priori* knowledge implies that sensorial data are simply the byproduct of a chemical-like reaction between mind and object, self and other. *A priori* knowledge is the reach of pure into practical reason, of nature into humanity; *a priori* knowledge is a synthesis of objective and subjective, but practice allows us to render to the mind and to the object what belongs to each. With the concept of *a priori* knowledge, Kant achieves the elusive reunification of object and subject—a reunification that will later dodge both Hegel and Marx who both sought their own means to achieve the same goal.

Kant's final critique, *The Critique of Judgement*, refined a concept of aesthetics that had been part of Shaftesbury, Hume, and others eighteenth-century philosophical discussions initiated earlier. Kant stripped aesthetics of its empirical attributes to make it a universal psychological trait, as the title of §12 of *The Critique of Judgement* indicates: "*The judgement of taste rests on* a priori *grounds*" (70 emphasis in the original); and Kant insists that, "The judgement of taste is therefore not a judgement of cognition, and is consequently not logical but aesthetical, by which we understand that whose determining ground can be *no other than subjective*" (45-46 emphasis in the original). But the subjective is inseparable from the objective, and in the following sentence Kant affirms that,

> Every reference of representations, even of sensations, may be objective (and then it signifies the real in an empirical representation); save only the reference to the feeling of pleasure and pain, by which nothing in the object is signified, but through which there is a feeling in the subject, as it is affected by the representation. (46)

Are we to understand that the images in the mind (sensations) are as real (objective) as actual paintings (empirical representation)? In this case Kant suggests that the pictures Locke refers to in his *Essay Concerning Human Understanding* have similar attributes to actual images. It is a point that Kant takes pains to make:

> [w]e understand by the word sensation, an objective representation of sense; and in order to avoid misinterpretation, we shall call that, which must always remain merely subjective and can constitute absolutely no representation of an object, by the ordinary term "feeling." The green colour of the meadows belongs to *objective* sensation, as a perception of an object of sense; the pleasantness of this belongs to *subjective* sensation by which no object is represented, *i.e.* to feeling, by which the object is considered as an Object of satisfaction (which does not furnish a cognition of it). (49, emphasis in the original)

Kant's laborious separation of the objective (objects and sensations) from the subjective (feeling of pleasure) implies that objects of perception are the equivalent of real objects.

The Kantian objective view of the world has been obscured by a series of misreadings and false interpretations from Hegel to John Dewey (Kant and Friedrich xvi). As Carl Friedrich puts it "Actually, Kant's philosophy is among the most rigidly "objective" systems; it is inspired by a profound sense of reality of existence distinct from the mind of man. We shall point out presently that Kant sees the mind as essentially an instrument or tool having definite limits which it is the task of philosophy to ascertain" (Kant and Friedrich xvii). Kant's distinction

between the beautiful and the sublime further separates and distributes what belongs to the object and what belongs to the mind. "All that we can say is that the object is fit for the presentation of a sublimity which can be found in the mind ; for no sensible form can contain the sublime properly so-called" (Kant and Bernard 103).

Kant's principal object of aesthetic pleasure, or displeasure, appears to be nature, even art needs to conform to nature in order to elicit the sublime in the observer's thought (Kant and Bernard 102). Kant, the philosopher, like Crichton the physician, belongs to a group of eighteenth-century thinkers who point to nature as the repository of true knowledge and true beauty. Kant's elaboration makes possible a theory of the objectification of the images of the mind—and may be the only avenue to true knowledge. In a remarkable parallel the theory expressed by Kant also found an outlet in the very real urban environment of the late-eighteenth century.

Kant's opening of the theory of aesthetic to nature did not, however, endure. A couple of decades after Kant's death, Hegel saw to limit aesthetic theory exclusively to the field of fine art and therefore appears to push apart the two realms of knowledge previously defined by Kant—self and nature. Hegel's intellectual exercise encouraged the aestheticizing of nature—by isolating it from the natural environment—into which both Romanticism, as a line of thought, and photography, as a practice, played such crucial roles. The *Lectures on Fine Art,* published just a few year after his death, is a compilation of Hegel's and his

students' notes pertinent to the lectures he gave in the early and late 1820s. In the very first paragraph of the introduction, “Prefactory Remarks,” we are being told that “aesthetics,” in spite of the “superficiality of this word,” is the name of the “*Philosophy of Fine Art.*” And to make sure, the next paragraph begins with, “By adopting this expression we at once exclude the beauty of nature.” It is not that natural beauty is not beautiful; it is that “The beauty of art is beauty *born of the spirit and born again, ...*” (Introduction emphasis in the original) which I take to mean that art is born first in the imagination and then again in reality; art, it turns out, is the objectification of the subjective. It is a process that Hegel explains in a latter passage:

> In works of art the nations have deposited their richest inner intuitions and ideas, and art is often the key, and in many nations the sole key, to understanding their philosophy and religion. Art shares this vocation with religion and philosophy, but in a special way, namely by displaying even the highest [reality] sensuously, bringing it thereby nearer to the senses, to feeling, and to nature’s mode of appearance. (*Philosophy of Fine Art* Introduction)

Thus an art object is a special object that belongs at once to the spirit and to reality, to self and to nature, individual and universal. It is also an object that expresses the collective psyche of a nation. It is then uncanny that along with the marked differences between the British calotype (artistic) and the French

daguerreotype (realist, eagerly adopted by American photographers), Paul Brunet points out the differing photographic ethos prevailing in each country. Ethos that, according to Brunet, underlines the dual character of the idea of photography: private and individual in England; public and universal in France (117-19). In many circumstances those two pairs of contradictory characteristics would have a paralyzing effect, but on the contrary they endow photography with a remarkable flexibility.

That it took more than one hundred years for photography to integrate the art marketplace in earnest does not mean that it didn't begin early to fulfill the task Hegel assigned to art: to transform the natural into the supernatural. Why insist on Kant's and Hegel's elaboration of aesthetics? Because, regardless of the reception of their theories in France and in England—where they both were well known, if not always understood or appreciated (Azouvi and Bourel)—the concept of aesthetics, which they each discussed comprehensively, summarizes pertinent questions about the objectification of the images of the mind and the reliability of the observer. For Kant aesthetics remained a bridge between object and subject. Kant considered two aspects of beauty, one objective and rational (beauty can be found in its natural state), the other subjective (beauty can also be found in the mind of the observer), and therefore part of it escapes rationality. Hegel does not fail to rush into that breach; in making aesthetics entirely the domain of the mind he pushed art, and its associated concept, completely toward the non-rational. Aesthetics (beauty) now a function of knowledge (“until long practice has made

us attentive to it [the subjective vs. the objective] and skilled in separating it out" as Kant put it) belongs to the domain of the non-rational.

In their qualities of philosophers, Kant and Hegel possessed the analytical tools and the knowledge necessary to articulate the questions for which popular culture was only capable to attempt remedies. In the first quarter of the nineteenth century, the superficial (observation) belonged to the same category as the irrational. To my knowledge neither Kant nor Hegel made mention of de la Mettrie, Helvetius, d' Holbach, or other French materialists. Nevertheless the whole range of eighteenth-century philosophy, as their aesthetic subjectivism tends to show, had to penetrate their thoughts like it did those of the reading public. While it is not my intention to review even a brief period of the history of philosophy, it appears that from Descartes to Hegel we can see the arc of the philosophy of the mind in tension between science and art, rational and irrational. It is not that in its history beauty didn't oscillate between objective and subjective before (Tatarkiewicz). It is that in an ever expanding public sphere criticism was not restricted to politics and the sciences, as argued by Jürgen Habermas and Paul Wood respectively; if one is to consider Baron d'Holbach's list of acquaintances, the conversation must also have encompassed art and aesthetics. The stage was set for the questions highflying philosophers were capable of articulating to be felt by an increasingly large segment of the population: How rational, and therefore reliable, is the human observer? This question demanded answers that became, figuratively and literally, part of the late-eighteenth and early-nineteenth centuries'

urban landscape. After discussing what philosophy tried to express in theory, the following sections are a look at three of the popular expressions of epistemic anxiety; those suggested two possible solutions: either control over subjectivity or its complete elimination. The phantasmagoria—commonly associated with photography and cinema—discussed in the following section, appears to be the practical expression of the Kantian theory regarding the world of the object versus that of the subject.

The Phantasmagoria: Control of the Images of the Mind

The phantasmagorias, which so concerned Sir David Brewster and his colleagues across Europe, turned the camera obscura inside out—making it into a magic lantern in order to illuminate the subject, metaphorically and literally. Profiling on the horizon of the nineteenth century, the phantasmagoria became a popular entertainment on the cusp of Modernity. According to Laurent Mannoni, the phantasmagoria arrived on the scene c.1780 and was reported in several publications of the time. Henry Decremps, a professor of physics and amateur magician, narrated the experience of a young man caught “at the heart of an optical storm” (Mannoni and Crangle 137). The disturbance in question was a spectacle enacted in a darkened room and consisting of projected images of skeletons and other frightening pictures all the while creepy sound effects enveloped the space. Mannoni tells us that Decremps’ early description became a template for the enactment of all subsequent phantasmagorias. But more than a recipe, to concoct the hero of the book, M. Hill, frightening experience Decremps'

entire narrative seems to have been constructed to play on the ambiguity between subjective belief and objective reality. For instance, in the passage describing the ghostly apparitions, Decremps doesn't give a complete explanation of the phenomena his hero was subjected to; instead, in a note inserted into the chapter, he writes that to make sure that the current book is not a forgery of the original the reader should send him the last page and six *livres* in exchange for a full description of the tricks (112-14). This clever "copyright protection device" certainly relieved the author from engaging in what would be a complicated explanation but it also perpetuates the mystery that it is supposed to unravel.

Several, not always consistent, stories about a German *Gespenstermacher* (ghost-maker) named Schröpfer, were publicized as early as the second decade of the nineteenth century. The story is that Johannes Georg Schöpfer[84] — alternatively a Liepzig tavern owner, a tavern waiter, and Baron Schöpfer ("Extraordinary German Impostor" 223)—sometime in the early 1770s offered the good people of Leipzig the opportunity to visit with the soul of their dearly departed. The necromancer had built an apparatus that illuminated a cloud of smoke with an image of the dead person (Mannoni and Crangle 138-39). Of course, Schröpfer, who ultimately committed suicide in 1774 (Kittler 99), didn't care to disclose the secret of his expertise to the public but subsequent operators were not as reticent. Magic lantern operators were quite openly discussing, and even publishing, the mysterious ways of their practices, but only to the point where it would promote rather than endanger their business.

84 A premonitory name which in German means someone who rips off others.

Just three years after the French Revolution, a Philadelphia-born American going by the pseudonym of Paul Philidor introduced the Parisians of the late eighteenth century to the first rear-projection phantasmagoria. In a rear-projection set-up, which became the standard of the genre, a powerful magic lantern was hidden in a room behind a screen made of a white fabric rendered translucent by an impregnation of wax. Once the lights were turned off, and the room pitch black, a curtain opened up to reveal ghostly forms floating in the air. The projector, concealed by the screen, could move forward and back thus changing the size of the image to give the impression of the figures approaching or receding from the audience. The spectacle was accompanied by music and other sound effects such as thunder, wind, and rain—sound effects comparable to the Foley techniques of modern film dubbing. According to eyewitness reports published in several European magazines of the period, the effects were truly captivating (Mannoni and Crangle 162). The shows were always introduced by a rationalist discourse like the one disclosed in an article describing "un spectacle curieux, nouveau et instructif"[85] in the weekly *La Feuille Villageoise* published in Paris but directed to the population of the provinces. *La Feuille Villageoise* reported that an unnamed British physicist—possibly Philidor—begins his show with the following speech:

> Je ferais venir devant vous tous les illustres morts, tous ceux dont la mémoire vous est chère et dont l'image est encore présente : je ne vous montrerez point des esprits,

85 "A new spectacle, strange and instructional."

> parce qu'il n'y en a point; mais je produirais devant vous des simulacres et des figures, telle qu'on suppose être les esprits, dans les songes de l'imagination ou dans les mensonges des charlatans. Je ne suis ni prêtre ni magicien; je ne veux point vous tromper; mais je saurai vous étonner. Il ne tiendrait qu'a moi de faire illusion; j'aime mieux servir a l'instruction.[86] ("La Phantasmagorie")

After describing a spectacle where images of spirit grow and shrink at will the author foreshadows Brewster's dismissal of priestly deceits with a mockery of his own. Loyal to the mission of *La Feuille Villageoise,* which was to instruct the provincial population of the capital's political proceedings, he proceeds by launching in a diatribe against Frederik William II, the king of Prussia, whom he accused of being a dupe to crude manipulations similar to the effects of the phantasmagoria.[87]

After Philidor, the next and most remarkable talent to enter the phantasmagoria business was Robertson whose shows had a forty-year run from 1798 to 1837. His performances ended upon his death just two years before the

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86 "I will bring before you all the illustrious dead, all those whose memory is dear to you and whose image is still present for you. I will not show you ghosts, because there are no such things; but I will produce before you enactments and images, which are imagined to be ghosts, in the dreams of the imagination or in the falsehoods of charlatans. I am neither priest nor magician; I do not wish to deceive you, but I will astonish you. It is not up to me to create illusions; I prefer to serve education" (also quoted in Mannoni, Laurent, and Richard Crangle. 144)

87 Frederick William II was indeed manipulated by his Rosicrucian first minister Wöllner. For more on Frederick William II see Flenley, Ralph. *Modern German History*. 4th ed. London, New York: Dent; Dutton, 1968.

invention of photography. Robertson—his real name was Étienne-Gaspard Robert—had been educated in a Belgium seminary, where he acquired a keen interest in science and the physics of electricity. He moved from Liège to Paris in 1791 where he was a private tutor for a while. In 1798, he turned down an offer to become a physics and chemistry teacher in his native province in order to stay in Paris. It was then that he began to demonstrate his genius for the elaboration of the phantasmagoria. First, Robertson began to teach a class on the topic—a sign of the wish to rationalize the practice. That same year Robertson built a special projector with a powerful illumination system; he rented a commercial space in the center of Paris; and began to advertise his phantasmagoria. Judging by the content of his memoir, Robertson, the *phantasmagore*, foreshadowed the discursive identity of the first photographers by many years. With some pride he repeated in his memoir an article of *Le Journal de Paris* that portrayed him in the following manner:

> Robertson est physicien, mécanicien, peintre, opticien; il est tout ce qu'il doit être pour opérer sur l'imagination les plus grands effets par les sens, excepté ce qu'il ne veut pas être, Magicien, nécromancien, dans un siècle où tous les prestiges ont disparu devant la raison de l'homme, perfectionnée par les sciences exactes.[88] (178)

88 "Robertson is a scientist, engineer, painter, optician; he is all that he has to be to work the greatest effects on the imagination through the senses, except that which he does not wish to be, magician, necromancer, in a century where all those tricks have vanished before the reason of man, perfected by the exact sciences."

Those words seem to anticipate photography's own connection to science, engineering, art, magic, and death. In his well known exploration of the semiology of the photographic image, *Camera Lucida,* Roland Barthes has most successfully expressed, maybe unwittingly, the inheritance of photography as a near parent of the phantasmagoria:

> And the person or thing photographed is the target, the referent, a kind of little simulacrum, any *eidolon* emitted by the object which I should like to call the Spectrum of the Photograph, because this word retains, through its root, a relation to 'spectacle' and adds to it that rather terrible thing which is there in every photograph: the return of the dead. (9)

For Barthes and many others (Philipe Dubois and Christian Metz among others) photography has been defined by its association with death as much as by its grip on reality—Dubois even renamed photography "thanatography" (160). Hence, a photograph is a remaining trace of the ephemeral as much as the index of the real.[89] Like the phantasmagoria, photography holds a privileged place as a bridge between the material and the spiritual, the body and the mind, and life and death.

89 John Szarkowski asserts that Ansel Adams, celebrated for his nature photographs, did not photograph mountains or deserts, "geography or geology," which are the permanent features of the landscape, but the that subject of Adams's picture was the ephemeral weather (*American Photography: A Century of Images, Episode 3: The Photographic Age, 1935-1959*. Dir. Muffle, Ellen, and Hovde Meyer. KTCA and Middlemarch Films Inc. 1999.).

The dual relationship of photography to both the real and the unreal—what Bazin understood as "the ontology of the photographic image"—is in many ways a direct link to the phantasmagoria.[90] Traces of this essence can be found throughout nineteenth–century gothic novels which made good use of the synthetic embodiment of mysterious attributes in the persona of the photographer. The most famous of all was the mysterious Mr. Holgrave. The daguerreotypist in Nathaniel Hawthorne's *The House of Seven Gables* was thought to be practicing black magic in his room; he, like Philidor and Robertson, also carried on under a pseudonym. Memories of an ancient past, a curse, and pictures of the dead were what fashioned Holgrave's story. Hawthorne's daguerreotypist, Jennifer Green-Lewis notes, "is presented here as a magical force and a supernaturally gifted authorial figure" (73).

The phantasmagore's magic, like that of its successor, the photographer, was to have been able to give the illusion of controlling time and to project the pictures of the mind onto the world of things. Phantasmagorias then, like photographs now, were tangible images stolen from an intimate and unspoken dimension and offered for public consumption. Despite its immanence, the dimension in question remained palpable only by it appearances. The spectators of the phantasmagoria sat in the dark chamber facing the manifestation of the

90 Bazin wrote that photography was the essence of cinema. It was the theory that gave birth to the realist cinema of the French New Wave. However, what is now termed "postmodern" photography (the work of Cindy Sherman, Nan Goldin, and Jeff Wall, for instance) on the contrary takes its inspiration from cinema. The genealogy common to photography and cinema is thus reaffirmed but with a twist; the relationship affirmed by Bazin has now been turned on its head.

pictures that had first formed in their heads. The audience had physically broken through the previously impenetrable separation between thought and reality; it stood on the dark side of the retina, at least for a while. It is at this moment that the metaphor of the camera obscura reached its apogee and collapsed in an instant, for the observer was now physically inserted in (the *camera obscura* of) the mind.

From this perspective, we can consider, then, that the phantasmagoria, despite its manifest association with the irrational, came from the wish to uncover a rational foundation for the images of the mind, to turn the camera obscura inwardly, as it were, to capture ideas, memories, and phantasms in the hope to understand and maybe take control of one's fate. It appears to be an expression of the realization that matters of life and death were not God's exclusive dominion anymore.The predilection of the nineteenth century for spirits and their manifestations is not foreign to those familiar with Victorian literature. And, according to John Durham Peters's *Speaking Into The Air*, contacts with the world of "doppelgangers" were a complement of the nascent communication technologies which defined nineteenth-century modernity as a challenge to space and time. Along with rear projection and the mobility of the magic lantern— which allowed to manipulate the size of the projected image— the duplicitous lectures described in *La Feuille Villageoise* became a customary staple of phantasmagorias. In her investigation of the eighteenth-century predilection for the uncanny Terry Castle remarks:

> In the process of the formation of the introspective subject of Modernity the spectre-show of the late eighteenth and early nineteenth centuries, we will find, mediated oddly between rational and irrational imperatives. The producers of phantasmagoria often claimed, somewhat disingenuously, that the new entertainment would serve the cause of public enlightenment by exposing the frauds of charlatans and ghost-seers. (143)

The phantasmagoria was not only an early manifestation of the rise of the subject as such but also an ambiguous means to gesture toward stabilizing the increasingly wavering epistemic regime of the end of the Classical period by attempting to get rid of superstition. But photography didn't sprout suddenly to turn into the instant remedy for the period's epistemic malaise. Concurrent with the phantasmagoria we can find several other visually oriented strategies foregrounding the invention of photography. The analysis of those strategies' physical manifestations—phantasmagoria, panorama paintings, and dioramas—and their social character gives us important clues as to the genealogy of photography.

The Panorama: Erasure of the Subject and the Control of Space

The first 360-degree panorama was conceived and realized in London by Robert Barker (1739-1806) who had obtained a patent from King George III in 1787. The acquisition of a patent did not just protect the inventor from

unscrupulous competitors[91] but it also subsumed, symbolically and practically, a mode of artistic expression[92] to the rule of law. Panoramas weren't meant to explore free expression but were integrated in a structure that regulated individual agency with a set of objectifying rules. Rules external to the operation of panoramas added an extra layer of tangibility to their existence and increased the weight of their social effect. Although not his first,[93] the largest panorama so far (250 square meters), titled *View of London From the Albion Mill,* opened in Leicester Square in London on May 1793. The painting attracted the beneficent attention of the artistic elite in the person of Sir Joshua Reynolds and that of the public at large. In his pre-cinematic history Laurent Mannoni describes Barker's Panorama, which served as model for all subsequent ones:

> The spectator was admitted onto a raised platform, in the center and about halfway up a cylindrical room with a conical roof, to view a large painted canvas stretched around a circular wall. This 'panoramic' view represented a landscape or a battle scene, a monument or some similar object. It was carefully created, with perspective, 'depth of field', and chiaroscuro effects. The canvas (which was effectively endless, since its two ends met and joined the

91 In that regard the patent wasn't effective at all, as many competitors set up their own panorama paintings, not only in London but also in the major European cities and other parts of the world.

92 Panoramists were refused the protection of copyright because panoramas were judged to be a mechanical rather than artistic rendition of nature (Comment, Bernard. *The Painted Panorama*. New York, N.Y.: Abrams, 1999. 8)

93 His first public panorama was *The* P*anorama of Edinburgh* that was shown with questionable success in his own house.

