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Estrangement of Vision. Edgar Allan Poe's Optics

I. The scope of optics and its deviations

In the first half of the nineteenth century, optics was not so much a single discipline as it was a fluctuating set of highly contested themes, practices, and technologies, located at the heart of various fields and at the intersections between them.¹ This paper takes optical themes as the basis for a reading of the innovative if fragmentary philosophy of art and nature in the writings of Edgar Allan Poe (1809-1849). Rather than simply exemplifying or directly translating contemporary themes of scientific optics and related discourses about reason and the senses into a literary register, Poe alters them through satire, extrap-

¹ These fields included physiology, the study of the the eye, the retina, color perception, and the nerves; psychology, investigations of the senses and their relation to thought, emotions, memory, will, and attention; epistemology and its reflections upon the relation between visible appearances, specific techniques and methods, and universal, general, repeatable, "objective" knowledge. An arcade of technologies dealing with optics also emerged – increasingly fine lenses, more powerful telescopes and microscopes, the Daguerreotype, and optical and philosophical "toys" from stereoscopes and phenakistiscopes to stroboscopes, zooscopes, and kaleidoscopes. Technical innovations like polarimeters and interferometers aided optical debates in physics, about the nature of light particles or waves. The luminiferous ether at center of these debates suggested possible links between light, heat, electricity, and magnetism. Mesmerists, somnambulists, and spiritualists claimed to navigate ether in their exploration of invisible realms; such metaphysical and theological uses of light had a respectable scientific pedigree stretching to Newton's Opticks. Among many others, see Jed Buchwald, *The Rise of the Wave Theory of Light: Optical Theory and Experiment in the Early Nineteenth Century*. Chicago: University of Chicago Press, 1989; Jonathan Crary, *Techniques of the Observer: On Vision and Modernity in the Nineteenth Century* (Cambridge, Mass.: MIT Press, 1990); Lorraine Daston, "Objectivity and the Escape from Perspective," *Social Studies of Science* 22 (1992): 597-618; Elizabeth Green Musselman, *Nervous Conditions: Science and the Body Politic in the Industrial Age*. Binghamton, NY: SUNY Press, 2005); Myles W. Jackson, *Spectrum of Belief: Joseph Von Fraunhofer and the Craft of Precision Optics* (Cambridge, Mass.: MIT Press, 2000); Naum S. Kipnis, *History of the Principle of Interference of Light* (Basel; Boston: Birkhäuser Verlag, 1991); Simon Schaffer, "On Astronomical Drawing," in *Picturing Science, Producing Art*, ed. Peter Galison and Carolyn Jones (New York: Routledge, 1998), 441-74; Alison Winter, *Mesmerized: Powers of Mind in Victorian Britain* (Chicago: University of Chicago Press, 1998); Arthur Zajonc, *Catching the Light: The Entwined History of Light and Mind* (New York: Bantam Books, 1993).

olation, inversion, and irony. As a preliminary example, consider one of his best-known tales, "The Tell-Tale Heart" (1843), which takes familiar notions about optics, reason, and perception in the first half of the nineteenth century and makes them strange.

The tale begins with an invocation of truth, nerves, disease and health, heaven and hell, and the powers of the storyteller:

"TRUE! – nervous – very, very dreadfully nervous I had been and am! but why will you say that I am mad? The disease had sharpened my senses – not destroyed – not dulled them. Above all was the sense of hearing acute. I heard all things in the heaven and in the earth. I heard many things in hell. How, then, am I mad? Hearken! and observe how healthily – how calmly I can tell you the whole story".²

Though he signals the sharpness of his sense of hearing, the tale turns heavily upon vision, light, and the instruments of seeing. The disease he alludes to manifests itself in a visual obsession over a troublingly opaque eye, possessed by the man with whom he shares his house:

"I loved the old man. He had never wronged me. He had never given me insult. For his gold I had no desire. I think it was his eye! yes, it was this! One of his eyes resembled that of a vulture – a pale blue eye, with a film over it. Whenever it fell on me, my blood ran cold; and so by degrees – very gradually – I made up my mind to take the life of the old man, and thus rid myself of the eye forever". (ibid.)

The narrator then details the patience and precision with which he quietly stalked the man, peering into his room at midnight with a lantern open "just so much that a single thin ray fell upon the vulture eye." On the seventh night of this vigil, the old man awakens, sensing the presence of an intruder but immobilized with fear. After an agonizing silence, the narrator stealthily opens his lantern, "until, at length, a single dim ray, like the thread of the spider, shot from out the crevice and full upon the vulture eye." The object of his obsession is open. The narrator at once begins to hear "a low, dull, quick sound, such as a watch makes when enveloped in cotton" (218), the terrified beating of the old man's heart, so loud that the narrator fears that neighbours will hear.

Where light has often symbolized knowledge and reason, here it is allied to madness; the narrator's vision is compulsively filled with a film-covered eye, not the perfectly adapted, transparent apparatus that served in texts of Natural Theology as a sign of God's creation.³ Where psychology and epistemology inquire about the conditions for reliable testimony, here we have an exemplarily unreliable narrator protesting far too much about the reliability of his sight, hearing, and reason.⁴ The darkened room recalls the *camera obscura*, the guiding technological metaphor of vision at least to the nineteenth century,

in which the eye and mind were compared to a room into which images of the outside world were projected. Yet the narrator's light comes from an artificial lantern; he acts by night; the image projected is not of external creation but "the thread of a spider" ensnaring its prey. The scene also restages Newton's experiments with prisms in the *Opticks* and his analysis of the colors hidden within white light – a primal scene for experimental optics and for experimental philosophy itself.⁵ Poe's scene inverts science's creation narrative of rational science into a black mass: if in the *Opticks*, the invisible ether served as the agent of vitality and God's action in the world, here vision becomes an agent of moral perversion and death. The heightened sensitivity celebrated in the age's new precision instruments passes into abnormality, bringing the narrator to perceive – perhaps through the ether's vibrating milieu – "many things in hell."