> picture continuously) was lit at an angle from above, through a glazed opening formed in the roof of the building. (176)

Panoramas became instant successes wherever they were built in Europe. Trying to circumvent Barker's patent French and German inventors, each in their own country proposed several technical improvements to the original panorama. On the continental side, Robert Fulton—of the steamboat fame—obtained a French patent for his panoramic system as well. And the official status of the panorama was further endorsed in France by a government inquiry conducted by the *Institut de France* (Oettermann 146). One of the enhancements proposed by Fulton would have allowed him to effortlessly alternate up to eight canvasses. Fulton's system was never constructed and the rights to his patent were bought by an other American entrepreneur, James Thayer. In September 1799, Thayer opened his panorama in the Jardin Des Capucines so close to the entrance of Robertson's "*Fantasmagorie,*" that Robertson worried the superior artistic quality of the competing attraction would undermine his business.

The word "panorama," which became a generic term like Kleenex and Frigidaire, didn't come from ancient times but was especially minted in 1793 for Barker's New Panorama on Leicester Square in London[94] (Oettermann 105). Many of those panoramas displayed landscapes that were already familiar to the inhabitants of the cities where they had been set up. In Paris, Thayer presented a

94 The word "Panorama" is a combination of the Greek root *pan* meaning all and the word *horama* meaning view.

painted view from the Pavillon des Tuileries which, at the time, offered an encompassing vista of the most important architecture of the city. From a survey of Oettermann's *Panorama: History of a Mass Medium*, one can easily conclude that in the early-nineteenth century the staging of sights already familiar to the public was a trope of panoramas world wide. The panoramic urban landscapes were most often alternated with minute depictions of battle scenes, faithfully painted according to the testimony of eyewitnesses. In London, along with the view of *London from the Albion Mills, Southwark* Barker exhibited *The Battle of the Nile.* In some cases the painter set out to the location of the event in person. For instance, John Thomas Serres drew the sketches for his much admired *The Pandemonium of Boulogne,* a depiction of the 1804 blockade of the French harbor of Boulogne[95] by the British fleet, from the deck of the *Leopold* flagship of the Royal Navy during that event (Oettermann 125-26). When live witnesses weren't available, the event was reconstructed from military reports and other accounts.

The urban landscapes like the battle scenes, by far the favored topics of panoramas, were not representations of the hand of God or the possession of a single individual—as natural landscapes and most of the art from previous centuries might have been—but depictions of the handy work of man. However they didn't tell of humanity's triumph over nature but of the conquest of "man" over what was perceived to be his own nature.[96] The detailed panoramas of the

95 The Royal Navy was blocking the French harbor of Boulogne to prevent the immanent invasion of Britain by the Napoleonic army.

96 In each of the countries were a battle scene was on display it was that of a victory. While the British painted the 1804 blockade of Boulogne the French represented the 1793 retreat of the British and Spanish fleets in Toulon.

large Western European cities, especially when shown to their inhabitants, were not representing the domination of the natural order but mastery over the social order. They stood for the objectification of the subjective, and were an affirmation of human's power over human nature.

Panoramas were touted as a mode of travel without the dangers and discomfort of actual travel; but images of foreign lands and foreign cities looked like surveys of the colonial projects of European nations; and thus participated to the internal justification of those nations' "civilizing missions." Soon after its invention, it was a task that photography would simplify and expand. Photography made it easy to multiply the image of the exotic subject thus reinforcing the stereotypes attached to the uncivilized in order to shore up the European identity.[97] The panoramas of exotic foreign cities like the panoramas of battle scenes were depictions of the encounter between nature and culture, rather than the expression of a fanciful desire to see the world, as the reviews of the many panoramas of distant cities, like Rio de Janeiro, Mexico, or Lima painted by Robert Burford, testify. In the first quarter of the nineteenth century, images of exotic places most often depicted a mix of the domesticated and the wild; similarly to the urban panoramas of foreign cities, they sometime replaced, images of battle scenes illustrated the clash of the civilized and the uncivilized. The confrontation of the tamed with the wild was sometimes described explicitly

97 The many aspects of the uses and abuses of photography as an ethnographic instrument has been studied in books too numerous to be mentioned. For a summary see Ranger, Terence. "Review: Colonialism, Consciousness and the Camera." *Past & Present*.171 (2001): 203-15.

as in this review of Burford's panorama of Calcutta in a critical article for *The Times of London*:

> The river covered with the boats of the natives, and the ships of European structure, forms an important feature of the Panorama, and the distant buildings, consisting of country houses and villages, give an agreeable finish to the distance.…
>
> The native prince, mounted on an elephant, and attended by a numerous escort, is one of the gayest and most prominent part of the assembly; one of those infatuated devotees, who perform a kind of voluntary penance, by being swung in the air at a distance of 20 feet from the ground, suspended by a hook inserted in the muscle of the back or breast … ("Panorama of Calcutta")

The reviewer to continue with a detailed description of a religious festival involving "the whole of the motley population." The "boats of the natives," assumed to be primitive, are set against the modern structure of the European vessels, and the domesticity of the white men's "country houses" contrasts with the roughness of the native "villages." In this particular review, the encounter between the tamed and the wild is further symbolized in the description of bizarre religious customs. When depicted as battle scenes the encounters between savagery and civilization appears much less benign. Consider this narration of the

panorama of the battle of Navarrino also published in The Times of London in 1828:

> The attention of the spectator is, however, chiefly and justly riveted on the most important part of the action, the opening of the fire of the *Asia*, which, […] is pouring in gallant style her annihilating bullets into the unfortunate vessels of the Turkish and Egyptian Admirals, the gaudy trappings of which form a good contrast to the plain, solid, and compact appearance of Sir E. Codrington's ship. ("Mr. Burford's Panorama of the Battle of Navarrino")

The streamlined look of the crafts of the British Navy is opposed to the organic shapes of the Turkish and Egyptian fleets. In this description even the aesthetics of the ships carry the symbol of the differences between civilized and uncivilized, culture and nature.

Germany, like many other European countries, was a site of the development of panoramas in the nineteenth century. Johann Adam Breysig, a set designer and an expert in rendering perspective, claimed to have conceptualized the panorama independently from Barker at about the same time. Breysig, who wrote in his memoir that he was inspired by a view of Rome, was involved in the construction of a single panorama, *Rome from the Palatine Hill*, which was a failure due to flaws in constructing the rotunda (Comment 51-52). But other German entrepreneurs pursued the construction of panoramas, and by the first

year of the new century panoramas operated in Hamburg, Leipzig, and Berlin (Comment 51-56). The simultaneous conceptualization of the panorama in England and Germany, and its swift development in France and throughout the rest of Europe, indicate the transnational character of the responses to the threat of epistemic destabilization within the relatively homogenous western European cultural environment.

Like phantasmagorias, panoramas were introduced to the public with a form of rational discourse. Panoramas were an ensemble made of pictures and words—brochures, advertisements, and reviews. The panoramas' *assemblages* included the mention of information that tended to rationalize the representation; for instance, the size and surface area of the paintings were almost always part of panoramas' advertising campaign. In the same promotional material the public was forewarned as to the deceptive nature of the image. The following classified announcement—and variations of such—ran in several newspapers beginning in late May 1791; it advertised Barker's partial rendition of the *London from the Roof of the Albion Mill* panorama that he installed in his own backyard before building the Leicester Square rotunda. The classified advertising went through several iterations in its latter form the area of the painting is emphasized by spelling it out in all caps on its own line:

ON MONDAY NEXT WILL OPEN,

THE PANORAMA;

> Which is allowed by most eminent Masters to be the greatest IMPROVEMENT to the ART of PAINTING that has ever been discovered.
>
> THE PANORAMA is erected on the Spacious Ground behind Mr. BARKER's house, No. 28, Castle-street, Leicester-square. The present Picture, containing
>
> ONE THOUSAND FOUR HUNDRED AND SEVENTY-NINE SQUARE FEET,
>
> Is a Representation of one of the best known Scenes in Europe; which, without any other deception than the simple art of the Pencil, appears the same as Nature in extent, and every other particular; and will be opened for Inspection at ten o'Clock every Morning.
>
> Admittance ONE SHILLING.

("On Monday Next Will Open the Panorama")

A decade later, another celebrated panorama painter, Thomas Girtin, advertised *Eidometropolis*,[98] a panorama of London, "which contains 1944 square feet" (Girtin quoted in Oettermann 120). The publication of the physical characteristics of the images was one crucial step toward the objectification of the representation, accuracy and truthfulness, also characteristics of panorama paintings were two more.

98 Eido for the Greek *eidon* (I saw) or *eidos* (idea or form). In the mind of its creator the *Eidometropolis* may have represented the ideal form of the city as it was.

Besides managing canvasses of mammoth size and weight, a remarkable achievement of panorama painters was their ability to create images which could be seen with the correct perspective from an almost infinite number of points-of-view.[99] Unlike the anamorphic Albertan perspective practiced since the early-Renaissance—which was based on a point of view that could only accommodate a single observer at a time—panoramas made the artifice of perspective equally transparent from all locations, effectively erasing the position of the privileged subject.[100] In today's terms, the style of painting used to create the room-size panoramic canvasses would be referred to as hyperrealism—a manner of painting that produces images virtually indistinguishable from photographs. The hyperrealist (photography-like) appearance of panoramas turned them into a combination of art and science—a qualification that photography took as its own. And more importantly, the critics' appraisal, which most likely repeated the information printed in the brochure handed to visitors, gave all the technical details pertaining to the "taking" of the image—a term already in use in the 1790s almost five decades before the invention of photography. Specifications would include the height of the point of view, the time of the day, the atmospheric conditions, and sometime the actual distance of various elements from the observer.[101] In his review of Pierre Provost's *Boulogne and the Fleet Assembled for the Invasion of England*, for instance, the critic for the *Journal London und*

99 The production of those paintings like their appreciation were collective enterprises.

100 The expectations of democracy, consistent with the political mood of the time, were also expressed in the design of theatrical sets.

101 As far as technical specifications go the only difference with photography would be the information pertinent to the lens—focal length and aperture.

Paris let us know that "The *point of view* is taken from a height of twenty four feet" and that "One sees Fort Napoleon about three hundred *toises* [550 meters] from the mouth of the harbor." (cited in Oettermann 148 italics in the original).

The reconciliation of nature with human nature was accomplished by a series of multiple erasures whose objective wasn't to make the invisible visible, as in traditional painting, but to eliminate subjectivity by asserting the materiality of all things. The first order of criticism, or praise, in the public's assessment of panoramic pictures was the subtlety by which atmospheric conditions were rendered without degrading the sharpness of details. Panorama painters were celebrated for their mastery at reconciling aims that seemed to work at counter-purpose, "atmosphere" traditionally standing for subjective perception while "accuracy" is a reminder of the invariability of the objective world. As the *Times of London* critic reviewing Burford's panorama of *The Battle of Navarrino* told his readers:

> The beauty of such portions of the sky as are seen peeping through the mountains of smoke, almost causes a regret to be felt that any of it should be obscured. *But truth must not be sacrificed to beauty.* ("Mr. Burford's Panorama of the Battle of Navarrino" my emphasis)

Many reviews of panoramas pointed to the difficult compromises the painter had to face, but the rule of panorama painting was to always promote the truth and for the painter to repress any undisciplined artistic impulses. By the same token the

review of Burford's *Pandemonium of Milton*, one of the very rare panoramas representing a work of fiction, was criticized in those terms:

> The difference between productions purely artificial and fanciful, and those which are built 'upon the rock of nature' is very wide, and in proportion as works of art recede from the sublime model, does the judgment concerning them become bewildered and uncertain. (New Panorama)

The reviewer finds himself faced with a personal micro-epistemic crisis; he is disoriented by a fictional panorama which seems to be on both sides of reality and fiction at once. The writer's bewilderment flows from having to fuse the real and the sublime, nature and culture, in a medium developed to uphold the sort of knowledge "built upon the rock of nature." In this particular case the reviewer ultimately decides to succumb to "*voluptas"* rather than to try to sort out the *ratio* of truth to beauty.

The erasure of the viewing subject was performed concurrently with the erasure of the author and by the same means. The extraordinary abundance of details which pushed the hand of the artist into the background did not leave any room for the imagination of the observer, effectively blocking the subjective input of the viewer who remained a passive, if interested, spectator. Before being able to admire those magical views, as they were qualified then as a sign of their extra-sensorial origin, spectators had to enter a long dark hallway. Then the audience had to climb up a slightly dizzying spiral staircase to emerge at the center of an

elevated platform—to about half the height of the painting—surrounded by a balustrade. This brief journey from the outside to the inside was meant to let the spectators' eyes adjust to a lower lighting level and to slightly disorient them—erasing as much as possible their impression of the outside. Once on the platform, the public could move around freely but remained separated from the image by a 7-to-10-meter space, most often filled with what appeared to be a natural landscape. The top edge of the image was hidden from view by a canopy suspended above; since the canopy didn't touch the canvas, the image disappeared behind its edge giving the illusion of extending upward to infinity. In this set up the image didn't appear to be formally framed; it was indeed advertised as a picture without a frame (Oettermann 143).

To display a picture without an actual frame removed all reference to external reality as well as to the traditional artifices of representation. Unlike a traditional painting a panorama was neither an art object nor a fractional rendering of a particular locale, but an all-encompassing representation of the world. The observers found themselves completely engulfed in an illusion which confounded the medium with the objects of the world to create a reality actually and figuratively folded upon itself (Egginton 4). The images of the panorama produced an environment that was judged to be equal to, if not better than, nature itself. Writing about the rendition of the landscape surrounding the city of Geneva in one of Burford's panoramas the *Times of London* critic felt literally transported:

> The beholder himself contemplating not a draught, but in reality the overpowering majesty of Mont-Blanc, and the luxuriance of the vallies and hills which are strewn at its feet. His imagination stays not until he fancies he feels upon his cheek the breeze sweeping along the mellow waters, and wafting to his ear the delicious sounds of the lute and the guitar. ("Panorama of Geneva")

In a neoclassicist burst of enthusiasm, this critic quoted a verse from Virgil's *Æneid XII*, "*Non haec humanis opibus*" ("This is done not of man's knowledge"). Overwhelmed by the most perfect copy of reality, the writer can't avoid expressing the complete erasure of the subjectivity of the painter—replacing it by the objectivity of natural representation—while projecting his own sensation into the painting in an exchange of objectivity and subjectivity which anticipated the need for the invention of photography. In this case the panorama painting accommodated both a subjective and an objective representation unlike traditional painting which, always mediated by human intervention and forced into idealizing conventions, can never incorporate a truly objective vision.

The Diorama: Control of Time

The diorama was patented by Daguerre both in France and in England; it was also sanctioned by the French government in 1839 when Daguerre received a pension for life for his two inventions, the diorama and the daguerreotype. The first diorama[102] opened in Paris in July 1822. As described by Laurent Mannoni, it

102 After the opening of the initial diorama in Paris and the one in London, both built at

consisted of a large building 16 meters high, 27 meters wide, and 52 meters long housing a rotating auditorium 12 meters in diameter capable of sitting 350 people. Facing the audience was a 7.5 by 6.5 meters horizontal opening in the wall. As the entire rotunda holding the audience pivoted around its vertical axis on ball bearings, the wall opening would align with one of two large painted screens distributed around the structure—a third stage was reserved for works in progress. The paintings were separated from the audience by a proscenium some 13 meters deep similar to that of a theater but entirely framed in black in order to confound the frame with its surrounding. The novelty of the first Dioramas eventually wore out as they simply presented giant canvasses, some 23 meters wide by 14 meters high, which changed appearances due to a clever alteration of the light illuminating them, going from night to day or vice-versa.

Subsequently the diorama evolved into a more sophisticated spectacle. The double-effect diorama consisted of a canvas made of light fabric that was painted with an image on each side. The lighting modification did not just alter the appearance of the frontal image but changed the ratio of the light coming from the front and the back (187). By lowering the illumination on the front and increasing it coming from the back, simultaneously one image substituted for the other, an effect similar to the cross-fade common in today's film and television production. In one of the favorite topics of the diorama both in France and in England, Gothic churches in various stages of decay, the image on the front would show the

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the initiative of Daguerre several imitators popped up throughout Europe, but the better known, most celebrated, and the only ones I discuss are the originals.

interior of the church in daylight while the one on the back would be the same view dimly lit by moonlight at nightfall. Daguerre and Charles-Marie Bouton, his business partner, were acclaimed set designers for the theatrical stage and the Paris Opera. The two artists had such control over lighting techniques that they could simulate the passing of a twelve-hour period of time within fifteen minutes. Daguerre and Bouton were capable of designing very sophisticated effects such as changing the appearance of the weather or filling and emptying the pews of the church during midnight mass—a simulation that was used repeatedly.

In his *Essai sur l'histoire des panoramas et des dioramas,* Germain Pabst relates the story of the invention of the panorama by Robert Barker. In that story Barker finds himself in debtor prison. The only light his jail cell receives comes from a window up high carved in the wall close to its intersection with the ceiling. It is while reading a letter held against the illuminated wall that Barker notices the unusual glow of the light reflecting off the paper. This is what, according to Pabst, gave Barker the idea to illuminate a large painting from above (7). What is significant, in what is most certainly an urban legend, is that Barker wasn't inspired by a sweeping view, like Breysig claimed to be, but by the effect of the light falling from a high window. What transpires from Pabst's[103] anecdote is that panoramas, like dioramas, were principally remarkable for their demonstrations of the mastery of light, a transitory and difficult-to-control aspect of nature and, not by coincidence, the key element of photography. Such command of light

103 To his credit Pabst himself doubted of the veracity of this anecdote.

demanded a refined and extensive knowledge of that particular natural phenomenon.

In addition to their hyperrealist appearance, panoramas went through an evolution similar to that of photography and cinema in their transformation from the static image of the 360° panorama to the unfolding of the "moving panorama." In the moving panorama the viewer remained stationary as the landscape, such as the shores of the Mississippi, unrolled from a long painted canvas while an announcer provided a commentary on what was seen. As has by now been widely acknowledge this development provides a link between the history of panoramas and that of motion pictures. It is a history that leapfrogs the invention of photography by going directly from panorama to cinema without first giving much thought to the relation of the panorama with still photography. It is a history that treads closer to the evolution of technology than to that of culture.

Because of their common appeal to realism, panorama and photography were both excluded from the realm of art in the same terms. As Bernard Comment puts it, "It is therefore not surprising that the criticisms targeted against it [the panorama] were similar to those made of *camera obscura* and, later, those addressed to photography, namely that it was a mechanical, soulless reproduction of the real, devoid of any artistry" (86). The diorama and its imitators complemented the epistemological function of panoramas, but where panoramas froze time in the unfolding of space, the diorama displayed the unfolding of time in a constrained space. For our purpose we will ignore the technical and aesthetic

differences between panorama and diorama, which relied on similar visual tricks and knowledge of cognitive behaviors. Thus from the onset, panorama, diorama and photography shared more than just an aesthetic precept—the accurate reproduction of the environment—they were "structuring structures" playing an important role in the organization of the social, economic, intellectual and legal spaces of the late-eighteenth and early-nineteenth centuries. Panoramas and dioramas[104] were apparatuses that exploited a special architecture to display colossal paintings illuminated with dynamic lighting effects. More than any other type of building, the architectural structure of panoramas and dioramas delimited interior and exterior spaces both physically and emotionally. Panoramas and dioramas were gigantic *camera obscura* if not in the exact scientific principle at least in their internal appearance and general intentions. Despite the fixed dimensions of their artificial environment,[105] the view spreading around the enchanted spectators seemed to be almost without limit reaching all the way to what appeared like a natural horizon. In the mix of metaphor and mimesis that unifies panoramas and dioramas, we can identify the modern expression of the interiority depicted in Vermeer's paintings *The Geographer* and *The Astronomer*. After more than one hundred years of a history marked by fundamental changes in philosophy, science, politics, and the economy, the human insightfulness modeled

104 Diorama was a term coined for the establishment L.J.M. Daguerre opened on Rue Samson in Paris, in 1822.

105 The dimensions of Barker's panorama were 84 feet 6 inches for the diameter and 35 feet 9 inches for height; but over the years their diameters varied between 30 and 130 feet with heights between 16 and 48 feet with the ideal size having been determined to be, for cognitive reasons, around 100 feet in diameter Stephan Oettermann, *The Panorama : History of a Mass Medium*, trans. Deborah Lucas Sneider (New York: Zone Books, 1997).

after the elite of Descartes' century was enacted in the form of entertainment in order to reassure the nineteenth-century modern public that knowledge was indeed possible.

While panoramas and Dioramas were the most popular expressions of the epistemic struggle of the late-eighteenth and early-nineteenth centuries, they were not the only style of representation expressing a yearning for the truth of nature. Several other manners of painting or drawing stylistically intersecting each other dominated the late-eighteenth and early-nineteenth centuries. *Vedute esatte*, for the Italian "exact view," were small but accurate renderings of urban or natural landscapes especially popular with seventeenth- and eighteenth-century affluent tourists on the "Grand Tour."[106] *Vedute* artists included Canaletto,[107] Guardi, Bellotto, and the architect Piranesi, to only mention a few of the better known. *Vedute* are so precise and reliable that they have been used as reference images in several modern projects. The restoration of the Warsaw Ghetto destroyed by the Nazis in 1944 (Ursyn) and the very mathematical task to complement the accuracy of geospatial data in the reconstitution of ancient landscapes (Fairbairn) are two of the recastings of eighteenth-century *vedute* in the twenty-first century. *Vedute*, which for some were just an intermediary step in the practice of painting, have also inspired a number of photographic undertakings.

106 The "Grand Tour" was a tour of the European cradle of civilization, Greece and Italy, as well as the centers of the birth of Christianity in the Middle-East, egypt and Palestine. The Grand Tour was popular with upper-class youth who was urged to make the visit part of their education since the sixteenth century.

107 There is some evidence that Canaletto, along other famous *vedute* painters, used a camera obscura. See Lüthy, Christoph. "Hockney's Secret Knowledge, Vanvitelli's Camera Obscura." *Early Science and Medicine* 10.2 (2005): 315-39.

In the mid-nineteenth century, Robert Mac Pherson, a British *vedute* painter installed in Rome was selling his production to Grand Tour travelers. Mac Pherson switched to making photographic albums of the Italian landscape, devoting to them the same attention as his paintings. Mac Pherson's photographs, although rare in Italy, are now an important part of many British collections (B. Millet 63). Bernard Millet even suggests that Mac Pherson abandoned painting in favor of photography simply because of the superior realism of photography over painting, and not because of speed or practicality (65). More recently, Giambattista Piranesi's drawings inspired Randolph Langenbach, a conservationist and photographer, to retrace the steps of the eighteenth-century architect around Rome with the intention to photograph the same views of the city's ancient ruins drawn in the mid-1700s. While the 2003 project revealed that Piranesi took many liberties with perspective and point of view, the drawings were accurate enough that by combining several photographs with the help of digital technology Langenbach was able to approximate the original images with an uncanny degree of accuracy. Laugenbach's reveals that Piranesi's goal was to mix objective and subjective vision, art and science. The combination of the mechanical and the intuitive was not unusual in visual representation at the time. That blend of art and science common to photography and Piranesi's work may explain why a photographer felt encouraged to follow the architect's path.[108]

108 To see more work comparing photography and Piranesi's drawings see Brooke, Steven, et al. *Views of Rome*. New York: Rizzoli, 2000. and Levit, Herschel, and Giovanni Battista Piranesi. *Views of Rome, Then and Now*. New York: Dover Publications, 1976.

Romantic paintings are in many ways the opposite of panorama paintings: they often depicts an imaginary landscape rather than a real place; they convey feelings through the exploitation of transient atmospheric phenomena such as mist and sunset rather than being sharp and clear; they emphasizes the hand, as well as the subjectivity, of the artist rather than attempting to erase them. But there is one thing that panoramas, romantic paintings—including in their neoclassical flavor—and photography have in common: the abundance of details. If visitors to a city panorama could recognize their dwelling's windows, visitors to an exhibit of romantic paintings were able to recognize the essential qualities of nature in the minute rendering of a rock or a blade of grass. One of the most celebrated German Romantic painters, Casper David Friedrich, is well known and appreciated for his precise depiction of nature:

> The accuracy of observation evident both in the carefully outlined details of Friedrich's monument and in the distant inlets of the view of Juel's [...] is not sustained in the foliage or in smaller details of the foreground. Before long, however, as Friedrich's feeling for landscape grew in intensity, it was accompanied by a growing sense of realism, a more penetrating investigation of the actual appearance of things. (Vaughan 79)

Friedrich doesn't turn toward more abstraction to communicate feeling but on the contrary toward a more naturalistic portrayal of nature. In fact the *vedutes*

published in popular almanacs and travel guides provided Friedrich with inspiration for his Romantic landscapes. Friedrich was drawing *vedutes* of his own, not as finished products but as "*clichés*"[109] of details, such a rocks or trees, for later use in a major compositions (T.F. Mitchell). While Romantic painters, among them Friedrich, did not copy nature their evocation of the essence of the natural passed through the accurate rendition of details, a preoccupation similar to that of panorama painters. But there is one more hidden connections between panorama and romantic painting: it is a preoccupation with the functions of nature in relation to humans and the environment. As we have seen, panoramas alternatively represented the accomplishments of the social nature of humans—with pictures of cities—and its wild, aggressive side—with pictures of war and of what was considered primitive people. Similarly, Romantic painters endeavored to represent the function of the natural world in combination with human interiority. Romantic painters depicted the mountains and trees that allowed for the natural flow of fresh water indispensable to the sustenance of human life (W.J.T. Mitchell 457) and conversely they expressed the power of environmental nature and the turmoil of human nature when painting ships battling the stormy sea, which was "a stock theme of the romantic era, an image of man at the mercy of the elements" (Vaughan 70). Lorenz Eitner writes of the romantic style of "storm-tossed boats" that,

> They were chosen—consciously by some artists, more or less intuitively by others—because they gave visual form to

109 To use a photographic term.

> feelings otherwise vague and inexpressible, to feelings which were part of the general emotional climate of the time. This explains their widespread occurrence, in literature and in art, and their use by artists who belonged to rather diverse stylistic currents. **(**289)

The images of boats tossed by the storm that so concerned romantic poets and painters, the decay and ruins favored by eighteenth-century neoclassicists (Johnson, 56-59) were not just representations of the forces of nature; they were also the expression of the disorder of internal human nature. Regardless of the stylistic differences between panoramic and romantic paintings, or even between romantic painters in England and those in Germany, the panoramic pictures of battle scenes like the storms depicted by the romantics expressed human disorder in quest of stability.[110]

Romantics, who have been depicted as idealists by many late-twentieth-century scholars, may in fact be more representative of the class of intellectuals of the period concerned by the integration of the mind and the body (Richardson). Johann Wolfgang von Goethe, that symbol of German romanticism, provides us with a link between romanticism and the panorama experience as well as an example of the romantics' absorption with the body. Here the poet tries to conquer his fear of height in order to enjoy unfettered the vista from the top of the Strasbourg cathedral:

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110 A stability that they sought to achieve with their artistic and political ambitions (Johnson 67).

> I was especially troubled by a giddiness which came over me every time I looked down from a height […] And thus I attended the clinical course of Doctor Ehrmann, as well as the lectures of his son on obstetrics, with the double view of being acquainted with all conditions, and of freeing myself from all apprehension as to repulsive things. And I have actually succeeded so far, that nothing of this kind put me out of my self-possession. (407)

As Oettermann points out "What Goethe is striving for here is the elimination of all obstacles to achieving a cool and level-headed view of things, a view unclouded either by subjectivity of physical frailty" (13). Goethe, whom Jonathan Crary choses as the poster child for the romantic expression of the subjective, knew well the necessity to subdue subjectivity in order to "get a grip on things," but for those who weren't endowed with such insight the half-century between 1780 and 1830 devised the variety of steadying mechanisms we have just surveyed.

The Effect of Excessive Mimesis.

Panoramas and dioramas were more curiosities than a works of art, a distinction that was going to be shared by the early daguerreotype. Panoramas and dioramas pertained to be simulations, perceived as exact copies of the real world. It was a characteristic that placed them on the outer fringe of representation and stripped them of the cathartic power of mimesis. In his comparative study of the

work of Nicolas Poussin and Michelangelo Caravaggio, *To Destroy Painting*, Louis Marin analyzes the characteristics of simulacrum as an excess of mimesis:

> [i]mitation maintains distance between the copy and the model, thereby allowing the mind and theory to examine the law by which mimesis is controlled and mastered. By eliminating the distance between the model and its copy, a trompe l'oeil traps the perceiving eye at the level of appearance-as-essence […] In as much as the trompe l'oeil generate stupefaction, it can have neither a contemplative nor a theoretical effect. (100-01)

The absence of contemplative or theoretical effect participates in the erasure of the subject to the profit of the object. The excruciatingly accurate copies of reality that were panoramas not only muted the subject from all sides but also conflated reality and representation in an attempt to inoculate knowledge against human irrationality.

Panoramas were aesthetically hyperrealist and socially hyper-rational. "More than just the aesthetic counterpart of a natural phenomenon, the panorama was both a surrogate for nature and a simulator, an apparatus for teaching people how to see it [nature]" (Oettermann 12). In 1829, for an extra six-pence over the price admission visitors could look at Thomas Hornor's massive panorama of London at the Colosseum with a *camera obscura* giving the public an *avant-goût* of the ultimate remedy devised to cure the long century's epistemic malaise. It

may make sense to want to experience viewing a landscape through the mediation of the *camera obscura*, but the double mediation carried out by the addition of the camera and the painting points to the century's obsession with the need to systematize and compartmentalize the relationship of nature with culture.

Contemporary critics of the panorama, like modern analysts, understood the encyclopedic rather than artistic nature of panoramas. Oettermann reports the following review of Hornor's panorama showing at the Colosseum: "Histories, descriptions, maps and prints, are all imperfect and defective when compared with the immense panorama—hey are scraps and mere touches of the pen and pencil—whilst this impart at a glance *a Cyclopedia of information*" (137). Throughout the late eighteenth-century, European panoramas were a throwback to the safe episteme of the *Mathesis Universalis* of the age of reason while they undertook a massive instructional program unconsciously designed to reeducate a population faced with the vertiginous prospect of a radical reevaluation of the nature of knowledge. Panoramas and dioramas came at a time when the integration of the mind with the body was overtaking Cartesian dualism. The creation of an interiorized but stable representation of reality was an attempt to reconcile the knowing subject and the intelligible object within a predictable relationship protected from the potential failure of a mind subjected to the vagaries of the body. Panoramas were at once an expression of the anxiety generated by an increasingly wavering episteme, and an attempt at providing a stable epistemic foundation. But, whether in a panorama or a diorama, the artist was still the agent

of the representation introducing doubt concerning the objectivity of the image. A better method would have to be found, one that did not involve the taint of human subjectivity in any way, shape, or form.

Chapter Four

The Invention of Photography

Rare and isolated instances of literary conceptions of photography appeared in the second half of the eighteenth century. The following passage excerpted from *Giphantie*, a utopian novel written by Charles-François Tiphaigne De La Roche in 1760,[111] is often quoted in histories of photography and cinema for describing what appears to be a prescient depiction of photography:

> Tu sçais que les rayons de lumière, réfléchis des différents corps, font tableau, & peignent ces corps sur toutes les surfaces polies, sur la rétine de l'œil, par exemple, sur l'eau, sur les glaces. Les esprits élémentaires ont cherché à fixer ces images passagères; ils ont composé une matière très-subtile, très-visqueuse & très-prompte à se dessécher & à se durcir, au moyen de laquelle un tableau est fait en un clin d'œil. Ils enduire de cette matière une pièce de toile, & la présente aux objets qu'il veulent peindre[...]
>
> La précision du dessein, la vérité de l'expression, les touches plus ou moins fortes, la gradation des nuances, les règles de la perspective; nous abandonnons tout à la nature, qui, avec cette marche sûre qui jamais ne se dément, trace sur nos toiles des images qui en imposent aux yeux, & font

111 The novel was translated in English in 1761. Giphantie is an anagram of the author's name.

douter à la raison si ce qu'on appelle réalités ne sont pas d'autre espèces de fantômes [...][112] (131-34)

Eder dismisses this passage as a poetic fantasy which was either inspired by "ideas which we found expressed thousand of years earlier by the Roman poet Statius" or by the author's awareness of Schulze's work in chemistry (89). Georges Potonniée, another celebrated early historian of photography, is even more gloomy than Eder when railing against *Giphantie* which he accuses of being a childish fantasy. "Non, la Giphantie n'a pas prévue la photographie et, bien loin d'avoir aidé en quoi que ce soit à sa découverte, c'est la photographie qui a découvert ce plat roman et l'a tiré d'un éternel oubli,"[113] he writes (56).

As Potonniée points out, *Giphantie's* pictures are made without the help of a camera; they are images forming on a canvas like reflections in a mirror. It could be pointed out to Potonniée, however, that a century later several modern medical imaging technologies—MRI, PET-scans, and CAT-scans, to name a few —do not use a camera either, and Talbot himself produced his "photogenic drawings" by the direct contact of objects with sensitized paper bypassing the

112 "You know that the rays of light, reflected from different bodies, produce an image and that the object appear delineated on all polished surfaces, as on the retina of the eye, in water and on mirrors. The elementary spirits have studied how to fix these fugitive images. They have composed a most subtle substance which is very viscous and prepared so as to dry quickly and harden; by the help of which a picture is produced in a few moment. They coat a piece of fabric with this substance and submit it to the objects they want to paint...
The precision of drawing, the truth of appearance, the more or less pronounced effects, the gradation of the shades, the rules of perspective; we leave all that to nature, which, with a sure and never-erring hand, paints pictures on our canvas which deceive the eye and makes one's reason to doubt..."

113"No, Giphantie didn't predict photography, and far from having helped in any way in its discovery, it's photography which has discovered this flat novel and pulled it from an eternal neglect."

camera all together in his own time, neither did Man Ray use a camera to make his Rayograms. In the medium's histories that are ostensibly based on the progress of the optic and chemistry of photography, such as Eder's and Potonniée's, *Giphantie* was easily dismissed as a fantasy. But Batchen speculates that Tiphaigne de la Roche's *Giphantie* may find a place in a more socially oriented history of photography (51-52), an assessment with which I agree wholeheartedly.

The first pioneers of photography, acknowledged as such by Eder and other histories, are Thomas Wedgwood and Sir Humphry Davy. Wedgwood and Davy were able to obtain negatives of drawings and other translucent objects, such as tree leaves and insect wing, by contact with a sheet of paper or a piece of leather sensitized with a solution of nitrate of silver but their experiments with the *camera obscura* bore no result. They published a paper on their research in 1802 but were unable to find out how to stabilize the images which blackened entirely when exposed to sunlight. Eder points out that this paper was the first communication published specifically on the reproduction of drawings on a support sensitized with silver nitrate. The story of Wedgwood and Davy's experiments including a reprint of their article is told in detail in Eder's history of photography. Eder acknowledges their pioneering efforts but denies them the title of "first photographers in the world" (140). After Wedgwood's death, Davy abandoned his work on photography to the profit of his research in electro-chemistry and his other duties.[114] According to Eder it was not until François Arago was preparing his speech announcing Daguerre's invention to the Academy

114 Davy's duties included the presidency of the Royal Society from 1820 until 1827.

of Science that the scientific community found out about Wedgwood and Davy's experiments. Eder blames Davy's lack of interest after Wedgwood's premature death in 1805, for having to wait another 34 years for photography to be invented. Eder even speculates that a means to fix the image formed on the sensitized paper was within reach if only Davy had read Scheele's report on ammonia[115] (135-41).

It should be pointed out that Wedgwood and Davy's partnership represents a much touted characteristic of photography: the collaboration of art and science. Each of the partners was interested in the properties of light for his own reason, Wedgwood, the artist, was the son of an celebrated potter and Davy, the scientist, had a kin interest in the nature of light and had already performed several experiments regarding its behavior (H. Hartley 155). However, the objective of Davy's investigation was not to invent photography, but to find a way to let nature "speak for itself," a goal that he was successful in achieving by chemical experimentation rather than photography. When the artistic half of the partnership passed away Davy turned exclusively to the method of science; for him experiments conducted with scientific logic accomplished the same objective as a photograph potentially could—to assist an unbiased understanding of what was considered to be the real world. Science was even superior to photography because in its pure form science wasn't encumbered by the artistic conventions. In Davy's eyes a photograph could only be an approximate advance toward ascertaining the global truth about nature. As a chemist Davy could understand

115 Actually, Davy could have figured out, as both Talbot and Daguerre did, that all he needed to stabilize a photographic image was a bath of salt water.

the difference between picturing a compound nature versus breaking it down into its primary components. Davy's discovery of the chlorine element (Cl), for instance, was more representative of his own interests in analyzing the components of nature than photography that only produces a compound picture. Davy's lack of concern for photography wasn't a lack of curiosity but a different trust in methodology. For Davy, and for much of the Western European elite at the turn of the eighteenth and nineteenth centuries, scientific experimentation was one of the many avenues allowing for the objectification[116] of nature, just like panoramas and other optical and pseudo-scientific endeavors were for common people, or intellectual cogitations were for philosophers. With an uncanny similarity to Wedgwood and Davy's association, photography was invented simultaneously by a scientist and by an artist—Talbot and Daguerre respectively —although not in partnership this time.

116 "Objectification" is taking here in its widest definition and not as an indication of the system of objectification studied in Daston, Lorraine, and Peter Galison. *Objectivity*. New York, Cambridge, Mass.: Zone Books; Distributed by the MIT Press, 2007.

Claims and Claimants to the Invention of Photography

Although the independent duplication of invention is not a rarity,[117] it was only the years between 1816 and 1839 that saw a flourishing of activities related to researches in various photographic processes. Most of those experiments were conducted independently of each other. The upsurge in activities that began in the early decades of the nineteenth century indicates a growing desire to photograph. Batchen undertakes to determine the earliest traces of this desire which he finds in discourses originating in the mid-1790s. Batchen's analysis maintains the notion of the rapid emergence of the demand for photography; that is certainly true but it appears to be the effect of epistemic uncertainty rather than a cause in itself as he argues. Indeed, the series of manipulations that made photography a reality were assembled, rather than discovered, during the few transitory decades from the end of the Enlightenment to the beginning of Modernity.

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117 As early as 1922 William F. Ogburn and Dorothy Thomas pointed to the fact that many inventions were simultaneously made by independent inventors. They suggest that cultural and sociological factors, in combination with "mental ability," must be at work in such a phenomenon. Despite the generality of their conclusion, "[t]he processes of cultural evolution are to be explained in cultural and social terms, that is, in terms of sociology and not in terms of biology and psychology." Ogburn and Thomas notion of "culture and sociology" seems to be stuck in a field solidly bounded by science. It is only decades later that Thomas Kuhn and Robert King Merton unstuck the sociology of science from the limit of this field at the same time that sociology in an alliance with psychology gave birth to the social psychology hinted nearly a half-century before by Emile Durkheim. See Ogburn, William F., and Dorothy Thomas. "Are Inventions Inevitable? A Note on Social Evolution." *Political Science Quarterly* 37.1 (1922): 83-98., Merton, Robert King. *The Sociology of Science : Theoretical and Empirical Investigations.* Chicago: University of Chicago Press, 1973., and Kuhn, Thomas S. *The Structure of Scientific Revolutions.* International Encyclopedia of Unified Science. Foundations of the Unity of Science,. 2d ed. Chicago: University of Chicago Press, 1970.

Niépce, Daguerre, and Talbot have become household names—at least in historian of photography households—but, as the list compiled by Pierre Harmant[118] shows, the early history of photography is replete with postulants to the title of inventor of photography. Notwithstanding Walter Benjamin's assertion in "A Short History of Photography" of a clear path to the invention of photography, the large number of aspirants to the title of "original inventor" did cloud the beginning of photography. In the midst of the various contentions, it does appear that, at least, five individuals had legitimate claims to the invention of photography without contest. They are, Nicéphore Niépce, Louis-Jacques-Mandé Daguerre, Hippolyte Bayard, William Henry Fox Talbot, and Sir John Herschel. The participation of the other aspirants is more questionable, or, as in the case of the American Samuel Morse, who, despite his claim to have been able to obtain a negative on paper some years before 1839 (Taft 11), should rather be linked to the "reinvention" of photography as Marien and Brunet understand it. But as noted by Batchen one of the most remarkable things about this long list of contenders is that so many people professed to have had a long and deep interest in photography in the first quarter of the nineteenth century. The surge of awareness of the possibility of photography in the early 1800s contrasts sharply with the total absence of a discussion about photography prior to the closing years of the eighteenth century (32, 52).[119]

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118 Cited in the "Introduction."

119 Among the many claimants figures Hercule Florence, a Brazilian of French origin, who deserves a special mention as he is the latest figure to emerge in that group. Florence's achievement which came to light in the last third of the twentieth century from the efforts of Boris Kossoy, a Brazilian historian of photography, have been

1839 Official Year of the Birth of Photography.

By the late 1830s rumors were circulating[120] that scientists from different nations were about to uncover the secret of making the images of the *camera obscura* permanent. Arago, renowned scientist and politician, informed of Daguerre's discovery, saw the potential for improving France's international standing by offering the invention to the public on behalf of the French government. In January 1839, Arago and a few of his academician friends began to lobby the government for the attribution of a life pension to the inventors of photography—Niépce and Daguerre—in exchange for releasing their secret to the public. Finally after several reports to the *Académie des sciences*, to the *Chambre des députés*, and to the *Chambre des pairs* Arago unveiled the daguerreotype on August 19th of that year (Gaudin 43). With Arago's presentation the invention of photography had acquired a formal date of birth as well as a nationality. A fact later acknowledged by Talbot who concluded "A Brief Historical Sketch of the Invention of the Art" with those words: "[I] think the year 1839 may fairly be considered as the real date of birth of the Photographic Art, that is to say its first public disclosure to the world" (36). Talbot, though, vaguely aware of Daguerre's

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vigorously contested notably by Derek R.Wood. Despite Kossoy's efforts it seems that Florence does not hold a legitimate place among the pioneers of photography. On the other hand Bayard's discovery of a direct positive process on paper is not in doubt but was recognized late. Except for a meager recompense of 3000 francs awarded him, in 1842, by the *Société d' Encouragement pour l'Industrie Nationale (*Gernsheim 69), Bayard was ignored to the profit of Arago's protégé Daguerre. After abandoning his own process to devote his skills and talent to Talbot's competing negative-positive system Bayard became a famous and successful photographer in the mid-1800s. In 1851, Bayard became a founding member of the *Société française d' héliographie* whose short existence—less than a year—prompted the creation, three years later, of the still existing *Société française de photographie.*

120 Or were circulated for strategic reasons by Daguerre's allies.

research was nevertheless surprised by the publication of the daguerreotype process. Talbot had introduced his own photographic method in a communication to the Royal Institute in January 1839, but without revealing the secret of his process. In 1841, Talbot patented a positive/negative system that he called "calotype" (Talbot's system used a paper substrate for both the negative and the positive). In the beginning, the need to reverse the image by exposing a new sheet of sensitized paper through the negative was seen as an inconvenience. Eventually negative-positive manipulations proved to be more advantageous for both artistic control and commercial duplication than the direct positive processes of Daguerre or Bayard which yielded a unique image with little possibilities of manipulation subsequently to the original "take."[121]

With an official date of birth after its long period of gestation, photography began to forge an autonomous cultural identity. Daguerre's original photographic technique became so widely and wildly popular that the lithographer Theodore Maurisset dubbed it "*Daguerreotypomanie*" in a lithograph that became a canon of the history of photography.[122] Some thirteen years later, in June 1852, the journalist A. Humbert was still mocking the popular "mania" in an article whose title he borrowed from Maurisset. In that article Humbert singled out one of the 52 processes "*en vogue"* for their particularly ridiculous claims. Humbert's

121 The negative-positive system was further improved when in 1851 Frederick Scott Archer patented a method that enabled photographers to use clear glass rather than paper for their negatives.