The narrator murders the old man without comment. He then proceeds, methodically, to dismember the body and bury its parts beneath the floorboards. The police arrive, having heard the old man's shriek; he entertains them coolly, inviting them in for a drink, placing their chairs directly over the buried body. Then he starts to hear, again, a constant beating, "like a watch wrapped in cotton" – his victim's heart growing louder and louder. The contrast between this incessant pounding and the apparent indifference of the police drive him to a frenzy; at last he cries out in horror and agony, confessing the details of his crime. Just as his desire to demonstrate his stealth and rational calmness leads to the revelation of the murder, the extreme sensitivity of his sense organs lets him perceive sounds which, hallucinated or real, take him outside the realm of sanity.

Poe wrote at a time when mechanical explanations of nature, aided by precision devices of experiment, observation, and measurement flourished. Concurrently, the broad movement of romanticism in the arts, in politics, and philosophy is often seen as defending the sensitive and volatile individual subject and valorising a dynamic, organic nature; it is read as a reaction against the mechanizing tendency of the early industrial age.⁶ A number of recent works, however, have put into question this polarization between machines and reason on one hand, and organisms and imagination on the other. In line with these reconsiderations of the standard historiography of this period, my attention has been fixed on a set of practices, machines, concepts and attitudes I call me-

5 This seven days' vigil also recalls Descartes' sequesterment in the *Meditations on First Philosophy* and his retreat to recreate natural science based on vivid, clear and distinct ideas. See René Descartes and Donald A. Cress, *Discourse on Method and Meditations on First Philosophy* (1st ed. Indianapolis: Hackett Pub. Co., 1980).

6 This opposition between romanticism and mechanism coalesced influentially in classic texts in the history of ideas from the first half of the twentieth century, notably in Arthur O. Lovejoy, *The Great Chain of Being: A Study of the History of an Idea* (Cambridge, Mass.: Harvard University Press, 1936), R. G. Collingwood, *The Idea of Nature* (Oxford: Clarendon Press, 1945) and Alfred North Whitehead, *Science and the Modern World* (New York: Free Press, 1967) with its key chapter on "The Romantic Reaction."

2 Edgar Allan Poe, *The Works of Edgar Allan Poe* (Roslyn, NY: Walter J. Black, 1927), 216

3 See William Paley, *Natural Theology; or, Evidences of the Existence and Attributes of the Deity* (London: Printed for R. Faulder, 1802).

4 See Wayne C. Booth, *The Rhetoric of Fiction* (2nd ed. Chicago: University of Chicago Press, 1983), 158-159, on the "unreliable narrator."

chanical romanticism.⁷ For instance, much attention has been paid to the continuing elaboration of *mechanical models* for understanding certain aspects of living beings in medicine and physiology; but vitalist and teleological explanations also thrived at this time.⁸ Furthermore, the *properties of living beings* were often attributed to machines: steam engines, presses, and railroads were frequently identified metaphorically with animals. In physics, the distinction between a machine as that which is moved by an external force and an organism as a system whose motive force is internal began to break down in the analysis of steam engines, the notion of *work*, “forces vives,” and “potential energy.” The *ethers* abounding in mechanical explanations of imponderables frequently drifted into meditations on the active powers of spirit and mind. Mass entertainment produced powerful emotions and verisimilar effects through elaborate techniques of spectacle; in literature and aesthetics, the “techniques” for producing sensational effects were presented in mechanical terms. The transitivity between the mechanical and the vital and organic was also apparent at the interface between the human senses and the external world, in new mechanical instruments of observation and inscription.

Though known primarily as the author of *Tales of Mystery and Imagination*, Poe was remarkably well versed in the sciences of his time, a fact neglected by the vast majority of his critics even today.⁹ He spent over a year as a cadet at West Point, the first school in the US to offer an exclusively scientific curriculum, an elite institution modelled direct-

7 For example, Timothy Lenoir, “The Gottingen School and the Development of Transcendental Naturphilosophie in the Romantic Era,” *Studies in History of Biology* 5 (1981); Andrew Cunningham and Nicholas Jardine, *Romanticism and the Sciences* (New York: Cambridge University Press, 1990); Friedrich A. Kittler, *Discourse Networks 1800/1900* (Stanford, Calif.: Stanford University Press, 1990); Michael Dettelbach, “Humboldtian Science,” in *The Cultures of Natural History*, ed. Nicholas Jardine, James A. Secord and E. C. Spary (Cambridge: Cambridge University Press, 1996), 287-304; Bernhard Siegert, *Relays: Literature as an Epoch of the Postal System* (Stanford, Calif.: Stanford University Press, 1999); Peter Galison, “Objectivity Is Romantic,” *ACLS Occasional Paper* 47 (2000); Norton Wise, *Bourgeois Berlin* (forthcoming).

8 For an overview, see Georges Canguilhem, *La Connaissance De La Vie* (2e édition Paris: J. Vrin, 1965), “Machine et organisme.”; “Aspects du vitalisme.”