122 A copy of that print can be found in the Musée d'Art Moderne et Contemporain de Strasbourg, in France, as well as the George Eastman House, in Rochester, New York, the Gernsheim collection at the university of Texas in Austin, Texas, and the National Gallery of Canada, in Ottawa. It has been reproduced in many books dealing with the history of photography.

article prompted the inventor of the "*Accélérateur Millet*" to answer in the following issue of the satirical journal "Le Tintamarre" that chemistry allowed man unthinkable feats and "la photographie sans retouche" ("unaltered photography") was no laughing matter (M. Millet). Millet was insisting on the two elements that still defined photography more than a decade after its invention: first, that it is a natural chemical process, and second that it is a serious mode of inquiry that shouldn't be tinkered with. As we will see in the following section, Millet's reaction was not without relevance with the conception of photography on the American continent.

American Daguerreotype "Exceptionalism"

Despite the rapid progress of photography technology with the invention of the wet collodion process in 1851,[123] Daguerre's process, slow and cumbersome as it was, kept flourishing in the United State a few years longer after it became obsolete in Europe. It was still practiced by American professional photographers—a number of them well familiar with the wet collodion process—more than occasionally as late as 1862 (Taft 136). *Humphrey's Journal of Photography and Allied Arts and Sciences* of February 1866, reports that, in the January meeting of the American Photographical Society, Professor Draper presented to the members a daguerreotype made by his own method of "silvered glass,"[124] in 1864, in order to explain the fading particular to this type of images

123 The year Daguerre passed away. The collodion process allowed a sensitive emulsion to stick to glass, thus allowing the use of clear glass instead paper to produce a negative. Archer didn't patent the process which gained rapid acceptance throughout Europe for its ease of use compared with the daguerreotype process.

124 Rather than on silvered copper.

("American Photographical Society" 296). The longevity of the daguerreotype in America is a phenomenon that cannot be simply attributed to the slow diffusion of the wet collodion technique which wasn't patented and remained free to use. Daguerreotypes did have a quality of precision and luminescence unequalled by any other process. As late as 1937 the daguerreotype was described as "[a] thing of real beauty, and in some respect is not surpassed by the products of any modern process, for a good daguerreotype possesses brilliance and shows detail far better than any paper print" (Taft 7).

In America, the daguerreotype was an immediate success right after its introduction Samuel Morse, who was in Paris in the Winter of 1839 to present his invention of the electro-magnetic telegraph to the *Académie des sciences,* heard of Daguerre's invention from Arago—president of the *académie,* and inventor of the electro-magnet essential to the telegraph. Morse arranged to meet Daguerre personally and wrote of his encounter to his brother on March 9, 1839. By the end of April that letter was made public by a New York newspaper (Newhall 15). It was an announcement which preceded Arago's official introduction of the daguerreotype to the French public by several months. According to Robert Taft, in early March, 1839, "The Boston *Mercantile Journal*, printed a description of the finished result of Daguerre's process as compared to a rival process by the Englishman, Talbot" (8). This descriptive article was picked up by a variety of newspapers throughout the country. Notwithstanding some expressions of perplexity, across the nation many interested Americans were ready to accept the

new invention and even eager to try it as soon as the details of the process could reach them. Daguerre's pamphlet explaining his process, *Historique et Description Des Procédés Du Daguerréotype et Du Diorama*, published just a few days after Arago's announcement, was soon translated in English. Newspapers had raised the expectations of American readers and it was with great excitement that the daguerreotype manual was received toward the end of September 1839. Details of the process, sufficient for experimenting, had been available for some weeks before, already propagated by the British press reaching America. Excerpts of Daguerre's booklet were reproduced in American newspapers in late August (Taft 14-15). By the Fall of 1839, Morse was able to execute a daguerreotype of the Unitarian Church in New York City (Newhall 22). But if Morse was the most famous American daguerreotypist he wasn't the first. Beaumont Newhall reports that another New Yorker, of whom little is known, D. W. Seager, claimed to have taken a daguerreotype on September 16, less than a month after Arago's August 19 presentation (22).

If one is to believe Alan Trachtenberg the daguerreotype generated a fair amount of anxiety which was expressed in various articles and a number of novels and short stories ("Photography :The Emergence of a Keyword" 26-37). Nevertheless daguerreotype portrait studios, then called “galleries,” were quickly established in Boston, Providence, New York, and Philadelphia in the very early-1840s. Robert Taft tells us that “In 1853, the New York *Daily* Tribune estimated that three million daguerreotypes were produced annually and, judging from the

known number of daguerreotypists, this does not seem unreasonable" (63). According to Susan Williams, in that same year, daguerreotypists numbered between 13,000 and 17,000 (162). Not only was the quantity of daguerreotypes produced in America astonishing but the quality of the best of them was recognized internationally. During the World Fair held, in 1851, at the Crystal Palace, in London[125] many American daguerreotypes took top prizes (Taft 69).

The acknowledged superiority of American daguerreotypes was attributed to the American continent's more favorable climate compared to Europe, a fact disputed by Taft who points rather to Yankee ingenuity, mechanization, and the role of competition as grounds for the success of American photographers (72). Without dismissing Taft's argument, which probably holds some truth, I will argue in favor of an additional possibility. While photography's form is indebted to realism, which in Europe is understood as contra-romanticism, realism made the daguerreotype especially compatible with the American concept of the romantic life. There is little doubt that the rapid propagation of the daguerreotype in America was, to some extent, due to the recognition of its business potential. Photography, then like now, had a low cost of entry and promised high returns. The severe recession that began in 1837 and the subsequent high unemployment may have pushed some enterprising spirits to investigate the business possibilities

125 Despite the fact that the a large proportion of the many American daguerreotypists were hacks. In his social history of early American photography Robert Taft dedicates several pages touting the superiority of American daguerreotypes to the point of making a critical reader wonder if as late as 1937, histories of photography had completely shed their nationalistic character, which was not the case. In Europe nationalistic sentiments were displaced onto claims of paternity for the invention.

of the novelty. But the commercial success of the daguerreotype confirms the interest of the public in photography regardless of which side of the camera they stood. The quick development, triumph, and longevity of the daguerreotype (as opposed to other photographic processes) in America and the popularity of the photographic portrait, appear to be signs of their particular affinity with typically American philosophy and politics.[126]

As for the slow adoption of the collodion process by American photographers compared to their European counterparts, it could be argued that the need to recover the heavy investment in the mechanization of the preparation of the daguerreotype silver coated copper plates—which had to be polished to a mirror-like appearance before being sensitized—in some large commercial studios offered a disincentive to switch. But, from a business stand point this last argument doesn't carry much weight. While the investment in a steam-powered buffing machine may soon turn out to have been a waste of money, the streamlining and increased efficiency of the wet collodion process would amply compensate for the loss. And many of the larger commercial studios did switch early for certain types of work despite those perceived obstacles. Mathew [sic] B.

126 For instance, in his anti-slavery (and nevertheless racist) pamphlet, *Slavery*, published in 1835, just a few years before the announcement of photography, William Ellery Channing, a prominent Unitarian, advocated a rationalist argument similar to that advanced by European daguerreotypists, even calling for the separation of the "flesh" from the "spirit," that is separating subjective passions from a moral objective (9). What Channing promoted was by and large the position of the Unitarian Church. Unitarianism had a major influence on American transcendentalism (Ralph Waldo Emerson among, other transcendentalists was a Unitarian, and Morse's choice of the New York Unitarian church for his first daguerreotype may not have been completely innocent). Channing's little book is but an example of the path leading from the rationalist argument developed by the European Enlightenment so influential in Europe to American philosophy.

Brady, for instance, adopted the wet collodion technique as soon as 1855 but continued to offer daguerreotypes to his most discerning customers. The technical and financial motives did not present sufficient forces to slow the spread of the wet collodion process in America—especially when we know of the swift adoption of the daguerreotype in the first place.

On the American continent the name daguerreotype became synonymous with truth, authenticity, accuracy, and richness of details. It was used to designate objects other than the images obtained by Daguerre's process; from a city on the bank of the Hudson river, “Daguerreville,” to a magazine, *The Daguerreotype,* established in 1847, to discuss not daguerreotyping but literature and science in general (Taft 63; Trachtenberg "Photography: The Emergence of a Keyword" 17; Rudisill 71). Writes Richard Rudisill:

> The spread of the daguerreotype through American consciousness was remarkably fast, as these examples of use of the word indicate. […] The most significant aspect of the medium's reception, however, is the great variety of ways in which its function was conceptualized. (76)

In America a daguerreotype was not just an image, it was a concept that found its way through all the strata of society from the intelligentsia of the East Coast to the pioneer of the West. “Daguerre himself was hailed as a kind of American national hero” notes Trachtenberg ("Photography: The Emergence of a Keyword" 21).

The graininess and lack of details, that made calotypes appear more like drawings, because of the softening of the positive image by the paper texture of the negative, appealed to European who had little appreciation for the details of the daguerreotype and no tolerance for its mirror-like effects—brilliance and left-to-right reversal. But those characteristics, which dissociated the daguerreotype from the traditional artifices of art, were precisely what attracted the American public and intellectuals. While for its British inventor photography was the pencil of nature, referring to European artistic inclinations, for the American Oliver Wendell Holmes it was a "mirror with a memory,"[127] (129) an exact reflexion of nature. The daguerreotype's incomparable sharpness and fidelity of details as well as its copper support—a direct link to an earthy quality—was more in tune with the American spirit of the mid-nineteenth century than the calotype which exhibited too much of a man-made, rather than natural, appearance. Their grainy surface gave calotypes the look of impressionist paintings and the soon to appear wet collodion, despite approaching the quality of the daguerreotype, was not quite the "real thing"—although convenience and cost made its adoption inevitable.

From the moment it had become a reality the European public recognized the ambiguity of the photographic image. Despite Arago's definition of photography as an art and a science, repeated throughout Europe and acknowledged with few variations, scientific applications far exceeded artistic prospects. Defenders of photography were in no pain to enumerate a wide array of scientific applications, from geology to photometry, but were reluctant to make

127 Thus validating Tiphaine de la Roche's description in *Giphantie.*

photography an art of its own. Unlike their European counterparts American practitioners didn't suffer from such ambivalence. For them art or science wasn't the point; the truthfulness of the representation, its profusion of details, and accuracy were far more important. They adopted the daguerreotype rather than the calotype, and switched to the wet collodion process when they finally recognized that they traded very little in authenticity for convenience. The lack of success of the calotype, which became truly practical as soon as 1841,[128] is attributed to the deterrent effect of Talbot patenting his system while the un-patented daguerreotype was free to use. Talbot's action may have had some effect but the British inventor was only granted a US patent at the end of June 1847; for the six years prior to that time interested Americans could have used his process without hindrance, but few did. Talbot's process was even made public in the *Journal of the Franklin Institute* as soon as April 1839, several month earlier than Daguerre's. Draper, credited as one of the first portrait photographers reproduced Talbot's results successfully but favored the daguerreotype anyway. The calotype found some takers in a few young experimenters—most were teenagers or college students—possibly because of its simplicity and low cost (Taft 110-12). American photographers went from the daguerreotype to the wet collodion process—and its variants ambrotype and tintype—without bothering much with the calotype.

Reflecting on “the daguerrean mystique” especially as it unfurled in America Trachtenberg writes:

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128 The calotype presented several advantages over the daguerreotype: it was simpler, cheaper, lighter, and reproducible but it lacked acuity and speed.

> From the beginning the daguerreotype excited people into a state of awe, wonder, reverence, clashing with disbelief, and provided a *frisson* of something preternatural, magic, perhaps demonic. A flickering image on mirrored metal, encased like a jewel in a decorated box, the daguerreotype seemed a simulacrum of the real: too real to be understood as just another copy of the world, too immediately compelling to seem only a likeness. ("Likeness as Identity : Reflections on the Daguerrean Mystique" 175)

Daguerreotypes were more than a simple copies of nature; they were its duplication, its repetition. What a religious icon did for a mystic figure, the daguerreotype did for nature: it did not simply reflect, it was nature incarnate. Marcus Aurelius Root reports, in 1864, that Morse, then president of the National Academy of Designers, addressing the concerns of painters about the daguerreotype on April 24th, 1840 remarked that:

> Its [the daguerreotype] influence on the artist must be great. By a simple and easily portable apparatus, [...] which will enable him to enrich his collection with a superabundance of *materials* and not *copies*; *they cannot be called copies of nature, but portions of nature herself.* (391 emphasis in the original)

In his report Root insists on the idea that a daguerreotype in not a simple copy but "nature herself." Root's remark distanced the American vision of nature and photography even further from that of Europeans. Europeans saw nature as a truth to be understood; American saw it as a truth to be imitated (Looby).[129] For the former nature was the object of science, for the later it was way of life. As Christopher Looby puts it, "In the thought of cultural leaders of the early national period, there is a kind of automatic metaphorical exchange between images of natural order and ideas of social and political order" (253). For Europeans photographs were drawings by the sun while Americans, later enthused by the stereograph, saw photography with the same properties as bronze sculptures—sturdy and lifelike.[130]

In America the formerly Cartesian and Kantian dualisms were each repositioned by transcendentalist philosophy in a manner that made of photography an effortless bridge over appearance and reality, the mind and body divide. As Ralph Waldo Emerson posits in the introduction of *Nature: Addresses and Lectures*:

> Philosophically considered, the universe is composed of Nature and the Soul. Strictly speaking, therefore, all that is separate from us, all which Philosophy distinguishes as the NOT ME, that is, both nature and art, all other men and my

129 Hence the importance of preserving it in its pristine state by creating national parks.

130 An exception needs to be made for true Romantics, but in Europe they were confined to a small group of like-minded intellectuals while in America romanticism intellectualized by the East Coast intelligentsia and experienced by homesteaders shaped the ethos of the entire country.

> own body, must be ranked under this name, *nature*. (4-5 emphasis in the original)

Without hesitation Emerson places all that is not his mind, including his physical body, in the realm of nature. Emerson's new dualism—the me and the not me—could have been reconciled by Mesmer's fluid of animal magnetism.[131] It is photography, however, that proved to be the tool most suitable to the task of reconciling the me and the not me.

The Daguerreotype magazine, mentioned above, had for mission to report accurately and in detail, but also to consolidate, the best of supposedly disparate European thoughts. Thus the word “daguerreotype” did not just stand for picture perfect but also for unity. As its publisher wrote as a way to introduce the publication:

> The *Daguerreotype* is, as the name imports, designed to reflect a faithful image of what is going on abroad in the great Republic of Letters; and, in order that this purpose may be accomplished, it will be our aim to make the several parts of which it shall consist combine together, and produce one harmonious whole. ("Other 6 - No Title")

The relation between American philosophy and photography has been largely ignored until now, but I believe that philosophy—or a popular version of its highflying conceptualizations—was as much an impetus for the development of

131 Mesmerism did find some success in America, and the hero of Nathaniel Hawthorne's *The House of the Seven Gables*, the daguerreotypist Holgrave, was once a mesmerism public lecturer.

photography in North America as the commercial drive or the attraction of novelty. On the American continent, the history of the portrait is singularly indicative of the link between photography, philosophy, and social identity—providing us with a textbook example of the potency of the social function of photography.

What happened early with remarkable fervor on the new continent, although more subdued, also happened on the old. The making of early daguerreotype portraits was not an exclusively American or Canadian affair. French and Belgian daguerreotypists[132] had had some success despite an exposure time of more than 20 minutes in bright sunlight, requiring their model to keep their eyes closed. Those pioneers used tricks such as powdering the hair and whitening the face that were adopted by early American experimenters. It is, however, Americans who made the first significant advances in shortening the exposure time sufficiently to be able to capture their sitters with their eyes open, producing a more natural and lively likeness.

The prosperity of the daguerreotype in America went hand in hand with the eagerness of New World photographers to take photographic portraits. As mentioned in the Introduction, both Talbot and Daguerre didn't believe in the imminent practicability of portraits mostly due to the length of the exposure. American photographers therefore endeavored, with more eagerness than their European counterparts, to reduce the exposure time. They used a variety of

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132 M. Jobard of Brussels, in Belgian and the Parisian M. Susse, in France, (Richard. *Mirror Image : The Influence of the Daguerreotype on American Society.* 1st ed. Albuquerque: University of New Mexico Press, 1971. 60-61).

techniques, from applying white powder to the face of their sitter as the Europeans did—John William Draper—to devising a camera that used a concave mirror instead of an lens—William S. Johnson and Alexander Wolcott—and shrinking the picture's size. But it is by increasing the sensitivity of the plate that an American daguerreotypist—Robert Cornelius in association with Paul Beck Goddard[133]—was finally able to reduce the exposure time to a "mere" 65 seconds. Far longer than 1/8 of a second deemed by modern photographers to be the longest exposure for a portrait without noticeable blur but workable given a suitable apparatus to restrain the movements of the head and hands of the sitter for a little over a minute.[134]

The photographic portrait, at once "me and not me," seemed especially well adapted to make whole once again what Emerson saw as a divided life-world. In a commentary on the mechanics of sight that enables humans to appreciate nature written circa 1836, a few years before Arago's presentation, Emerson offers what appears to be an uncanny justification for the invention of photography:

> The eye is the best of artists. By the mutual action of its structure and of the laws of light, perspective is produced, which integrates every mass of objects, of what character

133 Goddard, a Philadelphia physician, discovered a method to increase the sensitivity of daguerreotypes by exposing it to bromide vapors after the iodine sensitization recommended by Daguerre. This additional step became a standard practice.

134 Fast emulsions, developed by the Kodak company in the late 1880s, and fast shutter speeds (1/8 second and shorter) allowing candid "instantaneous" photographs have been in use since the apperance of the Kodak #1 camera in 1888.

> soever, into a well colored and shaded globe, so that where the particular objects are mean and unaffecting, the landscape which they compose is round and symmetrical. And as the eye is the best composer, so light is the first of painters. There is no object so foul that intense light will not make beautiful. (15)

The motivation for a uniquely American artistic genus was never more felt than at the beginning of the nineteenth century when American visual arts and literature were trying to wane themselves from the influence of European romanticism (Spiller). Photography afforded the American intelligentsia and their middle-class followers a slew of opportunities, the first one being to adopt a mode of expression free of weighty traditions and make it typically American. Photography could even do instantaneously what American literature was trying strenuously to accomplish: to create a distinctively American form counter to European thought.

The legacy of American transcendentalism on art in general and photography in particular had a far reaching effect despite the ephemerality of the American transcendental movement. Emerson's “photographic discourse” found a faithful echo some 100 years later in the photographs and essays of the classic American photographer Edward Weston. As Ralph F. Bogardus reminds us “To Emerson, Thoreau, and Weston, the facts of nature were there to be discovered if only we would look hard enough” (350). Between the era of the daguerreotype

and that of the social landscape,[135] the so called "straight photography" movement that succeeded the attempts at art photography of the pictorialists was rapidly adopted by American modernist photographers—such as Weston. Straight photography, a distinctively American style, appears to have been the direct descendent of the coupling between the unadulterated style of the American daguerreotype and transcendentalist philosophy.[136] Modernist photography's intention was indeed to feature the "object in itself" but unlike Emerson's celebration of the spirit of a natural object—albeit man-made—its style was to extract external appearance, form rather than content,[137] to the detriment of any other quality, thus limiting and even perverting the transcendentalist fundamentals.

Ultimately Weston, Ansel Adams and other famous nature photographers of mid-twentieth century ended up stuck in a nineteenth-century romantic frame of mind. Since Emerson's time, society has evolved away from the natural world and toward a landscape shaped by humans' domination of nature. Therefore, according to Bogardus, the authentic heirs to the transcendentalists are the photographers whose critical vision focus on the social order; among them Bogardus counts Robert Frank, Bruce Davidson, Lee Friedlander, Diane Arbus, and Leslie Krims (359). To Bogardus's list we should add the Canadian

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135 "Social landscape" is a denomination that surface circa 1966 with the publication of several retrospectives of the work of several American photographers active around the mid-twentieth century.

136 Reminding us of Millet's thought that unaltered photography was no laughing matter.

137 Strangely in compliance with Oliver Wendell Holmes's enthusiastic description of the stereograph allowing the form to be "*divorced from matter.*"

photographer Edward Burtynsky whose work is a perfect counterpoint to that of a celebrated American landscape photographer, Ansel Adams; and a fitting illustration of the new character of landscape photography. Where Adams photographed the majestic landscapes of Yosemite National Park, Burtynsky photographed the man-made inverted mountains that are the granite quarries digging deep into the earth rather than rising above deserted plains. Burtynsky's pictures the glowing rivers of nickel tailing rather than the pristine reflexion of the pics of Glacier National Park in the mirror-like water of McDonald Lake or the shimmer of the Snake River slithering its way from the picks of the Grand Teton range as Adams did. Turning his camera away from the ancient symbol of a society in the making, Burtynsky's photographs show us the reality of what could become that society's undoing.

Individualism, Democracy and Photography

An additional distinction with Europe, that portended well for the success of the photographic portrait in America, was the general acceptance and even celebration of individualism that paired with the enterprising and pioneering spirit of Americans. Individualism was a character trait that, at least initially, did not fare well in the old world. Koenraad Swart gives us a thorough definition of individualism:

> From the very beginning, “individualism” was used to designate at least three highly dissimilar clusters of ideas: first, the idealistic doctrine with equalitarian implications of

> the right of man, or what may be called political liberalism; secondly, the anti-statist, largely utilitarian doctrine of *laisser faire*, or economic liberalism; thirdly, the aristocratic cult of individuality, or Romantic individualism. (77)

The various types of individualism that Swart sees as "highly dissimilar clusters of ideas" found some coherence in the mind of the American public. What many European nineteenth-century writers perceived as the root of an evil bent on destroying sociability, became part of the American spirit fostered by a capitalism and industrialism imported from England and rapidly developing on the new continent. Michel Chevalier, an early-nineteenth-century French visitor, observed of the "Yankee" that "Il est l'individualisme incarné; chez lui l'esprit de localité et de morcellement est poussé à la dernière limite" ("He is individualism incarnate; in him the sense of locality and partition is driven to the last limit.") (104). But, while Chevalier derided Yankee individualism and at the same time admired the Yankees' prodigious sense of business, industriousness, and imagination, articles published in American magazines during that period gave a positive spin to the notion of individualism (Swart 86). The painted portrait, which had been the privileged expression of the superior character of the aristocracy, and in America of revolutionary heroes, found in photography a medium that made the expression of the belief that character could be imaged accessible to everyone who could spare the 25 cents that some daguerreotypists were content to pocket.

Silhouettes made in large quantity with the physionotrace had been in fashion with famous historical persons like George Washington, as well as common people, since the end of the previous century (Lukasik 433-34). Christopher J. Lukasik argues that, "The proliferation of the profile portrait and silhouette in early America began to separate the assumed relationship between a portrait's costs of production and its capacity to communicate extraordinary social character in public, and […] it was able to do so because of the logic of physiognomic distinction" (437). By focusing on the face only at the expense of the richness of the environment and the luxury of the clothes, Lavater's theory of physionomy displaced the meaning of portraits from character signified by wealth to character signified by physical characteristics. Among the many incentives to have one's portrait taken the middle classes, which once could only dream to be associated with the noble character of the figures of their nation's historical past, could now be one step closer to their ideal. Daguerreotype portraits facilitated a tradition of nation-building that started several decades before the invention of photography. A decade and a half after mid-century Root, himself a successful photographer, touted the beneficial moral and educational effect of photography in strengthening social cohesion, family ties, and educating the masses (26-29).

European visitors commented on the lavishness of American daguerreotype galleries, which had the solemnity of temples adorned with marble columns and expensive draperies:

> Ils [American photographers] font d'énormes dépenses pour leurs ateliers. Ce sont de véritable palais, digne d'entrer en comparaison avec les demeures enchantées que les orientaux prêtent aux héros les mieux doués de leurs *contes*. Marbres taillés en colonnes, ou animés sous l'habile ciseau du sculpteur ; tentures richement brodées, encadrant des tableaux de prix ; tapis moelleux, où le pied se pose sans bruit ; volières pleine d'oiseaux de toutes les contrées qui chantent derrière un rideau de plantes rares, dont les fleurs parfument l'air en s'épanouissant à la lumière adoucie du soleil. Voilà ce que le photographe américain appelle son atelier.[138] (Lacan)

What appears to be an excessively romanticized description of the American photographer's environment was printed in *La Lumière*, the journal of the French *Société Héliographique de Paris.*This grandiose architectural decorum had a number of functions, among them to distinguish one studio from an other and to create an (upper-scale) homely atmosphere that reassured potential sitters.With its echoes of extravagant orientalism this text, translated and reproduced in American magazines dedicated to the daguerreotype, gave American photographers a

138 “They go to enormous expenses for their workshops. They are true palaces worthy of comparison with the enchanted habitations that Orientals erect for the most capable heroes of their fantastic tales. Marble columns, or animated by the skillful chisel of the sculptor; curtains richly embroidered, framing expensive paintings; soft carpets; where the foot rests without a sound; birdcages full of birds of all countries which sing behind a curtain of exotic plants, whose flowers perfume the air in the soft sunlight. Here is what the American photographer calls his workshop.”

confirmation of the pivotal role they held in shaping American society. The display of pictures of familiar local, national, and even international figures enhanced the “artistic” prestige of the photographer. But, most significantly, the exhibition of a mix of plebeians', local celebrities', and national heros' portraits all side by side was an important symbol of democratic America. As Richard Rudisill reminds us:

> Finding “more noble men” of all nations and professions among the kings and queens, presidents and generals tended to minimize the separation of social levels between these persons. A democratic leveling process of great appeal to Americans was thus implicit in the gallery display. (203)

Daguerreotype galleries, such as that of Mathew Brady's located at the corner of Broadway and Tenth street, a fashionable New York spot, were public versions of private photography albums. Like albums, but on a grand scale, they presented the image of the ideal national family: the democratic American society. European daguerreotype studios were far more modest if no less busy. They did not, however, convey or participate to the making of a national identity to the same extent that they did in America.

The Problem of Photographic Reproducibility

Although reproducibility is touted as one of photography's principal characteristics it appears that the first photographers and their clients, as the

histories of the ambrotype and its variation the ferrotype show, were not primarily interested in the opportunity to multiply their photographic image.[139]Ambrotypes were cheap and fast, and they resemble daguerreotypes enough that the uninitiated is cautioned about possibly confusing them. So many were produced that ambrotypes from the later part of the nineteenth century can easily be purchased for just a few dollars in many antique stores though out Canada and the United States. Ambrotypes were basically underexposed negatives on glass, which once mounted on a black background, often velvet, would appear as positive. They were made possible by the wet collodion technique that displaced the daguerreotype beginning in the mid-1850s. Ambrotypes only take about 20 minutes from beginning (sensitization of the plate) to end (encasing) to produce. Customers could therefore have their picture taken and walk out of the studio 20 to 25 minutes later with a finished 2”x3”, or bigger, likeness of themselves encased in what looked like a precious jewelery case. While an ambrotype is a glass negative from which several copies can be printed few if any customer were interested in owning several copies of their image. The ferrotype, also know as the tintype, simplified the process even further making it ever more affordable. Ferrotypes, invented in France in the early 1850s, but popularized by Hamilton Smith in the United States, were produced by the thousands of photographers who

139 Even recent practices tend to confirm that fact: It is rare for amateurs to print many copies of a single negative. In the days of film, before digital photography, drugstores often offered a second set of prints at a discount. It was designed to promote a type of consumption that did not encounter a wild success. The fact that photo-labs had to offer the second set of prints at a deep discount, thus reducing their profit margin, is an indication of the public's indifference to the reproducibility factor. Of course digital photography and the internet in combination have shifted the paradigm altogether. Newspaper and magazine reproduction is discussed later in this chapter.

travelled between the Civil War encampments where Federalists and Unionists soldiers alike could have their portrait set on a sturdy metallic backing for a few cents, slip it in an envelop, and send it to their loved ones. Like daguerreotypes tintype images were reversed right to left and multiple copies required multiple takes. Of course the worldwide commercial successes of stereographs, and cartes-de-visite, discussed in the following paragraphs, blockbusters from the mid-1800s until well into the twentieth century, was partly due to the possibility of duplicating photographs in order to produce large quantity of prints. However, the success of those commercial ventures was most significant in their power to shape the social landscape.

Like the sale of multiple prints from a single negative that provided a livelihood to the professional photographers dotting the landscape along the path of the Grand Tour—Italy, Greece, Egypt, and Palestine— duplication only allowed opportunistic commercial ventures to thrive. In this latest case, photography simply substituted for other modes of production of visual art. The Grand Tour had been fashionable with the upper class since the seventeenth century; and it was customary for Northern European tourists to bring back souvenirs be they commemorative medals, portraits by Batoni, Canaletto's or Guardi's paintings, or mass-published books of Piranesi's etchings—of all those only the paintings were somewhat unique, but, there too, they featured the same Roman and Venetian landscapes over and over again.

As for reproduction of photographs in magazines and newspapers, the printing process used—the halftone invented in the late-nineteenth century—doesn't take advantage of the possibilities of the negative/positive operation. It took several decades, after the beginning of the twentieth century, for newspapers and magazines to use halftones rather than to reproduce photographs from woodcut copies. In the case of newspapers and magazines, reproducibility and diffusion are not the result of producing a negative but that of the ease of distribution. Ever since it has been possible to reproduce photographs and words on the same printing press, photographers have concerned themselves with providing a distinctive photograph rather than one that is easy to reproduce.[140] Up to the late-twentieth century, commercial photographers, for instance, shot color transparency film (direct positive rather than negative) that yield images difficult to reproduce accurately by conventional photographic means but are sharper and gives more control over color in the traditional printing process.[141] Commercial photographers edit their photographs to select the one(s) that best suits their client needs not the ones that will be easier for the printer to deal with. Commercial photography has been practiced almost since the invention of the medium (McCauley *Industrial Madness : Commercial Photography in Paris, 1848-1871*)

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140 Even today the original of the vast majority of photographs found in magazines are one of a kind color transparencies. The automation of film advancing (motor-drive) and now digital technology enable professional photographers to create several original images by taking several pictures in rapid succession, however only one of those is selected for reproduction.

141 Transparency film is sharper as well because it doesn't necessitate any additional generation. Commercial photography is now mostly digital bypassing film entirely.

but when it comes to taking photographs, reproducibility is far from being a major concern.

Louis Désiré Blancquart-Evrard opened his photography printing business in Lille, in 1851, after devising a method for improving the quality of prints made from paper negatives. His *Imprimerie Photographique* was driven to bankruptcy just four years later victim of the wet collodion process which produced a negative on clear glass making it easier to print the positive. Blancquart-Evrard's business didn't rest on the reproducibility of photographs but on the exclusivity afforded him by the patent that protected his paper negative printing process. The most significant fact is that Blancquart-Evrard was not able to develop a viable business simply based on the reproducibility of photographs whether on paper or glass. The ability to reproduce visual elements did not come with the invention of photography but with that of the printing press. Reproducibility, even that of artwork, precedes the invention of photography. The characteristic of reproducibility of photographs should be ranked at the same level as that of wood cuts, copper and steel engravings, and lithographs: it is not an insignificant capability but is hardly unique to photographs, and does not rank very high on the motivation scale.

The Carte-de-visite: A Worldwide Phenomenon

In about the same period (mid-1850s) as the single ambrotype and ferrotype developed as commercial successes, André Adolphe Eugène Disdéri deposed a patent that described a camera outfitted with multiple lenses and a

sliding plate holder permitting to take up to ten photographs on a single plate. While the patent deposed in November 1854 describes the possibility to make 10 images, Disderi and other photographers used a studio camera sporting just four lenses. Sliding the plate side to side allowed 8 images to be recorded on one plate, four at a time or each in succession. The small images—about 2 1/2" x 4"—were the size of a calling card (*carte-de-visite* in French), easy to store, carry, and exchange. The *carte-de-visite* became a decade long fad throughout the world. The *carte-de-visite* technique simply divided the cost of labor by 8 since a single plate needed to be prepared, developed, and printed yielding 8 images at once. In other terms, the *carte-de-visite* made for a productivity increase of 800% over previous techniques thereby reducing manufacturing costs by a substantial amount. But, like the pet-rock fad of the mid-1970s, the commercial success of the *carte-de-visite* was not due solely to marketing ingenuity and increased productivity, but to its social function. Activity in Disderi's studio began in earnest in 1859 after the first of Napoleon III's several visits. Activity steadily increased until it peaked in 1861 then precipitously decreased in the following two or three years (McCauley *A.A.E. Disdéri and the Carte de Visite Portrait Photograph* 227-28). The *carte-de-visite* came at a time when bourgeois society was in the process of redefining itself along economic trends rather than familial alliances as was the case with the preceding monarchies—national idiosyncrasies notwithstanding. The industrial revolution of the nineteenth century demanded a number of

accommodations to a mixed democratic and aristocratic hierarchy—the latter restored in France by several phases of political imperialism.[142]

The camera was enlisted to be an instrument helping in the reorganization of society; from the language of nature photography was enlisted to be the language of social stratification.[143] In the mid-nineteenth century photography permitted to create the appearance of a compressed social spectrum that masked the inequalities inherent to the industrial society. The *carte-de-visite* allowed the middle class to become upper-middle class (the photographer could even rent his customers the clothes they couldn't afford to buy) and the upper-middle class to pretend they were one with the people by sporting the fashion of the day. In England Queen Victoria and Prince Albert made sure several *carte-de-visites* were produced showing them wearing luxurious but very bourgeois fashion rather than royal regalia. In France, Napoleon III was photographed by Disderi wearing civilian clothes rather than the military uniform in which he was pictured in official paintings thus eschewing any sign of distinction like the red sash that marked him as royalty. His pose, though, is reminiscent of the portrait of his uncle, Napoleon I, most famously pictured by Jacques-Louis David typically standing up and holding his hand close to his stomach.[144]

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142 The story of Napoleon III rise to power is a perfect example of that fluid, problematic, political situation. Napoleon III was first elected French president in 1848 to then declare himself emperor in 1852.

143 It was a reversal that foresaw the use of photography for the exploration of social rather than environmental nature, as soon as cameras were small and fast enough to roam outside of the professional photographer's studio in the hands of amateurs.

144 Napoleon I is said to have been suffering from a stomach ulcer.

The c*arte-de-visite* also allowed the petty bourgeoisie to assemble their ideal society in the albums they were proud to display in the parlor—the public space of their private dwellings. There, they collected their own images and those of their friends as well as photographs of famous personalities. In many ways albums of *carte-de-visites* were the Victorian Facebook. *Carte-de-visites* became outmoded when photographers ran out of famous people to photograph and began to market images of the infamous—murderers, prostitutes, and the *demie-monde,* people ill-suited to figure among the "friends" of the bourgeois middle class. The popularity of the c*arte-de-visite* was in many ways similar to the popularity of the portrait in America but instead of cementing a national identity, it fashioned, literally and metaphorically, the new stratification of society affirming the reality of a new middle-class. Both the photographic portrait and the *carte-de-visite* showed people rather than nature; they were endemic of an unforeseen usage of photography to explore the other two constituents of nature: human and social. Photography's invention motivated by the exploration of environmental nature turned out to be well adapted (or was adapted) to the exploration of its complements; not that environmental nature has been completely forgotten in the process of redirecting the camera lens, but even the images of environmental nature, such as those of Ansel Adams and Edward Burtynsky, take their meaning from their relation with the other two components of nature.

Philosophy of the Photographic Portrait

While the second invention of photography can be observed in many quarters, the story of Montreal photographer William Notman combines the signs of photography's turn towards social nature. Notman's story provides a fitting example of the relation between philosophy and photography in the nineteenth century.

In the process of trying, unsuccessfully, to save the cash-strapped family business, Notman found himself embroiled in a financial fraud with a supplier in his native Scotland. Bankrupt, and in danger of spending a few years in jail, Notman escaped to Canada. Once in Montreal he benefited from an extensive network of well-to-do Scottish expats. Just a few months after his arrival, in the summer of 1856, Notman decided to turn his Scottish hobby into his Canadian profession; he set up a photography studio on Rue Bleury. Notman rapidly became a successful photographer opening studios bearing his name in Ottawa, Toronto, Halifax, Saint John, Boston, and Albany (Triggs). But besides executing run-of-the-mill portraits with the utmost technical competence if not originality, Notman distinguished himself by creating composite photographs of large groups. Those groups could include as many as 400 people, as some of the photographs evidence, each person photographed separately in the studio; and then assembled as a group on a single background. The technique required extensive planning (each person had to be photographed at a distance appropriate to the overall perspective of the image) as well as rigorous drawing and photographic skills.

By the mid-nineteenth century composites were not new. From the onset composites were used to build images in the same fashion paintings would be constructed, as an assemblage of ideal parts. In his study of the relation between photography and literary realism, *Realism, Photography, and Nineteenth-Century Fiction,* Daniel Novak cites a paper given by Henry Peach Robinson at a meeting of the Photography Society of Scotland in 1860:

> [t]he purpose of the paper I am about to read this evening is to induce you to do in photography something similar to that which the old Greek did in painting, that is, to take the best and most beautiful parts you can obtain suitable for your picture, and join them together into one perfect whole. (Robinson 52)

Though Notman would not have attended that meeting he could have read about it in *The British Journal of Photography* where it was published soon after Robinson's presentation. Novak argues that photographs of that time had much in common with the period's realist literature as they both relied on a montage of realistic “pictures” in order to insist on the “truthfulness” of a situation (a truth that, for writers and photographers alike, was more ideal than objective). In photography, as in literature, realism had to be mitigated as reality was most unflattering, unsightly even, and often only partially expressive of a situation. Novak points out that the very realism of photography brought out the suspicion of a well-crafted lie.

For the early photographers the problem composite photography seemed to solve was, as a critic put it in the 1867 *British Journal of Photography*, how to practice a photography that offers "a scope for the embodiment of ideas" rather than a "photography that deals only with the actual." This particular critic promptly dismissed composite photography calling it "patchwork photography" and insisting that the absence of subject integrity shunted the genre from the realm of artwork (Greenwood 207). Actually, photography didn't acquire artistic integrity until the mid-twentieth century. But unlike Robinson's and other British art photographers Notman's notion of composite photography was thoroughly influenced by his Canadian experience as well as his Scottish roots. I have no doubt that Notman's intent, in creating his composites, was to find a way around some technical difficulties rather than to embody an idea. Considering the state of technology at the time, some of his composite photographs would have been impossible to take, mainly for the lack of proper illumination of his indoors subject. But other photographs, such as that representing a group of engineers of the Grand Trunk Railway, were taken outdoors in full daylight, and all twenty of his sitters could have been captured at once on a single plate sparing him the tedious work of assembling several images. To understand Notman's choice beyond the technical rationale which was his manifest motivation and to uncover the latent reasons behind his composites, we need to turn to the legacy of the philosophy developed during the Scottish Enlightenment, its aftermath, and some particularities of the Canadian Victorian society.

Numerous Scottish philosophers had a lasting influence beyond their corner of the British Isles. If the high point of the Scottish Enlightenment was from the middle to the end of the eighteenth century we should not doubt that institutional memory (preserved in schools and universities) and the frame of mind established during that period lasted well into the 1800s. Notman's life in Scotland, where he was managing the family business, and his experience and education were much closer to those of the upper middle class than to those of the mass of Scottish immigrants. Education didn't just facilitate Notman's integration into a network of successful Scottish immigrants it gave him the foundation that enabled him to gather a more analytical perspective on the Canadian society to which he now belonged. I would like to suggest that it is this analytical and philosophically informed perspective that he expressed, maybe unconsciously, in the practice of composite photography.

Notman's composites happen to be a perfect visual expression of the Enlightenment concept of nature and its fulfillment in Victorian Canadian society. The European Enlightenment refined the medieval notion of a tripartite nature made of: 1) human nature, considered central; 2) social nature, managed by the authority of law and religion, and displayed by the orderly organization of urban space, church and social rituals; and 3) environmental nature, the setting of the true and beautiful fixed and predictable, it is the domain of science and industry. The three natures fit into one another like Russian stacking dolls. Human nature is

the smallest doll; slightly bigger is social nature, and holding them both is environmental nature.

Among the multiples usages of the word nature eighteenth-century French dictionaries, such as the *Dictionnaire de l'Academie française,* in its 4th and 5th editions (1762 and 1798), distinguished the three varieties as "*nature humaine,*" "*nature angelique*," and "*nature divine.*" Nature divine was the whole of nature, *nature angelique* represented the ideal Christian community—what human society could be under ideal conditions—and *nature humaine* was the site of individual feelings, often governed by pain and pleasure. But while the dictionaries hung onto a pre-Enlightenment definition of the order of nature, the secular undercurrent of the Enlightenment was one step ahead. The Scottish philosopher David Hume, for instance, dedicated his life to understanding how the three natures penetrated each other. For Hume society redeems individual flaws and enhances humankind's quality (that idea of social benevolence goes a long way in explaining the solidarity of the Scottish immigrant network). Hume's vision of a tripartite composition of nature is akin to a composite photograph of the natural order.[145] This tripartite understanding of nature is a useful guide in the exploration of the evolution of photography—if only in the guise of heuristic categories.

145 The camera is a suitable metaphor for Hume's interpretation of what makes a human being. Hume must have been well aware of the existence of the *camera obscura,* as already in his time it had been a common drawing aid for more than a century and one of philosophy's favorite metaphors.

Notman in his quality of photographer confronted the three components of nature on a daily basis: Individual human nature in the studio when he shot portraits; social nature when taking pictures of Canadian cities, groups belonging to diverse sporting associations, or various military outfits; and environmental nature when exploring the Canadian landscape. Unlike the chaotic real world, Notman's photographs, exemplary visual syntheses of the three parts composing nature, show absolute control and mastery over each component. Notman wrote the story of Canada, and of its Victorian society, not just by taking and displaying the portraits of its elite, or by elaborating the photo-romances for which he was well known (the faking of the intersection of human and environmental natures as his series of photographs depicting moose hunting). Notman's photographs introduced Canadian society by elaborating its ideal representation and thus Notman found an answer to a question that deeply concerned Hume: Can society as it is tell us much about society as it ought to be? Notman's photographs made it appear so. For instance, whether it is a group portrait of the Montreal Snowshoe Club assembled on Mont Royal or a re-creation of the Skating Carnival—a prestigious annual event—no participant is hidden behind another—as would be expected in an instantaneous photograph of a large crowd. The perfection of those group photographs is far from the chaotic realism of everyday life.