9 For almost a century, American critics of Poe were concerned with whether or not he deserved the acclaim he received in France, thanks to his admirer and translator Charles Baudelaire; such questions about the literary merit of his work have been displaced in favor of analyses of his doubled audience of the discerning few and the tasteless many within various contexts of antebellum USA, including the North/South divide, slavery, the struggle for cultural independence from European models, and images of the individual in relation to the state, see Patrick Quinn, *The French Face of Edgar Allan Poe* (Carbondale: Southern Illinois University Press, 1954). To date no monograph on the subject exists, despite some important though limited studies which acknowledge the importance of science and technology for Poe’s literary practice, so John Limon, *The Place of Fiction in the Time of Science: A Disciplinary History of American Writing* (New York: Cambridge University Press, 1990); Edgar Allan Poe and Harold Lowther Beaver, *The Science Fiction of Edgar Allan Poe* (Harmondsworth: Penguin, 1976); David Ketterer, *New Worlds for Old: The Apocalyptic Imagination, Science Fiction, and American Literature* (Bloomington: Indiana University Press, 1974); David Van Leer, “Nature’s Book: The Language of Science in the American Renaissance,” in Cunningham/Jardine 1990 (as in note 1), 307-321; Henri Justin, *Poe Dans Le Champ De La Vertige: Des Contes À Eurêka, L’élaboration Des Fi-*

ly, both in terms of its subject matter and its discipline, on France’s Ecole Polytechnique. His early interest in natural history (he published *The Conchologist’s First Book* in 1832) was complemented by West Point’s rigorous training in military engineering: calculus, astronomy, navigation and surveying, and descriptive and projective geometry for mapping and construction. His writing career spanned a period in which large-scale industry, steam transportation, and a vast realm of new technological devices were introduced, to great acclaim, in the USA, and his works show traces of his immersion in the system of mass production of cultural goods: mass-marketed objects made with steel-type and steam presses. His tales, which set a new standard for science fiction by incorporating scientifically exact details of physical and technical constraints, were informed by his reports on new gadgets and discoveries.¹⁰ In addition, in his final days composed *Eureka: An Essay on the Physical and Material Universe*, a cosmology dedicated to Humboldt that combined analyses of Laplace, Newton, and Kepler with elements of Stoic and Epicurean philosophy and aesthetics.

Despite the consistent overturnings in “The Tell-Tale Heart” and related stories, in his treatment of rationality and science, Poe does not stop at satire and inversions. Unlike the typical skeptic, he does not simply show the fragility of our knowledge and the irrationality lurking within it. Instead, he implies, *if this world can be made strange, other worlds can be made familiar*. His works’ estrangement from typical conceptions of vision, knowledge, and technology can be read as a dialectical step toward a synthesis, one which appears most clearly in his later works, including *Eureka* and “The Domain of Arnheim”. His corrosive skepticism served a higher optimism about the creative interaction between humans and nature. In many ways this dialectic follows the three-stage process familiarly associated with romanticism: a primary unity, a fall into fragmentation, and a return or reunification at a higher level.¹¹ But Poe’s doubts and aspirations are expressed in starker and more extreme terms than those of many of his predecessors, testifying in part to changed conditions of literary production in the 1830s and 40s: he was one of the first authors to support himself only through his writing, seeking a mass audience in a highly competitive and recently industrialized marketplace.

More importantly, Poe’s work frequently runs against one common assumption about romanticism: in many of his writings, science and technology appear not as the enemy of the human, but as integral components for the creation of a romantic “sec-

gures De L’espace (Paris: Klincksieck, 1991); Ian Higginson, “The First Antarctic Voyage of Edgar Allan Poe,” *Polar Record* 30 (1994): 175-92.

10 Natural philosophical musings abound in his tales and criticism, but his “Chapters on Science and Art” (Edgar Allan Poe, “A Chapter on Science and Art,” *Burton’s Magazine* 4 installments, 1840) show him as a nineteenth century science reporter (These fragments have been edited and collected online at the Poe site administered by the Poe Society of Baltimore. Online at <http://www.eapoe.org/works/misc>). For further discussion on Poe, science fiction, and the press, see John Tresch, “Extra! Extra! Poe Invents Science Fiction,” in *The Cambridge Companion to Poe*, ed. Kevin J. Hayes (Cambridge: Cambridge University Press, 2002), 113-32.

11 See M.H. Abrams, *Natural Supernaturalism* (New York: Norton, 1971).

ond nature.” Despite many other points of resemblance, Poe’s attitudes here contrast directly with those of Samuel Taylor Coleridge, one of the main vectors for post-Kantian German philosophy and literature in English. Coleridge indeed proposed a book on “the CONSTRUCTIVE PHILOSOPHY” which would synthesize Kant, Fichte, and Schelling, yet Coleridge’s new system of nature was explicitly opposed to mechanical philosophy. In this paper I wish to introduce Poe as a theorist of *technological constructivism* or *technopoeisis*, focusing on three overlapping aspects of this view of the relation between humans, machines, and nature: 1) The assembly of a coherent experience of the world from perceptions shaped by technically variable perceptual organs; 2) The artificial synthesis of nature as a whole through a combination of reason, imagination, representation, and instruments; and 3) The technological transformation of the natural landscape in an aesthetic key.

I will first show how Poe’s texts stage a polarized debate with themselves, presenting both sides of hotly contested issues like the reliability of vision, the progress of knowledge, and modern pride in technological development. A rapid overview of certain themes of English romanticism and of treatments of perception in materialist natural history will set the stage for a discussion of Poe’s views on optical technologies, poetic construction, and cosmic engineering. Poe offers a key example of a widespread movement of thought and practice in this period which mingled the romantic and the mechanical – sometimes recognizing and heightening the tension between these poles, sometimes denying or ignoring any such tension. This configuration is distorted or simply invisible when works of this period are examined with familiar dualistic lenses.

II. Modern wonders and modern doubts

The attempt to pin Poe down to a single critical or epistemological position has posed endless difficulties for his critics. We can instead adopt a framework which allows for a mobile enunciative position, in order to avoid collapsing all his masks and voices into a single authorial identity and to avoid reducing his range of arguments to a single authorial “point of view.” If Poe’s writings form a system, it is one which entails contradiction: He argued that the principle of non-contradiction in J.S. Mill’s *Logic* should apply only to humans with their limited faculties: “That a tree can be both a tree and not a tree, is an idea which the angels, or the devils, may entertain.”¹² Whether angel or devil, Poe rarely felt himself bound by the hobgoblin of consistency, oscillating instead between optimist and pessimist, realist and skeptic, where the progress of knowledge, science, and technology and the reliability of vision were concerned.

¹² Eureka, in Poe/Beaver 1976 (as in note 9), 218.

Take for instance the common-sense view that sight gives humans direct knowledge of the world. Poe offers many cases of vision as primary mode of knowledge: “The Man of the Crowd” opens with a narrator reading the profession and characteristic worries of individuals directly off their faces, clothing, and gaits; in his tales of detection, his hero Auguste Dupin easily finds the visible clue which allows him to grasp the circumstances leading up to a crime; in “The Gold-Bug,” the dissecting gaze of natural history leads the protagonist to construct a visual apparatus that uncovers a buried treasure.¹³ Yet such testimonies of the epistemological power of vision are contradicted by a recurrent suspicion about the visible. In speaking about the observations of the Orion Nebula taken by Lord Rosse’s giant telescope, he writes, “it was supposed that we ‘had ocular evidence’ – an evidence, by the way, which has always been found very questionable”; in “The Purloined Letter,” Dupin’s victory over his rival depends on the police’s reliance on the *merely* visible which blinds them to the object before their eyes.¹⁴

Similarly, two of his minor tales turn entirely upon visual distortion and misperception. In “The Sphinx”, set during the influenza epidemic in New York City, a narrator with a strong propensity to believe in omens retreats to his friend’s home on the banks of the Hudson. Through the window he sees a “monster of hideous conformation, larger than a ship, with huge wings covered with metal scales and a mouth at the end of a sixty foot long proboscis, with hair at its root, and a crystal prism on either side of this nose” (575). As in the “tales of sensation” made popular by Edinburgh’s *Blackwood’s Magazine* at the start of the century, the narrator details the phenomenology of horror and uncertainty: “I doubted my own sanity – or at least the evidence of my own eyes; and many minutes passed before I succeeded in convincing myself that I was neither mad nor in a dream” (574). He takes the monster as an omen of his fast-approaching death. After hearing this description, his host casually remarks that “the principal source of error in all human investigations [lies] in the liability of the understanding to underrate or to overvalue the importance of an object through mere misadmeasurement of its propinquity” (577). He picks up a book of Natural History, and reads “a school-boy account of the genus *Sphinx*, of the family *Crepuscularia*, of the order *Lepidoptera*, of the class of *Insecta*.” Sitting where the narrator had sat when he saw “the monster,” the host says, “Ah, here it is,” and points out a small winged insect on the window pane. The mysterious vision was a simple distortion, an hallucination produced by a misconstrual of distance and by unreasonable fear.¹⁵

¹³ See Barry Ferguson Saunders, *Insection and Decryption: Edgar Poe’s ‘the Gold Bug’ and the Diagnostic Gaze* (M.A. Thesis, Department of Religious Studies, University North Carolina Chapel Hill, 1989), on Poe’s works as allegories for the training of the clinical gaze.

¹⁴ Poe 1927 (as in note 2), 269.

¹⁵ Vladimiro Valerio has pointed out that the distortions like those described in “The Sphinx” were familiar epistemological horrors for surveyors and cartographers of this period, who shared Poe’s training in military engineering and draftsmanship. A “crisis of perspec-

Another tale, "The Spectacles," poses as a diverting reflection on "love at first sight" – "what may be termed ethical magnetism or magnetoaesthetics" – an affection which arises "as if by electric sympathy" (585). Its vain and nearsighted protagonist refuses to wear his spectacles in public. In the *loge* across from him one night at the opera, he brazenly stares at a woman of "perfect exquisiteness," who returns his gaze with equal boldness. At last he makes her acquaintance despite the obstructions of a friend. In a darkened room, he confesses his love and proposes marriage. At first she dismisses his passion as "a fancy or fantasy of the moment – a baseless and unstable creation rather of the imagination than of the heart." After much resistance, she relents, on the condition that once they are married he must wear her "optical assistant," a double eye-glass, "a complex and magnificent toy," which "can be adapted to the eyes in the form of spectacles" – an innovation possible only after 1837, when it became possible to draw steel light and strong enough to hold lenses on the face. His suddenly helpful friend arranges their secret elopement, and once away from the city he looks at his new bride through the ameliorative lenses. To his shock he discovers that the Parisian beauty he has just wed is eighty-six years old; her overall appearance of beauty from a distance is preserved only "through all the cunning of art." In a series of flashbacks of farcical *malentendus*, we learn that the woman is actually the narrator's distant cousin; appalled by his vanity and foolishness, she and his friend staged a counterfeit marriage. This slight tale, like "The Sphinx," is the literary equivalent of a cheap optical toy – a pocket magnifying glass, a fish-eye lens, a miniature prism. Their manipulation of the reader's attention, eventually revealing the (slightly implausible) "truth" behind appearances, parallels the epistemological "moral of the story" about the mind and emotions' power to shape, limit, and deform what is seen.