In the process of creating these ideal representations Notman advertised his project in local newspapers. The publicity was not only meant to incite those in attendance at the event to show up in his studio but it also encouraged many

other Montrealers, who were not guests to those exclusive event, to participate nonetheless by contemplating or even purchasing a photograph. Notman's composites stood for social cohesion rather than individual particularity. Notman's photographs were more than innocent representations they participated to the social dynamic of the Montreal community at the end of the nineteenth century. It was finally noticed that, in a group photograph, personality tended to be lost, overwhelmed by the group's social significance.

By the late-1800s composite images became a hybrid of collective and individual portraitures; with the turn of the century they simply became an assemblage of portraits that put more weight on a person's assumed character than the group's collective identity. Notman's composite photographs were more socially significant than aesthetically original. The evolution of their arrangement parallels the evolution of bourgeois society—be it Canadian, American, or European. In their later configuration Notman's group portraits did not just emphasize character by doing away with individual poses and conventional perspective, they also replicated standardized photographic portraits. Showing a photography that was at once singular and repetitive foresaw the commodity that photography was destined to become toward the end of the century.

Conclusion

The Third Invention of Photography

In critiquing Hegel's philosophy, Karl Marx translated its spiritual abstractions into concrete social relationships. Marx's philosophy, like that of Hegel, was very much of his time. Marx criticized what he saw as the dehumanization of a large segment of the population; his preoccupation was with the plight of workers subjected to repetitive and meaningless tasks regulated by the rhythm of the mechanical apparatus of the factory, workers whose lives were dominated by those who benefited most from that quasi-slavish situation: the owners of capital. Marx didn't write a treatise on art to rival Hegel's A*esthetics*; his emphasis was not the artistic objectification of subjectivity but the objectification of the subject in everyday life.[146] Marx's philosophy of art can be coaxed from a number of his writing as Mikhail Lifshits endeavored to do in 1933. The work which is actually most relevant to the evolution of photography is not Marx's musing on art but his elaborate analysis of the human implications of the capitalist economy. Photography followed the same path to commodification as many other products of modernity. Soon after the mid-1800s photography was transformed from an artisanal practice to industrial product with the establishment of the Kodak Company in Rochester, New York. Kodak's famous motto "you press the button, we do the rest" summarizes how this transformation was accomplished. Kodak took care of the nitty-gritty, all that was left to do for the photographer was to activate the symbolic function of photography. Thanks to Kodak, photographs

146 On that point Lifshits points out how much Marx hated the romantics.

became both a fetishized and a fetishizing object. This transformation is particularly well illustrated by a series of three articles written by Oliver Wendell Holmes and published in *The Atlantic Monthy* successively in 1859, 1861, and 1863. Holmes's articles preceded the creation of the Kodak Company by nearly three decades but the symbolizing function of photography and its potential as an industrial commodity were already in motion and described by Holmes with uncanny foresight, albeit unconsciously.

The year Napoleon III patronized Disdéri's Paris studio Holmes,[147] based in Boston, wrote the first of three influential articles. Titled "The Stereoscope and the Stereograph" the first article in the series has been anthologized many times since its issuing. Its most famous quote—"*Form is henceforth divorced from matter.* In fact matter as a visible object is of no great use any longer, except as the mould on which form is shaped. Give us a few negative of a thing worth seeing, taken from different points of view, and that is all we want of it. Take it down burn it up if you please" (161, emphasis in the original)—is taken as describing the assumed essence of photography: the emphasis of form over function.[148] But Holmes' intuition, that appearance matters and reality can be disposed of, far exceeds the realm of 3D vision. The stereograph and the *carte-de-visite* participated equally in the reification and fetishization of photographs as commodities and social currency. As they succeed each other, Holmes's articles

147 In today's world Holmes would qualify as a "pundit" whose overinflated predictions would never come to pass.

148 Several of the articles Holmes wrote for *The Atlantic Monthly* were republished in a single volume, titled *Soundings from the Atlantic*, in 1864. The three concerning photography are all part of this volume which I took for reference.

become increasingly explicit in describing the social as well as the economic functions of photography. Unfortunately, for its provocative quote, only “The Stereoscope and the Stereograph” has benefited from expansive publicity. The other two accounts seem, on the surface at least, to be just exercises in ekphrastic prose and elitist punditry. In reality they all are explicit of the status of photography in mid-nineteenth century.

From Holmes' first article, his most famous, we will jump to his last. Titled “Doings of the Sunbeam,” it was published in 1863. Unbeknown to Holmes it turns out to be a straight tale of the production and consumption of photographs as commodities. It could be used as a summary of the situation that prompted Marx to launch the analysis of the political economy which makes up the bulk of Volume I of *Das Kapital,* published just a few years later. Holmes' piece begins by describing a visit to one of the largest and better known purveyors of photographic equipment and stereographic views in the U.S. at the time, the E. & H. T. Anthony firm in New York City. There “a row of young women before broad, shallow pans” ("Doings of the Sunbeam" 229) manufacture albumen paper. Somewhere else steam-power “performs much of the labor” ("Doings of the Sunbeam" 231) necessary to make photographic albums. Holmes naturalizes and reifies the production of that machine by comparing the manufacturing process to the natural cycle of a butterfly genesis—first larva, then chrysalis, and finally *imago* ("Doings of the Sunbeam" 231). Holmes follows with a thorough description of the division of labor. While the division of labor is not a bad thing

in itself, in conditions of capitalist production, according to Marx, it is the first step toward the alienation of labor. It is an argument that is not difficult to understand in light of Holmes' description of the production of stereographs at the E. & H. T. Anthony Company. With a certain pride he tells us that each worker, performing a small task, is ignorant of the other steps necessary for the completion of the product, “A young person who mounts photographs on cards all day long confessed to having never, or almost never, seen a negative developed, though standing at the time within a few feet of the dark closet where the process was going on all day long” ("Doings of the Sunbeam" 232). His way (although unconscious once again) to express the alienation, both social and psychological of such labor, is to point out that each worker has posted near his or her station a favorite maxim or song title reminiscent of their home country such as “*Kind words can never die,*” or the title of the then famous Irish ballad “The Haunted Spring” while observing that none of them is an original, and looking for a pearl of wisdom of his own manufacture ("Doings of the Sunbeam" 233 emphasis in the original). Thus Holmes emphasizes another division of labor dear to Marx that of manual versus intellectual labor; and by the same token outlines the class distinction between the workers and himself. Those postings, which Holmes finds charmingly quaint, are a sign that, as Marx describing the alienation of labor puts it, “The worker therefore only feels himself outside his work, and in his work feels outside himself. He is at home when he is not working, and when he is working he is not at home” (*Economic and Philosophical Manuscripts of 1844*

74) although, in this case, attempting to bring home and work close to each other. Holmes leaves “[t]he great manufacturing establishment of the Messrs. Anthony, more than ever impressed with the vast accession of happiness conferred upon mankind by this art, which has spread itself as widely as civilization” ("Doings of the Sunbeam" 233) without giving much attention to the happiness of the workers he just observed.

After touting the benefits of industrial manufacture—“A portrait such as Isabey could not paint for a Marshal of France, a likeness such as Malbone could not make of a President's lady, to be had for two coppers, — a dozen *chefs d'œuvre* for a quarter of a dollar” ("Doings of the Sunbeam" 234)—and, overlooking its drawbacks, Holmes recounts his own initiation to photography, a task that unlike factory workers, alienated from the product of their work, he is proud to have performed from beginning to end by himself. After the description of the complete production cycle of a photograph, Holmes perceptively concludes that *carte-de-visites* which he calls “card-portraits” “[h]ave become the *social currency*, the 'Green-backs' of civilization, within a very recent period” ("Doings of the Sunbeam" 255, emphasis mine) betraying the connection between production, consumption, and exchange of photographic commodities. Further on, Holmes can't help but use his authority as a physician to forward yet another social function of photography by engaging in a lengthy advocation of a mix of physiognomy and phrenology. Physiognomy and phrenology were still considered legitimate sciences in the U.S. until the beginning of the twentieth century.[149]

149 Spurzheim died of typhoid in Boston, Holmes's hometown, in 1832, and is buried at

Adding a scientific aura to the religious character of American individualism, phrenology and physiognomy found a receptive audience on the new continent. Americans, like Europeans, were attached to the belief that character could be read on the face. In a brief survey of the popularity of Lavater's pseudo-scientific elaborations in America Lukasik found out that:

> At least 20 editions of Lavater's *Essays* were published in English, including two in America, before 1810, and American publishers later added numerous editions of *The Pocket Lavater* (1817), *The Juvenile Lavater* (1815), and *The Physiognomist's Own Book . . . Drawn from the Writings of Lavater* (1841), among others. By 1825, no fewer than 63 articles on physiognomy had been published in American periodicals from South Carolina to Massachusetts. (428)

By flattering the manners of the elite while finding a number of flaws in the physical appearance of common people, physiognomy and phrenology, under the guise of science, were nothing more than contributors to the process of a new social stratification stretching over more than a century in both the European and American societies. Still claiming the label of "language of nature" promoted by its original inventors, in combination with the pseudo-sciences photography proved to be a valuable instrument of naturalization of an eminently social process.

Mount Auburn Cemetery, in Cambridge.

Holmes' middle article, published in 1861, is just as revealing as the first and last ones when it comes to the social function of photography. Titled “Sun-Painting and Sun-Sculpture; with a Stereoscopic Trip Across the Atlantic” it affirms that “All the world has to submit to it [photography], —kings and queens with the rest” ("Sun-Painting and Sun-Sculpture; with a Stereoscopic Trip across the Atlantic" 167) making plain the social compression simulated by photography. But, even more striking, is his (unconscious but historically fitting) further description[150] of the stereograph as a commodity and a fetish—an object allowing the substitution of reality by appearances (Ripstein 736). In this piece Holmes describes several stereographs taken in the United States and England. Some of those stereographic views do not simply bear the name of the place they represent, they are first, and it seems foremost, numbers; conferring on them a sort of comparability with what Marx, referring to money this time,[151] calls a “universal equivalent” (*Capital* 70, 76). After reading Holmes' description, one has the distinct feeling that one picture is indeed worth another, one place the equivalent of another place. Thus a picture of Broadway in New York City is “(No. 203)” ("Sun-Painting and Sun-Sculpture; with a Stereoscopic Trip across the Atlantic" 176, 81), Niagara Falls is “'Thomson's Point of View, 28'” ("Sun-Painting and Sun-Sculpture; with a Stereoscopic Trip across the Atlantic" 179), “'Terrapin Tower, 37' is perfection itself” ("Sun-Painting and Sun-Sculpture; with a Stereoscopic Trip across the Atlantic" 179), and Shakespeare's house is “(as you

150 As well as the orientalist fascination that appears in each of the pieces.
151 In volume 1 of *Capital* published, in 1867, four years after Holmes's last article.

see in No. 2)" and "(as you see in No. 3)" ("Sun-Painting and Sun-Sculpture; with a Stereoscopic Trip across the Atlantic" 196). Each of those places has lost its individuality; each now a piece of a system that conceives the world in the same fashion as a paint-by-the-number illustration. In his series of articles, Holmes tells the story of photography's hijacking from the passive "language of nature" (or its mirror depending on which side of the Atlantic ocean one is standing) to that of an active instrument destined to shape the new collective representation of nature in the age of the industrial society. A nature (environmental and social) made of numbered pieces fitting together like the pieces of a machine and assembled as needed for its appropriate functioning. The camera, a machine itself, used to make the world appear like a machine in a draw back to the eighteenth-century materialism but this time the social, in addition to human life, is made to appear mechanistic.

In order to further his point Holmes begins his middle piece with a "photographic" reinterpretation of a classic tale—the flaying of Marsyas by Apollo—that Marx, had he been the elitist Holmes reveals himself to be, could have used as a metaphor for the exploitation of the proletariat by the capitalist class. Holmes once again dismisses the artisanal labor of portrait painters in order to elevate the benefits of the mechanical precision and inexpensiveness of photography. He then proceeds by describing several stereographs encompassing a large swath of American territory from Niagara Falls to Charleston, South Carolina.[152] Holmes continues his virtual travel to London and then to

152 Holmes takes the opportunity of narrating the image of Fort Sumter—where the

Shakespeare's haunts at Stratford-on-Avon. There he brings us to the house where the poet was born, his lover's cottage, and the church where he is buried. It is obvious that Holmes does not simply describe a series of stereographs but his own experience of having been there; and I have little doubt that he would shiver at the thought of burning the place down, as, according to him, once photographed it wouldn't be of any use. Holmes proves to be a master as narrating superficial appearances: the rounded bricks on the corners of Shakespeare's home, the signs of passing time marking the front of Ann Hathaway's cottage, the solemnity of the Church of the Holly Trinity, where the poet is buried, reminding us that this is the temple of Christ and not of Shakespeare.

Holmes' descriptions are an uncanny reminder of what Ludwig Feuerbach wrote in the preface of the second edition of *The Essence of Christianity*, shortly after photography was disclosed to the public,[153] "But certainly for the present age, which prefers the sign to the thing signified, the copy to the original, fancy to reality, the appearance to the essence … *illusion* only is *sacred, truth profane*. Nay sacredness is held to be enhanced to proportion as truth decreases and illusion increases, so that the highest degree of illusion comes to be the highest

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major event of his lifetime, the American Civil War, began and was still going on at the time of his writing to express his contempt for war. The article was originally published in *The Atlantic Monthly*, issue 45, volume 8, July 1861, a few months after the start of the war. Holmes at that point still compares the war to the tantrum thrown by "our foolish little spoiled sister Caroline ..." (185)

153 The second edition of *Das Wesen des Christentums* was published in 1843. A few sentences after the passage quoted Feuerbach defines his time as "the age of shows and illusion," Feuerbach, Ludwig. *The Essence of Christianity*. Trans. George Eliot. 2nd ed. New York: Harper & Brothers Publishers, 1957. XXXIX. Although Feuerbach specifically addresses religious rituals his observation applies equally to profane society.

degree of sacredness.” (XXXIX, emphasis in the original). Holmes waxing poetic on Shakespeare can be profitably compared to Marx's use of the playwright's words to explain the role of money in bourgeois society. Marx didn't think of Shakespeare as an innocent little boy running around his house, or a teen courting Ann Hathaway, but as a person of substance who had a profound understanding of the role of money in society (*Economic and Philosophical Manuscrits of 1844* 136-38).

“[F]ull of Shakespeare” ("Sun-Painting" 200), it is the turn of Wordsworth's and Coleridge's burial grounds as seen in “view 302” ("Sun-Painting" 201) to be objects of narration emphasizing the function of photography to generate fetishes. Then churches and castles duly named and numbered succeed each other thus “Warwick Castle (81)” succeeds “Henry VII's chapel... (323 and 324)” ("Sun-Painting" 208) giving Holmes the opportunity to demonstrate his knowledge of history; a history which like a photograph seems frozen, to be observed attentively but never questioned, like when a king's sarcophagus opened every few hundred years always tells the same story (“Sun Painting” 206). Then Holmes takes us to continental Europe; from London we go to Paris, and from there to the South of France on our way to Italy via the Swiss Alps; then it's off to Greece and the Middle East entered at once through Italy and Spain—a geographical impossibility. Thus Holmes recreates for us a disorderly Grand Tour, his point being that such a voyage is now accessible in its virtual form to those who have neither the leisure nor the funds to afford the real thing. The Grand Tour

is now a consumable to be purchased and seen but not experienced, at least by those who can't pay. The Grand Tour can remain the privilege of the wealthy while the photographic ersatz should satisfy everyone else. In *Capitalism's Eye*, Kevin Hetherington reminds us that:

> Within the idea of the spectacle and of the gaze associated with it there has been something of a distinctive take on the question of mobility too. Key to this has been a displacement of the idea of mobility from the subject onto the object. If not moving images themselves as in film, then fractured, disorienting, and ever changing urban and consumption "screens" have become indicative of a mobile world of modernity that is available only to the gaze of a static modern subject. (26)

Holmes's virtual voyage is a textbook illustration of what Herrington, taking his cue from Stephen Kern, sees as the development of the society of spectacle analyzed by Guy Debord: A society whose split between appearance and reality, thanks to the development of photography, can now substitute to and perpetuate the mind-body divide that medicine, theology, and philosophy have tried to assess and sometimes eliminate.

Although aesthetic considerations still permeate Holmes' articles, the Bostonian doctor does deserve some credit as he introduces us to photography as not an artistic medium but a social one. Holmes' articles for *The Atlantic Monthly*

show us both the potential, as a witness, and the pitfall, as a substitute, of photography. The patenting of the roll-film by George Eastman in 1884 and the creation of the Kodak company a few years later were part of a general impulse toward the industrialization and commodification of photography. Historians of photography have relished telling the rag-to-riches story of the founder of one of the largest and most powerful film-manufacturing companies in the world. It is not that side of the story which proves most interesting to me but the consequences of the transformation of photography from an artisanal practice to an industrial commodity, the third invention of photography.

Afterword

The burden of this dissertation has been to shed light on the conditions of possibility of the invention of photography and its subsequent reinventions. The question of the late arrival of photography's invention was clearly stated in Arago's speech unveiling the daguerreotype to the general public. Arago's answer to his question, "it is not how the human mind works," empty as it was, has been accepted as legitimate by several generations of photography historians; and the question itself, when broached since then, has been answered with the same vague assumption that technological knowhow wasn't there before. The most grounded inquiries—those of Eder and Potonniée, for instance—all consider the progress of science as the main engine of the discovery of photography, even though from the outset Arago's words expressed the idea that social conditions—albeit restricted to the sociality of seventeenth-century scientific minds, some with the knowledge of optics others with that of chemistry, never meddling their respective expertise—were at the center of the mystery of the timing of the invention of photography.

As soon as the desire to photograph—to use Geoffrey Batchen's pronouncement—became a reality, photography modified the very conditions that brought about its creation. The rapid adoption of photography, while a sign of its timely arrival, participated in the creation of a new environment, one where it was not only possible to make photographs but also to see photographs. The epistemic rupture, dear to the Foucaultians, occasioned by the invention of photography combined with the acceleration of the capitalist project to generate new conditions of possibility—including for photography itself.

The first chapter of this dissertation referred to the discussion of the mind-body problem as stated by Descartes whose memorable utterance marked culture with an indissoluble stamp ever since it was pronounced early in the seventeenth century. Descartes' declaration, “Je pense donc je suis,” pointed to a duality which appears to be at the core of the human condition. It turns out that photography invented as an epistemic tool to probe the truth of nature revealed itself to be at once object and product of the mind, objective and subjective, and especially well adapted to the exploration of the domain where both combine: society. Preoccupied with the human face, human activities, and the appearance rather than the working of nature, from the original epistemic function photography was transformed into a tool of ontological exploration suitable for probing the other two components of nature—human and social. Thwarting what was unconsciously expected, photography did not resolve the duality of mind and body which occasioned some extreme *prise de position* (Hegel on the side of mind, Marx on that of the body). Photography in its attempt to reconcile the object and the subject materialized and democratized the mind-body split. Photography began to distribute the weight of this split between the shoulder of those who had both the leisure and the education to reflect on the human condition—the philosophers—and those of the middle class newly minted in the nineteenth century.[154] Pierre Bourdieu, in his study of photography's spectacular success among the middle class, declared it a “middle-brow art.” While Bourdieu

154 Whether photography is mending the split or simply masking it is a question for philosophers.

did not invoke philosophical or ideological imperatives in the adoption of photography by the middle class his finding is hardly surprising in the perspective of an analysis of the intellectual genesis of photography.

The transformation of photography from artisanal practice to industrial commodity was, not unexpectedly, a transformation well in tune with the capitalist spirit of nineteenth-century America. Taking photography from the hand of the elite, of which Oliver Wendell Holmes was one of the most erudite representatives, gave the less educated a chance to express their understanding of the relation of self to other, body to spirit, object to subject. However one of the consequences of such democratization was to spur the creation of a specialized elite of art photographers who ended up distancing themselves from what they saw as amateurish practices.[155] That wouldn't be so bad in itself, but the self-reflexion of this educated *crème de la crème* of photographers on their specific practice marked the definition of photography for generations of practitioners and theorists. By foregrounding form and aesthetic qualities this elitist attitude left the bulk of photographic production at the margin of the vulgar; both the practice and theory of photography have been disproportionally influenced by this small group of experts. For most of its existence photography has been compared, and has compared itself, to painting, and especially to a succession of painting styles—impressionism, symbolism, expressionism, etc. For the first hundred years and then some, aesthetics was the path insisted upon by theorists and practitioners

155 First with the creation in the UK of the brotherhood of the Linked Ring, in 1892, followed in the US by the Photo-Secession, in 1902.

alike, despite the fact demonstrated just a few years after its invention that photography is a most effective means of social observation. The systematic documentation of the disappearing way of life of the Newheaven fishermen's families carried out, in the mid-1840s, by David Octavius Hill assisted of Robert Adamson should have tipped us off early to the social nature of photography.