These bipolar (or bifocal) perspectives on the reliability of vision parallel an ambivalence in his work towards scientific knowledge in general. This period saw the rise of a new image of the "scientist", a term coined by Whewell in 1833, as a disciplined professional strengthened with an arsenal of institutions, instruments, and methods.¹⁶ Poe often speaks "with profound respect" of contemporary scientists, as in his dedication of *Eureka* to Alexander von Humboldt; his Dupin is the very figure of the infallible reasoner; his literary criticism advanced "rational principles" for evaluating verse. Yet at other times Poe ridiculed a simplistic or naively realist conception of science. His "Ms. Found in a Bottle" opens with the hyperrational narrator's profession of "Pyrrhonism" and proceeds to destabilize the reader's and narrator's assumptions about reality and the best means of

discovery. *Eureka* makes light of Aristotle and Mill's logical ambitions; "Maelzel's Chess-Player" and "The Balloon Hoax" mock the claims of modern engineers and scientists to unlock nature's secrets. Stanley Cavell has presented Poe's "The Imp of the Perverse" as a skeptical subversion of Descartes' *cogito*.¹⁷

Throughout this period, science's application of reason and the senses to the world was said to make it possible to master nature secrets; science contributed to and was strengthened by the creation of new machines. The rhetoric of the "technological sublime" analyzed by Leo Marx celebrated the power of new technology to impose human will upon nature. Two playful tales, "Some Words with a Mummy," and "The Thousand and Second Tale of Scheherazade," employ a cliché of Oriental otherness – a mummified Egyptian pharaoh, the *1001 Nights* – to frame an inventory of the scientific and technical advances of the modern world.

They do so, however, to opposite effect. "Scheherazade" emphasizes the astounding, unbelievable aspects of new technology. This tale, which purports to be the last chapter of the famous framework tale, has Scheherazade telling a final story to the incredulous king about "a nation of the most powerful magicians." These magicians have domesticated "a huge horse whose bones were iron and whose blood was boiling water[...] so strong and swift that he would drag a load more weighty than the grandest temple in this city, at a rate surpassing that of the flight of most birds" (149). Their "conjurers created a man out of brass and wood, and leather, and endowed him with such ingenuity that he would have beaten at chess all the race of mankind," and "a creature that put to shame even the genius of him who made it[...] [as it] performed calculations of so vast an extent that they would have required the united labor of fifty thousand fleshly men for a year" (150). The king interjects, "Ridiculous!", "Absurd!", and "Tattle!", but Poe's footnotes identify these wonders as, respectively, the railroad, Maelzel's chess player, and Babbage's calculating engine. The tale further "orientalizes" and makes marvellous the Daguerreotype, the electrotelegraph, and the steam press (the last described as "fingers[...] endowed with such incredible speed and dexterity that it would have had no trouble in writing out twenty thousand copies of the Koran in an hour[...] a thing of such prodigious strength, so that it erected or overthrew the mightiest empires at a breath; but its power was exercised equally for evil and for good"). In this confection, Poe joins others of his time in suggesting that modern inventions and discoveries would have been thought in other times and places to be the stuff of fairy tales and myths.¹⁸

The epigraph for "Scheherazade" was "Truth is stranger than fiction"; that of "Mummy" could be "Nothing new under the sun." As suggested above, it was a common-

tive" emerged from such discoveries as the fact that, against classical perspective theory, the horizon does not present itself as a perfectly straight line.

¹⁶ The introduction to John F. W. Herschel, *A Preliminary Discourse on the Study of Natural Philosophy* (Chicago: University of Chicago Press, 1987), which appeared in 1831, is a beautiful example of many of the traits found in the mainstream science of this time – thematics of mastery, imitation, though within a God-friendly recognition of limits to knowledge. See Fiorentini in this volume.

¹⁷ "Getting Even, Being Odd" by Stanley Cavell, *In Quest of the Ordinary: Lines of Skepticism and Romanticism* (Chicago: University of Chicago Press, 1988), a book which provocatively reads romanticism as a genre expressing skepticism's constant movement between doubt and renewal.

¹⁸ See Leo Marx, *The Machine in the Garden: Technology and the Pastoral Ideal in America* (Oxford: Oxford University Press, 1964).

place of the 1830s and 40s that the advances of modern technoscience were a return and even a fulfilment of the claims of Renaissance natural magic and the hermetic science of the Egyptians.¹⁹ While the tone of such historical comparisons was usually one of wonder or awe, in “Some Words with a Mummy,” Poe uses them to tweak the pride of his contemporaries. A group of modern men electrically reanimates the mummy of a Pharaoh by means of “an experiment or two with the Voltaic pile.” The experiment succeeds: “Morally and physically – figuratively and literally – was the effect electric.” The Pharaoh, Allamistakeo, returns to life, berating the American gentlemen, “in very capital Egyptian.” The Americans note “the marked inferiority of the old Egyptians in all particulars of sciences, when compared with the moderns, and more especially with the Yankees” (166); yet the Pharaoh replies to each example of modern scientific achievements with an account of Egyptian superiority, citing their knowledge of chemistry, astronomy, artesian wells, mechanical conveyances, steam power, and architecture. The only discoveries lacked by the Egyptians, it appears, were democracy and quack medicine – innovations which the Pharaoh (and the author) seem to place on a par. If Scheherazade’s tale highlights all that is astounding in modern technology, Allamistakeo’s conversation, on the contrary, makes us wonder if progress is just another word for standing still or moving backwards.