Photography, which became a recognized social medium after just a few years of existence, reached a milestone toward the end of the nineteenth century with Jacob Riis's pictures of the New York slums, and again soon after the turn of the 20th century with the audacity of Lewis Hines who exposed the ruthless exploitation of children in the first decades of the twentieth century. Hill's, Riis's and Hine's pictures did more than unmask the cruel by-products of the industrial society; they revealed a deeply embedded character of photography: its particular suitability to exploring the social nature of human life. Hill, Riis, Hine, and their successors[156] demonstrate that the "reinvention" of photography, was its reversal from an epistemological method of inquiry of the environmental nature to a means of ontological exploration of social nature. The temporary displacement of the discourse of sociology by that of art history didn't fundamentally alter the function of photography. Photography, shortly after its invention, had proven that those two ways—social and aesthetic—to see the world are not mutually exclusive; true to Arago's words photography asserted itself as both art and science, just neither the art nor the science Arago had in mind.

156 The sociological aspect of Riis's and Hine's photographs is also noticeable in August Sander, Eugene Atget, Jacques Henri Lartigue, Henri Cartier Bresson, Robert Frank, and Diane Arbus, to cite only a few.

While photography's historical association with death is thought to be a remembering contrivance, it is also a mode of questioning life. Even Roland Barthes, whose meditations in *Camera Lucida* is mostly a reflection on photography's relation to death, can't help but exclaim, when describing a picture representing two young girls looking at an airplane, "How alive they are!" (96). Barthes' characterization of the relation of photography to time is that of the peculiar anterior future—the oft noted what-has-been—is a conjugation that expresses past and future, life and death all at once. A careful reading of Barthes's insistence on the relation of photography with death throughout *Camera Lucida* inevitably draws attention to its relation to life, in the same way that the objective summons the notion of the subjective, and vice-versa. Like Barthes, Christian Metz opposes photography and cinema as respectively the expression of death and life. Yet cinema can't be dissociated from photography, that is the point Bazin makes in "The Ontology of the Photographic Image." This point of view was reiterated by Barthes, and paradoxically by Metz too, despite all the differences enumerated by Metz it appears that cinema teases life out photography rather than substituting life for death; Metz writes "[f]ilm 'includes' photography: cinema results from an addition of perceptive features to those of photography" (83).

The conversation between life and death that is at the center of Metz and Barthes pondering, biased as each appears to be, may just reveal the most dramatic aspect of the multiple dialogical plays that make of photography a means of philosophical investigation. I argued that photography came at a time when the

public was particularly receptive to the metaphysics of the struggle between truth and falsehood. As philosophers put forward the concepts relevant to that struggle in their own terms early photographers took their apparatus in the field to explore the same theme in their own manner. Even in the hand of the most casual practitioner, photography becomes a probe to explore the many facets of the relations between past and future, humans and non-humans, self and others, and life and death. Photography's privileged position of mediator provides the mechanism by which taking pictures becomes an effective means of ontological exploration as the fashions of postmortem and spirit photography, brief episodes in the history of photography, testify.

Only the forces of the marketplace—there is not enough high caliber artistic production responding to the previously established aesthetic criteria to satisfy the demand—brought amateur productions back to the interest of museum curators and art historians. Today hanging on the same gallery wall as celebrated art photographers, one can see anonymous contemporary snapshots as well as scientific photographs, which when taken had no pretension to artistic status whatsoever. This renewal of interest had a profound influence on the late-twentieth and early-twenty-first centuries practices of photography with the (conscious or unconscious) recognition that photography is first and foremost a historical and social medium; art photographers have once again turned to exploring the social environment. The observation of human behavior among

friends, family, and strangers has now found a new legitimacy among elite photographers.[157]

Photography born of the impetus of modernity turned early its witnessing power against the wicked side of its progenitor. Despite an effort to sanitize it through the filter of aesthetics, photography is proving its enduring quality. The democratization of photography (the upside of its commodification) as well as its masterful control in the hands of the artistic elite will continue to be an effective witness to the most egregious abuses of the industrial society. What was seen by art historians (here I think of Beaumont Newhall in particular) as a timely phase in the history of photography rendered necessary by temporary social conditions may instead have been the acute expression of a fundamental characteristic of photography: its sociability.

157 See the work of Nan Golden or Jeff Wall for instance.

Works Cited

17th-18th Century Burney Collection Newspapers. Retrieved 2/20/2010, from Gale Cengage Learning: http://find.galegroup.com/bncn/start.do

Aber, James S. "Lighter-Than-Air Platforms for Small-Format Aerial Photography." *Transactions of the Kansas Academy of Science (1903-)* 107.1/2 (2004): 39-44.

Aldini, Jean. *Essai Théorique et Expérimental Sur Le Galvanisme*. Vol. 1. 2 vols. Paris: Fournier Fils, 1804.

"American Photographical Society." *Humphrey's Journal of Photography and Allies Arts and Sciences* 17.19 (1866): 296-97.

American Photography: A Century of Images, Episode 3: The Photographic Age, 1935-1959. Dir. Muffle, Ellen, and Hovde Meyer. KTCA and Middlemarch Films Inc. 1999.

Arago, François. "Le daguerreotype." *Œuvres Complètes de François Arago*. Vol. 7. 13 vols. Paris: Gide et J. Baudry, 1854-62. 455-517.

Azouvi, François, and Dominique Bourel. *De Königsberg À Paris : La Réception de Kant En France : (1788-1804)*. Bibliothéque D'histoire de La Philosophie. Paris: J. Vrin, 1991.

Barthes, Roland. *Camera Lucida : Reflections on Photography*. New York: Hill and Wang, 1981.

Batchen, Geoffrey. *Burning with Desire : The Conception of Photography*. Cambridge, Mass.: The MIT Press, 1997.

Bates, David. "The Epistemology of Error in Late Enlightenment France." *Eighteenth-Century Studies* 29.3 (1996): 307-27.

Bayle, Pierre, and Karl Heinrich Hoym. *Dictionnaire Historique et Critique*. A Rotterdam: Chez Reinier Leers, 1697.

Bazin, André. "The Ontology of the Photographic Image." *Classic Essays on Photography*. Ed. Alan Trachtenberg. New Heaven: Leete's Island Books, Inc. , 1980.

Beiser, Frederick C. *Hegel*. Routledge Philosophers. 1st ed. New York ; London: Routledge, 2005.

Benjamin, Walter. "A Short History of Photography." *Classic Essays on Photography*. Ed. Alan Trachtenberg. New Haven, Conn.: Leete's Island Books, 1980. 199-216.

Bernardi, Walter. "La Controverse Sur L'électricité Animale Dans L'italie Du XVIIIe Siècle : Galvani, Volta et... D'autres /the Controversy over Animal Electricity in 18th-Century Italy : Galvani, Volta And... Others." *Revue d'histoire des sciences* 54.1 (2001): 53-70.

Beuchot, Adrien Jean Quentin. *Œuvres Complètes de Voltaire*. Collection Des Classiques François. Vol. XXXVII. Paris: Werdet et Lequien Fils, 1829.

Blade Runner. Dir. Scott, Ridley. Warner Brothers. 25 June 1982. 1982.

Blanc, Olivier. "Cercles Politiques et « Salons » Du Début de La Révolution (1789-1795)." *Annales historiques de la Révolution française* (2006): 63-92.

Bogardus, Ralph F. "The Twilight of Transcendentalism: Ralph Waldo Emerson, Edward Weston, and the End of Nineteenth-Century Literary Nature." *Prospects* 12 (1987): 347-64.

Bolingbroke, H.S.J.. *Letters on the Study and Use of History*. printed for A. Millar, 1752.

Bolléme, Geneviéve. "Littérature Populaire et Colportage Au 18e Siécle." *Livre et Société Dans La France Du Xviiie Siècle*. Ed. Geneviève Bollème. Civilisations et Sociétés. Paris ; La Haye: Mouton et Cie, 1965. 61-92.

Bouchard, Marcel. *De L'humanisme a L'encyclopedie*. Paris: Hachette, 1929.

Bourdieu, Pierre. *Photography, a Middle-Brow Art*. Stanford University Press, 1990.

Bresadola, Marco. "Medicine and Science in the Life of Luigi Galvani (1737–1798)." *Brain Research Bulletin* 46.5 (1998): 367-80.

Brewster, David. *Letters on Natural Magic, Addressed to Sir Walter Scott, Bart*. Family Library. London: John Murray, 1832.

Brooke, Steven, et al. *Views of Rome*. New York: Rizzoli, 2000.

Broman, Thomas. "The Habermasian Public Sphere And." *History of science* 36 (1998): 123-50.

Brunet, François. *La Naissance de L'idée de Photographie*. Paris: Presses Universitaire de France, 2000.

Cabanis, Pierre Jean George, and L Peisse. *Rapports Du Physique et Du Moral de L'homme et Lettre Sur Les Causes Premières*. 8eme ed. Paris: JB Baillière, 1844.

Castle, Terry. *The Female Thermometer: 18th Century Culture and the Invention of the Uncanny*. Oxford: Oxford University Press, 1995.

---. "Phantasmagoria: Spectral Technology and the Metaphorics of Modern Reverie." *Critical Inquiry* 15.1 (1988): 26-61.

Channing, Ellery William. *Slavery*. Fourth Edition ed. Boston: James Munroe and Company, 1836.

Chevalier, Michel. *Lettres de L'amérique Du Nord*. 4 eme ed. 2 vols. Bruxells: Wouter et Co., 1844.

Comment, Bernard. *The Painted Panorama*. New York, N.Y.: Abrams, 1999.

Condorcet, Marie-Jean-Antoine-Nicolas. *Tableau Historique Des Progrés de L'esprit Humain*. Paris: Brissot-Thivars, 1823.

"Contribution to the Physiology of Vision" *The Journal of the Royal Institution of Great Britain* 1 (1831): 101=17.

Crary, Jonathan. *Techniques of the Observer: On Vision and Modernity in the Nineteenth Century*. Cambridge: MIT Press, 1990.

Crichton, Alexander. *An Inquiry into the Nature and Origin of Mental Derangement : Comprehending a Concise System of the Physiology and Pathology of the Human Mind, and a History of the Passions and Effects*. Vol. 1. London: T. Cadell, Junior, and W. Davies in the Strand, 1798.

Crocker, Lester Gilbert. "The Problem of Truth and Falsehood in the Age of Enlightenment." *Journal of the History of Ideas* 14.4 (1953): 575-603.

Cushing, Max Pearson. "Baron d'Holbach: A Study of Eighteenth Century Radicalism in France." Dissertation. Columbia University, 1914.

Daguerre, Louis Jacques Mandé. *Historique et Description Des Procédés Du Daguerréotype et Du Diorama, Rédigé Par Daguerre* 2éme ed. Paris: Susse Fréres éditeurs, 1839.

Darnton, Robert. *Mesmerism and the End of the Enlightenment in France*. Cambridge, Mass.,: Harvard University Press, 1968.

Daston, Lorraine. "Objectivity and the Escape from Perspective." *Social Studies of Science* 22.4 (1992): 597-618.

Daston, Lorraine, and Peter Galison. *Objectivity*. New York, Cambridge, Mass.: Zone Books; Distributed by the MIT Press, 2007.

Daston, Lorraine, and Fernando. Vidal. *The Moral Authority of Nature*. Chicago, London: University of Chicago Press, 2004.

De la Mettrie, Julien, Offray. *L'histoire Naturelle de L'ame*. La Haye: Jean Neaulme, 1745.

---. *L'homme Machine*. La Salle: Open Court.(Original work published 1748), 1912.

de Rouvière, L. H., et al. *Nouveau Cours de Medecine. Ou, Selon Les Principes de La Nature et Des Mècaniques*. Paris: F. Clouzier & P. Aubouyn, 1669.

Debord, Guy. *Society of the Spectacle*. Detroit: Black & Red, 1983.

Decremps, Henri. *La Magie Blanche dévoilée, Ou, Explication Des Tours Surprennants, Qui Font Depuis Peu L'admiration de La Capitale et de La Province : Avec Des Réflexions Sur La Baguette Divinatoire, Les Automates Joueurs D'échecs, &C. &C*. Paris: Chez Langlois ... : Tiger Relieur ... et chez l'auteur ..., avec permission 1784., 1784.

Deleuze, Gilles, and Félix Guattari. *What Is Philosophy?* New York: Columbia University Press, 1994.

Dhombres, Jean. "Books: Reshaping Science." *Revolution in Print : The Press in France, 1775-1800*. Eds. Robert Darnton and Daniel Roche. Berkeley: University of California Press in collaboration with the New York Public Library, 1989.

Dictionnaire de l'Académie Française. (1762). *Nature*. Retrieved May 5, 2010, from ARTFL: http://artfl-project.uchicago.edu/content/dictionnaires-dautrefois

Diderot, Denis, and Jean d'Alembert. *Encyclopédie Ou Dictionnaire Raisonné Des Sciences, Des Arts et Des Métiers.* . Vol. 9. 17 vols. Neufchastel: Samuel Faulche & Companie, 1751-1765.

Dubois, Philippe. *L'acte Photographique*. Dossiers Media ; Paris : F. Nathan: Bruxelles, 1983.

Duris, Pascal. "L'enseignement de L'histoire Naturelle dans les Écoles Centrales (1795-1802)/the Teaching of Natural History in the Écoles Centrales (1795-1802)." *Revue d'histoire des sciences* 49.1 (1996): 23-52.

Durkheim, Emile. "Représentations Individuelles et Représentations Collectives." *Revue de métaphysique et de morale* VI (1898).

Dr. Marshall Lecture. Advertisement. *Oracle and Practical Advertiser* 17 January. 1795, 18 906 ed.

Eder, Josef Maria. *History of Photography*. Trans. Edward Epstean. New York: Columbia University Press, 1945.

Edwards, Steve. *Art and Its Histories : A Reader*. New Haven: Yale University Press in association with the Open University, 1999.

Ehrard, Jean, and Jacques Roger. "Deux Périodiques Français Du 18^{e} Siécle." *Livre et Société Dans La France Du Xviiie Siècle*. Ed. Geneviève Bollème. Civilisations et Sociétés. Paris ; La Haye: Mouton et Cie, 1965. 33-60.

Eitner, Lorenz. "The Open Window and the Storm-Tossed Boat: An Essay in the Iconography of Romanticism." *The Art Bulletin* 37.4 (1955): 281-90.

Elisabeth, Lisa Shapiro, and René Descartes. *The Correspondence between Princess Elisabeth of Bohemia and René Descartes*. The Other Voice in Early Modern Europe. Chicago: University of Chicago Press, 2007.

Emerson, Ralph Waldo. *Nature: Addresses and Lectures*. The Complete Works of Ralph Waldo Emerson. Vol. 1. 12 vols. Boston, New York: Houghton Mifflin Company, 1904.

Esquirol, Etienne. "Hallucinations." *Dictionnaire des sciences médicales. Paris, Panckoucke* (1817).

"Extraordinary German Impostor." *The Portfolio* July 17 1824.

Fairbairn, David. "Using Vedute to Source Geospatial Information: Data Flowline and Accuracies." *e-Perimetron* 4.2 (2009): 131-39.

Faraday, Michael. "On a Peculiar Class of Optical Deceptions." *The Journal of the Royal Institution of Great Britain* 1 (1831): 205-23.

Febvre, Lucien Paul Victor, and Henri Jean Martin. *L'apparition du livre : Avec 2 cartes en dépliant et 24 planches hors texte*. Paris: Éditions A. Michel, 1958.

Feuerbach, Ludwig. *The Essence of Christianity*. Trans. George Eliot. 2nd ed. New York: Harper & Brothers Publishers, 1957.

Findlen, Paula. *Possessing Nature : Museums, Collecting, and Scientific Culture in Early Modern Italy*. Berkeley: University of California Press, 1994.

---. "Translating the New Science: Women and the Circulation of Knowledge in Enlightenment Italy." *Configurations* 3.2 (1995): 167-206.

Flenley, Ralph. *Modern German History*. 4th ed. London, New York: Dent; Dutton, 1968.

Flusser, Vilém. *Towards a Philosophy of Photography*. London: Reaktion, 2000.

Focaccia, Miriam, and Raffaella Simili. "Luigi Galvani, Physician, Surgeon, Physicist: From Animal Electricity to Electro-Physiology." 2007. 145-58.

Fortier, Rénald. "The Balloon Era." *Ottawa: Canada Aviation Museum* (2004).

Foucault, Michel. *Madness and Civilization; a History of Insanity in the Age of Reason*. New York: Vintage Books, 1973.

---. *The Order of Things; an Archaeology of the Human Sciences*. New York: Vintage Books, 1973.

Foucault, Michel, and Colin Gordon. *Power/Knowledge : Selected Interviews and Other Writings, 1972-1977*. New York, N.Y.: Pantheon Books, 1980.

Frank, Jr., Robert G. . "Thomas Willis and His Circle: Brain and Mind in Seventeenth-Century Medicine." *The Language of Psyche: Mind and Body in Enlightement Thought*. Ed. G.S. Rousseau. Berkeley, Los Angeles, Oxford: University of California Press, 1990. 107-46.

Freund, Giséle. *Photography & Society*. Boston: D.R. Godine, 1980.

Frixione, E. "Albrecht Von Haller (1708–1777)." *Journal of Neurology* 253.2 (2006): 265-66.

Furet, François. "La "Librarie" Du Royaume de France Au 18^{e} Siècle." *Livre et Société Dans La France Du XVIIIe Siècle*. Ed. Geneviève Bollème. Civilisations et Sociétés. Paris ; La Haye: Mouton et Cie, 1965. 3-32.

Galvani, Luigi, Giovanni Aldini, and Robert Montraville Green. *Commentary on the Effect of Electricity on Muscular Motion*. Cambridge, Mass.: Elizabeth Licht, 1953.

Gaudin, Marc-Antoine. "Traité Pratique de La Photographie." *La Photographie En France - Textes & Controverses: Une Anthologie 1816-1871*. Ed. André Rouillé. Paris: Macula, 1989.

Gernsheim, Helmut. *The Origins of Photography*. London: Thames and Hudson, 1982.

Gernsheim, Helmut, and Alison Gernsheim. *The History of Photography from the Earliest Use of the Camera Obscura in the Eleventh Century up to 1914*. London; New York: Oxford University Press, 1955.

---. *L.J.M. Daguerre; the History of the Diorama and the Daguerreotype*. New York: Dover Publications, 1968.

Goethe, Johann Wolfgang von, and John Oxenford. *The Autobiography of Johann Wolfgang von Goethe*. New York: Horizon Press, 1969.

Goodman, Dena. "Enlightenment Salons: The Convergence of Female and Philosophic Ambitions." *Eighteenth-Century Studies* 22.3 (1989): 329-50.

Goubert, Jean-Pierre. "L'art de Guérir. Médecine Savante et Médecine Populaire Dans La France de 1790." *Annales. Histoire, Sciences Sociales* 32.5 (1977): 908-26.

"Grand Exhibition." Advertisement. *Oracle and Practical Advertiser* 20 January. 1795.

Green-Lewis, Jennifer. *Framing the Victorians : Photography and the Culture of Realism*. Ithaca, N.Y.: Cornell University Press, 1996.

Greenwood, H. *The British Journal of Photography*. 1867.

Habermas, Jürgen. *The Structural Transformation of the Public Sphere : An Inquiry into a Category of Bourgeois Society*. 1st paperback ed. Cambridge, Mass.: MIT Press, 1991.

Hartley, David. *Observations on Man, His Frame, His Duty, and His Expectations*. Printed for T. Tegg and son, 1834.

Hartley, Harold. "The Wilkins Lecture. Sir Humphry Davy, Bt., P.R.S. 1778-1829." *Proceedings of the Royal Society of London. Series A, Mathematical and Physical Sciences* 255.1281 (1960): 153-80.

Hatin, Eugéne. *Bibliographie Historique et Critique de La Presse Périodique Française*. Paris: Librairie de Firmin Didot Fréres, fils et C^{ie}, 1866.

Hawthorne, Nathaniel. *The House of the Seven Gables*. Norton Critical Editions;. [1st]. ed. New York: Norton, 1967.

Hegel, Georg Wilhelm Friedrich. *Aesthetics : Lectures on Fine Art*. Oxford: Clarendon Press, 1975.

Hegel, Georg Wilhelm Friedrich, and J. B. Baillie. *The Phenomenology of Mind*. Harper Torchbooks. The Academy Library. New York,: Harper & Row, 1967.

Hegel, G.W.F., and S.W. Dyde. *Hegel's Philosophy of Right*. G. Bell and sons, 1896.

Henry, Paget. "Between Hume and Cugoano: Race, Ethnicity and Philosophical Entrapment." *The Journal of Speculative Philosophy* 18.2 (2004): 129-48.

Herschel, J. F. W. "The Bakerian Lecture: On Certain Motions Produced in Fluid Conductors When Transmitting the Electric Current." *Philosophical Transactions of the Royal Society of London* 114 (1824): 162-96.

---. *Letter to W.H.F. Talbot*. Letter. National Media Museum, Bradford, England.

---. "On the Chemical Action of the Rays of the Solar Spectrum on Preparations of Silver and Other Substances, Both Metallic and Non-Metallic, and on Some Photographic Processes." *Philosophical Transactions of the Royal S ociety of London* 130 (1840): 1-59.

Hetherington, Kevin. *Capitalism's Eye : Cultural Spaces of the Commodity*. Cultural Spaces Series. New York ; London: Routledge, 2007.

Holbach, Paul Henri Thiry. *Système de La Nature; Ou, Des Lois Du Monde Physique et Du Monde Moral*. nouv. éd., ed. Paris,: Étienne Ledoux, 1821.

Holmes, Oliver W. "Descartes, Hume, Kant and Diderot: The Interconnectedness of the Self and Nature." Phenomenology of Life from the Animal Soul to the Human Mind." Ed. Anna-Teresa Tymieniecka. Vol. 94. Analecta Husserliana: Springer Netherlands, 2007. 381-417.

Holmes, Oliver Wendell. "Doings of the Sunbeam." *Soundings from the Atlantic*. Ed. Oliver Wendell Holmes. Boston: Ticknor and Fields, 1864. 228-81.

---. "The Stereoscope and the Stereograph." *Soundings from the Atlantic*. Ed. Oliver Wendell Holmes. Boston: Ticknor and Fields, 1864. 124-65.

---. "Sun-Painting and Sun-Sculpture; with a Stereoscopic Trip across the Atlantic." *Soundings from the Atlantic*. Boston: Ticknor and Fields, 1864. 166-227.

Humbert, A. "La Daguerreotypomanie." *Le Tintamarre* June 20. 1852: 1.

Humboldt, Frederic-Alexander von. *Expériences Sur Le Galvanisme, et En Général Sur L'irritation Des Fibres Musculaires et Nerveuses*. Paris: Didot Jeune, 1799.

Hume, David, and Charles William Hendel. *An Inquiry Concerning Human Understanding : With a Supplement, an Abstract of a Treatise of Human Nature*. Library of Liberal Arts ; No. 49. Upper Saddle River, New Jersey: Prentice-Hall, 1995.

Jacob, Margaret C. "The Mental Landscape of the Public Sphere: A European Perspective." *Eighteenth-Century Studies* 28.1 (1994): 95-113.

Johnson, James William. "What Was Neo-Classicism?" *The Journal of British Studies* 9.1 (1969): 49-70.

Jones, Paul. "The Technology Is Not the Cultural Form?: Raymond Williams's Sociological Critique of Marshall Mcluhan." *Canadian Journal of Communication* 23.4 (1998).

Kale, Steven D. *French Salons : High Society and Political Sociability from the Old Regime to the Revolution of 1848*. Baltimore, Md.: Johns Hopkins University Press, 2004.

Kant, Immanuel, and J. H. Bernard. "Kant's Critique of Judgement." 1914. Macmillan. <http://www.archive.org/details/cu31924028104085>.

Kant, Immanuel, and Carl Joachim Friedrich. *The Philosophy of Kant : Immanuel Kant's Moral and Political Writings*. The Modern Library of the World's Best Books. New York: Modern Library, 1993.

Kant, Immanuel, Paul Guyer, and Allen W. Wood. *The Critique of Pure Reason*. The Cambridge Edition of the Works of Immanuel Kant. New York: Cambridge University Press, 1998.

Kennedy, Emmet. "The Secularism of Destutt de Tracy's « Ideology »." *Colloque International / Internationales Kolloquium Idéologie - Grammaire Générale - Écoles Centrales*.

Kern, Stephen. *The Culture of Time and Space 1880-1918*. Cambridge, Mass.: Harvard University Press, 1983.

Kettenmann, Helmut. "Alexander Von Humboldt and the Concept of Animal Electricity." *Trends in Neurosciences* 20.6 (1997): 239-42.

Kim, Mi Gyung. "Balloon Mania: News in the Air." *Endeavour* 28.4 (2004): 149-55.

Kitcher, Patricia. "Revisiting Kant's Epistemology: Skepticism, Apriority, and Psychologism." *Noûs* 29.3 (1995): 285-315.

Kittler, Friedrich A. *Optical Media : Berlin Lectures 1999*. English ed. Cambridge, UK ; Malden, MA: Polity, 2010.

Kossoy, Boris. "Hercule Florence: Pioneer of Photography in Brazil." *Image* 20.1 (1977): 9.

Lacan, Ernest. "De L'héliography à New York." *La Lumière* 02 Sept. 1851: 138.

"La Phantasmagorie." *La Feuille Vilageoise* February 28 1793.

Langenbach, Randolph. "Outside the Frame: Piranesi's Perspective and Composition, Re-Explored in the Digital Age." *ICOMOS General Assembly*.

Lavater, Jean-Gaspard. *L'art de Connaître Les Hommes Par La Physionomie*. Paris: Depélafol, 1820.

Levit, Herschel, and Giovanni Battista Piranesi. *Views of Rome, Then and Now*. New York: Dover Publications, 1976.

Lifshits, Mikhail Aleksandrovich. *The Philosophy of Art of Karl Marx*. Trans. Ralph B. Winn. London Pluto Press Ltd., 1973.

Locke, John. *An Essay Concerning Humane Understanding*. Early English Books, 1641-1700 / 361:02: London : Printed by Eliz. Holt for Thomas Basset ..., 1690.

Looby, Christopher. "The Constitution of Nature: Taxonomy as Politics in Jefferson, Peale, and Bartram." *Early American Literature* 22.3 (1987): 252-73.

Lovejoy, Arthur O. "Reflections on the History of Ideas." *Journal of the History of Ideas* 1.1 (1940): 3-23.

Lukasik, Christopher J. "The Face of the Public." *Early American Literature* 39.3 (2004): 413-64.

Lüthy, Christoph. "Hockney's Secret Knowledge, Vanvitelli's Camera Obscura." *Early Science and Medicine* 10.2 (2005): 315-39.

Lynn, Michael R. *Popular Science and Public Opinion in Eighteenth-Century France*. Studies in Early Modern European History. Manchester: Manchester University Press, 2006.

Macdonald, Gus. *Camera : Victorian Eyewitness : A History of Photography, 1826-1913*. New York: Viking Press, 1980.

Mannoni, Laurent, and Richard Crangle. *The Great Art of Light and Shadow : Archaeology of the Cinema*. Exeter Studies in Film History;. Exeter, Devon: University of Exeter Press, 2000.

Marien, Mary Warner. *Photography: A Cultural History*. 2nd ed. Upper Saddle River, NJ: Pearson Prentice Hall, 2006.

Marin, Louis. *To Destroy Painting*. Chicago: University of Chicago Press, 1995.

Marx, Karl. *Capital. A Critique of Political Economy*. 1867. Trans. Samuel Moore and Edward Avelin. Vol. 1. 3 vols. New York: International Publishers, 1967.

---. *Economic and Philosophical Manuscripts of 1844*. Trans. Martin Milligan. Amherst, New York: Prometheus Books, 1988.

Marx, Karl, and Friedrich Engels. *Karl Marx, Frederick Engels : Collected Works*. Vol. 3. New York: International Publishers, 1975.

Maurisset, Theodore. *La Daguerreotypomanie*. 1839. Bauger, Paris.

Mauro, Alexander. "The Role of the Voltaic Pile in the Galvani-Volta Controversy Concerning Animal Vs. Metallic Electricity." *J Hist Med Allied Sci* XXIV.2 (1969): 140-50.

McCauley, Elizabeth Anne. *A.A.E. Disdéri and the Carte de Visite Portrait Photograph*. New Haven: Yale University Press, 1985.

---. *Industrial Madness : Commercial Photography in Paris, 1848-1871*. Yale Publications in the History of Art. New Haven: Yale University Press, 1994.

McClellan, James E. *Science Reorganized : Scientific Societies in the Eighteenth Century*. New York: Columbia University Press, 1985.

McLuhan, Marshall. *Understanding Media the Extensions of Man*. Mentor Books. New York, London: Penguin Books Ltd., 1964.

Merton, Robert King. *The Sociology of Science : Theoretical and Empirical Investigations*. Chicago: University of Chicago Press, 1973.

Mesmer, Frantz Anton. *Mémoire Sur La Découverte Du Magnétisme Animal*. Paris: Didot le jeune, 1779.

Mesmer, Frantz Anton, and J. L. Pilcher Grandchamp. *Memoire de F. A. Mesmer, Docteur En Medecine Sur Ses Découvertes*. Paris: Pierre Maumus et Cie, 1826.

Metz, Christian. "Photography and Fetish." *Over Exposed: Essays on Critical Photography*. Ed. Carol Squiers. New York: New Press, 1999.

Michael, Emily, and Fred S. Michael. "Corporeal Ideas in Seventeenth-Century Psychology." *Journal of the History of Ideas* 50.1 (1989): 31-48.

Millet, Bernard. "Le “Grand Tour”, Un Paysage Photographique." *La pensée du Midi*.3 (2000): 63-68.

Millet, M. Letter to the editor. *Le Tintamarre* June 27. 1852: 2.

Mitchell, Timothy F. "From Vedute to Vision: The Importance of Popular Imagery in Friedrich's Development of Romantic Landscape Painting." *The Art Bulletin* 64.3 (1982): 414-24.

Mitchell, W. J. T. "Romanticism and the Life of Things: Fossils, Totems, and Images." *Critical Inquiry* 28.1 (2001): 167-84.

Moravia, Sergio. "The Enlightenment and the Sciences of Man." *History of Science* 18 (1980): 247-68.

"Mr. Burford's Panorama of the Battle of Navarrino." *The Times* Jan 21. 1828: g. 3; Issue 13494.

Mungin, Arthur. *La Navigation Aerienne*. Tours: Alfred Mamae et Fils, 1894.

Museum of Modern Art (New York N.Y.), and Beaumont Newhall. *Photography, 1839-1937 : [Exhibition March 1937]*. New York: The Museum of Modern Art, 1937.

"New Panorama." *The Times* Apr 25. 1829: g. 2; Issue 13898.

Newhall, Beaumont. *The History of Photography : From 1839 to the Present*. New York : Museum of Modern Art: Boston, 1982.

---. *The Daguerreotype in America*. Dover Books on Photography. 3d rev. ed. New York: Dover Publications, 1976.

Novak, Daniel Akiva. *Realism, Photography, and Nineteenth-Century Fiction*. Cambridge Studies in North American Indian History. Cambridge, UK ; New York: Cambridge University Press, 2008.

O'Connor, James P B. "Thomas Willis and the Background to Cerebri Anatome." *J R Soc Med* 96.3 (2003): 139-43.

Oettermann, Stephan. *The Panorama : History of a Mass Medium*. Trans. Deborah Lucas Sneider. New York: Zone Books, 1997.

Ogburn, William F., and Dorothy Thomas. "Are Inventions Inevitable? A Note on Social Evolution." *Political Science Quarterly* 37.1 (1922): 83-98.

"On Monday Next Will Open the Panorama." Classified. *Oracle* May 28. 1791, Issue 624

"Other 6 - No Title." *The Daguerreotype: A Magazine of Foreign Literature and Science: Comp. Chiefly From the Periodical Publications of England, France, and Germany (1847-1849)* 31 Mars 2011 1847.

Pabst, Germain. *Essai Sur L'histoire Des Panoramas et Des Dioramas*. Paris: Imprimerie Nationale, 1891.

"Panorama of Calcutta." *The Times* Feb 27. 1830: g. 3; Issue 14161.

"Panorama of Geneva." *The Times* Apr 07. 1827: g. 3; Issue 13247.

Parent, André. "Giovanni Aldini: From Animal Electricity to Human Brain Stimulation." *The Canadian Journal of Neurological Sciences* 31.4 (2004): 576-84.

Peters, John Durham. *Speaking into the Air : A History of the Idea of Communication*. University of Chicago Press, 1999.

Picavet, François Joseph. *Les Idéologues*. New York: Arno Press, 1975.

Popkin, Richard H., Ezequiel de Olaso, and Giorgio Tonelli. *Scepticism in the Enlightenment*. Archives Internationales D'histoire Des Idées = International Archives of the History of Ideas. Dordrecht ; Boston: Kluwer Academic, 1997.

Potonniée, Georges. *Histoire de La Decouverte de La Photographie*. Paris: Publications Photographiques Paul Montel, 1925.

Porter, Roy. *Flesh in the Age of Reason*. 1st American ed. New York: W.W. Norton & Co., 2004.

Priestley, Joseph. *Disquisitions Relating to Matter and Spirit*. 2nd ed. Birmingham: Printed by Pearson and Rollason, for J. Johnson, 1782.

---. *A Familiar Introduction to the Study of Electricity by Joseph Priestley*. The second edition. ed. London: printed for J. Dodsley; T. Cadell, successor to Mr. Millar; and Johnson and Payne, 1769.

---. *Hartley's Theory of the Human Mind*. Ed. David Hartley. London: J. Johnson, 1775.

---. "The History and Present State of Electricity with Original Experiments, by Joseph Priestley." 1769. printed for J. Dodsley, J. Johnson and J. Payne, and T. Cadell (successor to Mr. Millar).

Ranger, Terence. "Review: Colonialism, Consciousness and the Camera." *Past & Present*.171 (2001): 203-15.

"Resuscitation by Means of the Galvanic Fluid." News. *The Times* February 04. 1803: 4; issue 5634.

Richardson, Alan. "Romanticism and the Body." *Literature Compass* 1.1 (2004).

Riskin, Jessica. "The Lawyer and the Lightning Rod." *Science in Context* 1.12 (1999): 61-99.

Robertson, Etienne Gaspard. *Mémoires Récréatifs, Scientifiques et Anecdotiques Du Physicien-Aéronaute E.G. Robertson*. Paris: Chez l'auteur et à la Librairie de Wurtz, 1831-1833, 1834.

Robinson, Henry Peach. "On Printing Photographic Pictures from Several Negatives." *The British Journal of Photography* 1860: 94.

Roche, Daniel. "Censorship and the Publishing Industry." *Revolution in Print : The Press in France, 1775-1800*. Eds. Robert Darnton and Daniel Roche. Berkeley: University of California Press in collaboration with the New York Public Library, 1989. 3-26.

Root, Marcus Aurelius *The Camera and the Pencil; or the Heliographic Art*. Philadelphia, N.Y.: M.A. Root J.B. Lippincott & Co.; D. Appleton & Co., 1864.

Rorty, Richard. *Consequences of Pragmatism : Essays, 1972-1980*. New York: Harvester, 1991.

Rousseau, Jean-Jacques. *Discours Sur L'origine & Les Fondements de L'inégalité Parmi Les Hommes*. A Amsterdam: Chez Marc Michel Rey, 1755.

---. *Du Contrat Social*. Paris: Félix Alcan, 1896.

Rudisill, Richard. *Mirror Image : The Influence of the Daguerreotype on American Society*. 1st ed. Albuquerque: University of New Mexico Press, 1971.

Sales, Jean-Baptiste-Claude. *De La Philosophie de La Nature: Ou Traité de Morale Pour Le Genre Humain, Tiré de La Philosophie et Fondé Sur La Nature*. 3rd ed. Vol. 6. London, 1778.

Sarbin, Theodore R., and Joseph B. Juhasz. "The Historical Background of the Concept of Hallucination." *Journal of the History of the Behavioral Sciences* 3.4 (1967): 339-58.

Schaaf, Larry J. *Out of the Shadows : Herschel, Talbot & the Invention of Photography*. New Haven: Yale University Press, 1992.

Schaffer, Simon. "The Consuming Flame." *Consumption and the World of Goods*. Eds. John Brewer and Roy Porter. London ; New York: Routledge, 1993. 489-526.

---. "Natural Philosophy and Public Spectacle in the Eighteenth Century." *History of Science* 21.51 (1983): 1-43.

Scharf, Aaron. *Art and Photography*. Pelican Books. Harmondsworth, Eng. ; Baltimore: Penguin, 1974.

Schickore, Jutta. "Misperception, Illusion and Epistemological Optimism: Vision Studies in Early Nineteenth-Century Britain and Germany." *The British Journal for the History of Science* 39.03 (2006): 383-405.

Schiebinger, Londa L. *The Mind Has No Sex? : Women in the Origins of Modern Science*. Cambridge, Mass.: Harvard University Press, 1989.

Schudson, Michael. *Discovering the News : A Social History of American Newspapers*. New York: Basic Books, 1978.

Schulze, Ludmilla. "The Russification of the St. Petersburg Academy of Sciences and Arts in the Eighteenth Century." *The British Journal for the History of Science* 18.3 (1985): 305-35.

Sontag, Susan. *On Photography*. New York: Farrar, Straus and Giroux, 1977.

Spiller, Robert E. "Critical Standards in the American Romantic Movement." *College English* 8.7 (1947): 344-52.

Stent, Gunther S. "Epistemic Dualism of Mind and Body." *Proceedings of the American Philosophical Society* 142.4 (1998): 578-88.

Swart, Koenraad W. "'Individualism' in the Mid-Nineteenth Century (1826-1860)." *Journal of the History of Ideas* 23.1 (1962): 77-90.

Taft, Robert. "Photography and the American Scene a Social History, 1839-1889." 1942. Macmillan Co.

Tagg, John. *The Burden of Representation : Essays on Photographies and Histories*. Amherst: University of Massachusetts Press, 1988.

Talbot, William Henry Fox. *The Pencil of Nature*. New York: Da Capo Press, 1969.

---. "A Brief Historical Sketch of the Invention of the Art." *Classic Essays on Photography*. Ed. Alan Trachtenberg. New Haven, Conn.: Leete's Island Books, 1980. 27-36.

The Scotsman. "Horrible Phenomena!-Galvanism." *The Times* February 11. 1819: 3; issue 10594.

Telindus. "The Family of Man". Clervaux, 2007. (06/22/2009): Musée "The Family of Man". 4/15 2010. <http://www.family-of-man.public.lu/index.html>.

The Times Digital Archives. Retrieved 2/20/2010, from Gale Cengage Learning: http://infotrac.galegroup.com/itw/infomark/0/1/1/purl=rc6_TTDA?sw_aep=crepuq_mcgill

Tatarkiewicz, Wladyslaw. "Objectivity and Subjectivity in the History of Aesthetics." *Philosophy and Phenomenological Research* 24.2 (1963): 157-73.

Tiphaigne de la Roche, Charles-François. *Giphantie: Voyages Aux Pays de Nulle Part*. Paris: Nicolas-François Moreau, 1760.

Tomaselli, Sylvana. "The First Person: Descartes, Locke and Mind-Body Dualism." *History of Science* 22.2 (1984): 185-205.

Tonelli, Giorgio. "Kant and the Ancient Sceptics." *Scepticism in the Enlightenment*. Ed. Richard H. Popkin. Dordrecht ; Boston: Kluwer Academic, 1997. 69-98.

---. "The 'Weakness' of Reason in the Age of Enlightenment." *Scepticism in the Enlightenment*. Ed. Richard H. Popkin. Dordrecht ; Boston: Kluwer Academic, 1997. 35-50.

Trachtenberg, Alan. "Photography: The Emergence of a Keyword." *Photography in Nineteenth-Century America*. Ed. Martha A. Sandweiss. Fort Worth Tex. New York: Amon Carter Museum ; H.N. Abrams, 1991. 17-47.

---. "Reflection on the Daguerrean Mystique." *The Portrait in Photography*. Ed. Graham Clarke. London, England: Reaktion, 1992. 173-92.

Triggs, Stanley, William Notman, and Art Gallery of Ontario. *William Notman : The Stamp of a Studio*. Toronto Coach House Press,: Art Gallery of Ontario :, 1985.

Triggs, Stanley, William Notman, and Musée McCord d'histoire canadienne. *Le Studio de William Notman : Objectif Canada = William Notman's Studio : The Canadian Picture*. Montreal: McCord Museum of Canadian History, 1992.

Tucker, Jennifer. *Nature Exposed : Photography as Eyewitness in Victorian Science*. Baltimore: Johns Hopkins University Press, 2005.

Ursyn, Anna. "Art as Information." *Leonardo* 35.4 (2002): 445-46.

Valéry, Paul. "Discours du Centenaire de la Photographie." *Études Photographiques*.10 (2001). October 26, 2009

Van Lier, Henri. *Philosophy of Photography*. Lieven Gevaert Series. Leuven: Leuven University Press, 2007.

Varin d'Ainvelle, Madeleine. *La Presse en France : Genèse et Évolution de Ses Fonctions Psycho-Sociales*. Université de Grenoble, Publications de La Faculté Des Lettres et Sciences Humaines. Paris: Presses universitaires de France, 1965.

Vaughan, William. *German Romantic Painting*. New Haven: Yale University Press, 1980.

Voltaire."Dieu: Reponse de Mr. de Voltaire Au Système de la Nature". [S.l.], Au Château de Ferney. 1770.

Wahrman, Dror. *The Making of the Modern Self : Identity and Culture in Eighteenth-Century England*. New Haven [Conn.] ; London: Yale University Press, 2004.

Ware, M.J., et al. *Quantifying the Vulnerability of Photogenic Drawings*. Royal Danish Academy of Fine Arts. School of Conservation, 1996.

Warner, Michael. *Publics and Counterpublics*. New York Cambridge, Mass. ; London: Zone Books ; Distributed by The MIT Press, 2002.

Weber, Max, and Richard Swedberg. *The Protestant Ethic and the Spirit of Capitalism : The Talcott Parsons Translation Interpretations*. 1st ed. New York: W.W. Norton & Co., 2009.

Weckel, Ulrike. "A Lost Paradise of a Female Culture? Some Critical Questions Regarding the Scholarship on Late Eighteenth-and Early Nineteenth-Century German Salons." *German History* 18.3 (2000): 310-36.

White, Leslie A. *The Science of Culture, a Study of Man and Civilization*. New York: Farrar, Straus, 1949.

Wood, Derek R. "Letters of R. Derek Wood, 1990s Part III". 2009. October 18 2009. <http://www.midley.co.uk/Letters/LETTERS9.HTM#A12>.

Wood, Paul. "Science, the Universities, and the Public Sphere in Eighteenth-Century Scotland." *History of Universities* xiv (1994): 99-135.

Williams, Raymond. *Television: Technology and Cultural Form*. Hanover and London: Wesleyan University Press, University Press of New England, 1992.

Yolton, John W. *Thinking Matter : Materialism in Eighteenth-Century Britain*. Minneapolis: University of Minnesota Press, 1983.

Zola-Morgan, S. "Localization of Brain Function: The Legacy of Franz Joseph Gall (1758-1828)." *Annual Review of Neuroscience* 18.1 (1995): 359-83.