Poe often expresses himself in polarities or antinomies, in a complex play of irony and self-contradiction. Vision is the privileged means of access to natural reality, and vision is deceptive. Science presents the truth of nature, and current scientific knowledge and its methods are narrow and untrustworthy. Modern technology gives us unprecedented mastery over nature, and modernity is in stasis or decline.

III. Active vision and world-making

This irony, ambivalence and skepticism align Poe with other “romantic” authors.²⁰ Before we can appreciate Poe’s novel theories of perception, knowledge, and creation, we must first give a brief overview of the literary movement into which he self-consciously

19 See John T. Irwin, *American Hieroglyphics: The Symbol of the Egyptian Hieroglyphics in the American Renaissance* (New York, 1980); David F. Noble, *The Religion of Technology: The Divinity of Man and the Spirit of Invention* (1st ed. New York: Alfred A. Knopf, 1997).

20 As suggested in the introduction, scare quotes should always be seen hovering around “romanticism” – even if the different waves of cultural production identified by this term, whether in Germany, England, or France, were particularly self-conscious in their creation of a “movement” that embodied “the spirit of the age.” The issue of the coherence and core tenets of romanticism has accompanied the movement since its start. See Arthur O. Lovejoy, “The Meaning of ‘Romantic’ in Early German Romanticism,” in *Essays in the History of Ideas* (Baltimore: Johns Hopkins University Press, 1948), 65-77; Isaiah Berlin and Henry Hardy, *The Roots of Romanticism* (Princeton, N.J.: Princeton University Press, 1999); James K. Chandler, *England in 1819: The Politics of Literary Culture and the Case of Romantic Historicism* (Chicago: University of Chicago Press, 1998) on this age’s obsession with defining “the spirit of the age”.

wrote. Our focus will be largely on Coleridge, who influentially presented post-Kantian philosophy to an English audience. One point that recurs consistently in authors classed as romantics is the concern with humans’ desire to transform the world and create a new one for good or ill. This idea of a transformed world could play out at various levels: in perception, in the unification of experience in a harmonious synthesis, and in some cases, in the transformation of nature and society.²¹

Perception as active.

Perception was understood as the product of a dynamic exchange between observers and the objects of sense, through the interaction of concepts, imagination, or emotions with sensuous intuitions of the natural world. This view is rooted in Kant’s claim that the mind contributes to the experience of the outside world, assembling intuitions into objects. Through the “transcendental unity of apperception,” concepts of the understanding were applied to phenomena. Coleridge placed heavy emphasis on the dynamic role of the imagination in ordinary perception and poetic creation: he defined the *primary imagination* (contrasted with the *secondary imagination*, discussed below), as “the living Power and prime Agent of all human Perception and as a repetition in the finite mind of the eternal act of creation in the infinite I AM.”²² In other words, the active forces of an infinite universe that is constantly creating itself are *repeated* in the moment-to-moment activity of (finite) human perception. Seeing, then, is a kind of *doing* and *making*, an act, which recapitulates the ongoing act of divine creation or *naturing* nature.

Inner vision

Despite Kant’s protest against the dreams of spirit-seers, his primary distinction between the phenomenal experience of objects and their unknowable noumena was often read as compatible with platonism and mysticism.²³ Theories of active perception could in fact

21 The final aspect of romantic world-making can only be mentioned, although Poe’s version of it will reappear in the closing discussion of landscape gardens; for further discussion see Chandler 1999 (as in note 20), on Romantic politics, with Shelley’s poet as the “unacknowledged legislator of the world”, as well as Theodore Ziolkowski, *German Romanticism and Its Institutions* (Princeton: Princeton University Press, 1990) and David Owen Evans, *Social Romanticism in France, 1830-1848* (Oxford: Oxford University Press, 1951).

22 Coleridge, Samuel Taylor. *Biographia Litteraria*, ed. Nigel Leask (London: Everyman, 1997), 175.

23 In the *Biographia Litteraria*, Coleridge acknowledges his debt to Marsilio Ficino, Giordano Bruno, Jakob Boehme, and George Fox, defending them against critics; strikingly, he thanks Kant for invigorating his appreciation for metaphysical philosophical systems of nature which rely upon on an “INNER SENSE” (150), and sees the spirit of Kant’s work as opposed to its cloak: “In spite therefore of his own declarations, I could never believe, it was possible for him to have meant no more by his *Noumenon*, or *THING IN ITSELF*, than his mere words express; or that in his own conception he confined the whole *plastic* power to the forms of the intellect, leaving for the external cause, for the *materiale* of our sensations, a matter without form, which is doubtless inconceivable” (90). In other words, Coleridge, like Schelling before him, denies the unknowability of things in themselves, and promotes the imagination as an

encourage doubt towards physical vision and a privileging of inner as opposed to outer eyes: if our minds and perceptions help create what we see, why should we believe that our vision presents us with anything real? The followers of Emmanuel Swedenborg (one of the targets of Kant's critical philosophy) propounded the idea of a spirit world more real than this one. Increasingly allied with mesmerism, clairvoyance, and metempsychosis in the early 1800s, Swedenborgianism strengthened the image of the poet as a seer who transcends ordinary, distorted perceptions of things as they are – which we ordinarily perceive only as “through a glass darkly” – in a visionary comprehension of a higher plane of truth. The seer employed a different faculty, power, or organ than that of ordinary perception, whether Wordsworth's inner eye, Blake's visionary faculty, or “genius” as the harmony of all the faculties.

The constructive imagination

Though some versions of the notion of the active imagination – for example, the power of a pregnant woman's mental states and experiences to affect the features and character of her child in utero – had been dispelled by 1800, the faculty itself had lost none of its vitality and force in romantic thought.²⁴ Coleridge considers the secondary imagination as

“an echo of [the primary imagination], co-existing with the conscious will, yet still as identical with the primary in the kind of its agency, and differing only in degree, and in the mode of its operation. It dissolves, diffuses, dissipates, in order to re-create; yet still at all events it struggles to idealize and to unify. It is essentially vital”. (175)

No longer considered as a passive mirror, the mind of the poet was understood as a spring, as an aeolian harp, or following M.H. Abrams' argument, as a lamp, illuminating and thus changing the aspect of the external world. In Coleridge's language, this “esemplastic power” allowed for the creation of unity where there was none before, assembling a cosmos out of chaos. This function of the imagination was comparable to Kant's “regulative idea” of nature as designed according to a final end. Although for Kant this was strictly a notion with which to guide research and reflection, the volatile generation of thinkers who followed him made the unifying, synthetic, and “plastic” power of the mind a central aspect of the poet's ability to remake the world.

active power of synthesis and unity. He proceeds to offer a systematic introduction of Schelling's system of nature, the brunt of which is to elaborate the OBJECTIVE and SUBJECTIVE as “coinstantaneous” (152); no object can be conceived without an experiencing subject as its antithesis. If this is indeed the first use of “objective” in a recognizably modern form in English, as Peter Galison has written (cf. Galison 2000, as in note 7), it is within an argument about the objective and subjective as inextricably entwined, a prelude to the analysis of the imagination as plastic power in perception, artistic creation, and intellectual synthesis, and thus distinct from the idea of objectivity as impersonality or disembodiment.

²⁴ Lorraine Daston, “The Material Powers of the Imagination in Early Modern Europe,” paper presented at “Interior Temptation: Early Modern Imagination” conference, Northwestern University, November 2003.

Poetry creates a world

The poet occupied a position analogous to that of the Creator. As Goethe wrote in “On Truth and Probability of the Work of Art,” a good opera “constitutes a little world in itself, in which everything proceeds according to positive laws, which will be judged according to its own laws, and felt according to its own characteristic qualities.”²⁵ A comparable notion is expressed by another of Poe's major influences, Percy Bysshe Shelley, whose *Defence of Poetry* established the rights of the ‘imperial faculty’ of imagination. Poetry, Shelley wrote, “makes us the inhabitants of a world to which the familiar world is a chaos[...] It creates anew the universe, after it has been annihilated in our minds by the recurrence of impressions blunted by reiteration.” Shelley, for one, moved from this notion of recreating the world in thought to various plans to remake the world in action.²⁶

Anti-mechanism

If the poem was a plant, it could not be a machine; if the poet was a creator of new life, he could not be a mere chemist or engineer who combined elements according to a formula. Just as in Kant's contrast between an organism and a machine, with his example of a watch as an object with its organizing principle outside of it, Coleridge opposed the vital, “plastic” power of the imagination to the “merely mechanical” faculty of the fancy, which “knows only distance and nearness [and] the relations of unproductive particles to each other, so that in every instance the result is the exact sum of the component qualities, as in arithmetical addition.” Stressing the dynamic unity of all “counter-powers” in a living being, Coleridge held that an organic form, whether plant or poem, “shapes as it develops itself from within, and the fullness of its development is one and the same with the perfection of its outward form.” This opposition between the organic and the mechanical relies on a specific set of contrasts: an organism grows; the parts interact and alter each other as they create a whole, which alters the disposition, composition, and purpose of each; each part is both means and end, as each serves to maintain and extend the reach of the whole; it develops by its own internal vital force.²⁷

²⁵ Quoted in M. H. Abrams, *The Mirror and the Lamp: Romantic Theory and the Critical Tradition* (New York: Oxford University Press, 1953), 278.

²⁶ *ibid.* 282. Placing oneself in the position of a creator analogous (or identical) to God led to considerable theological anxiety, as demonstrated in an admirable book exploring this mytheme in English romanticism from Milton to Byron, see Paul A Cantor, *Creature and Creator: Myth-Making and English Romanticism* (First paperback ed. Cambridge Cambridgeshire; New York: Cambridge University Press, 1985); this point led Baudelaire, Poe's French translator, to distance himself from several of Poe's views of literary creation and technology in the 1850s: see John Tresch, “The Uses of a Mistranslated Manifesto: Baudelaire's ‘Genèse D'un Poème’,” *Esprit Créateur* 43, no. 2 (2002): 23-35.

²⁷ See Abrams 1953 (as in note 25), 170-177.

Paradoxes of the organic theory of poetry

Yet paradoxes abounded in such attempts to ally creation exclusively with the natural.²⁸ The preface to Wordsworth and Coleridge's *Lyrical Ballads* famously defined poetry as "the spontaneous overflow of powerful feeling"; what is less well-known is the way this text subsequently entered into a long discussion of meter and memory, both of which are means of creating – artificially, as it were – a distance between the author and these same powerful feelings, in order to master, contain, and make them communicable. In an essay written fourteen years after *Lyrical Ballads*, and in direct opposition to it, Coleridge speaks of meter in "each species of composition" as "a studied selection and artificial arrangement" which aims to heighten "such delight from the whole, as is compatible with a distinct gratification from each component part." In other words, *organic* unity is presented as emerging from careful analytic and synthetic thought, no longer as the *spontaneous* growth proposed earlier.²⁹

IV. Materialist and transformist theories of perception

The strenuous insistence on banning the artificial and the mechanical from romantic theories of perception, imagination, and creation suggests how great a threat they posed notions of "nature" and "the organic." As the dividing line between the mechanical and the organic came to play a more significant cultural role, any attempt to mix or fuse the two domains – or to show that they were always already mixed – could provoke the range of affect habitually associated with transgression of charged cultural boundaries: disorientation, anger, fear. Yet the "merely artificial" may be just as hard to escape as the "truly natural" is to pin down. The dependence of the organic creation of poetry upon artifice was already obvious in the prominence given to the use of mind-altering drugs as an analogue or aid to poetic creation, from Coleridge's dream of Xanadu in "Kubla Khan," to the perceptual and moral decomposition of Thomas de Quincey in London streets and opera-houses.³⁰ Opiates gave an artificial stimulus to the imagination, from shaping and

distorting visual, spatial, and temporal perceptions at the level of the *primary imagination*, to use Coleridge's terms again, to producing full-blown visions of other worldly landscapes at the level of the *secondary imagination*. Poe's use of mind-altering substances is well-known and has been duly sensationalized; several of his protagonists, including the mesmerized clairvoyant Bedloe in "A Tale of the Ragged Mountains" attain their visions explicitly or implicitly under the influence.³¹

The romantic theory of active vision has also been provocatively linked to developments in *external* optical technologies which also produced repeatable visual illusions. Toys like those discussed in David Brewster's *Letters on Natural Magic* – phenakistiscopes, thaumascopes, zooscopes, stroboscopes, etc. – highlighted the *artifactual* nature of perception. To put it provocatively, it has been suggested that hallucinations are the key to the visual epistemology of the early 19th century. Visual distortions and phantasmatic perceptions shaped thinking about "normal" and "reliable" observation. Elizabeth Green-Musselman shows how 19th century natural philosophers were obsessed with detailing their personal experiences, especially those in which their mental and physical equilibrium were threatened by disorders of the senses and the nerves.³² Jonathan Crary argues that "the widespread preoccupation with the defects of human vision defined ever more precisely an outline of the normal," leading to the idea that even *normal* vision was an artefact of the material configuration of our senses.³³ Poe's interest in vision, hallucinations and optical technologies clearly belongs within this constellation. We can see "The Sphinx" and "The Spectacles", discussed above, as examples of the *primary imagination* overstepping its bounds, seeing more and less than what is there due to fear or desire, shadows and deceptions. This reflection on the deficiencies of natural vision went

Nichol on *The Architecture of the Heavens*; see Simon Schaffer, "The Nebular Hypothesis and the Science of Progress," in *History, Humanity and Evolution: Essays for John C. Greene*, ed. John C. and James R. Moore Greene (Cambridge: Cambridge University Press, 1989); Elizabeth Kessler, "Representation of Nebulae," Paper presented at HSS, Boston MA 2003.

³¹ The notion of the mechanical as the opposite of the human – and thus as that which must be excluded if the "dynamical" human faculties of "hope, wonder, love, imagination" are to be preserved – is presented in exemplary form in Thomas Carlyle's *Signs of the Times* (Thomas Carlyle, *Selected Writings*, ed. A. Shelston (Harmondsworth: Penguin, 1971). See Tobin Siebers, *The Romantic Fantastic* (Ithaca, NY: Cornell University Press, 1984), which relates the experience of the supernatural and its affects to transgression of norms under fluid social conditions, along lines laid down by René Girard, *Violence and the Sacred* (Baltimore: Johns Hopkins University Press, 1977); see also Mary Douglas, *Purity and Danger; an Analysis of Concepts of Pollution and Taboo* (New York: Praeger, 1996), for a Durkheimian account of transgression of norms regarding sacred and profane. A link is made below between optical technology and drugs, discussed influentially in Marshall McLuhan, *Understanding Media: The Extensions of Man* (New York: McGraw-Hill, 1964); following this line of argument, one recurrent explanation for bans on mind-altering substances would be their "unnaturalness" and their diminishment of the individual will – the same moral reproaches which began to be made against machines in this period.

³² See Musselman 2005 (as in note 1).

³³ Crary 1990 (as in note 1), 16.

²⁸ On the potential of the organic metaphor to lead to the unintended consequence of a promotion of automatic, unconscious poetry, see Abrams 1953 (as in note 25), 179.

²⁹ Coleridge 1997 (as in note 22), 183.

³⁰ See Wolfgang Schivelbusch, *Tastes of Paradise: A Social History of Spices, Stimulants, and Intoxicants* (New York: Pantheon Books, 1992), along with studies of De Quincey in *Thomas De Quincey: Bicentenary Studies*, ed. Robert Lance Snyder (Norman, OK: University of Oklahoma, 1985), especially M. Bock, "De Quincey's Retrospective Optics: Analogues of Intoxication in the Opium-Eater's 'Nursery Experiences'", 72-87 and Robert Lance Snyder, "The Loom of Paligenesis: De Quincey's Cosmology in System of the Heavens", 338-59 which link de Quincey's opium use both to optical metaphor and to concrete visual technologies, most notably Lord Rosse's gigantic telescope; this instrument, the "Leviathan of Parsonstown", appears frequently in Poe's writings, thanks in part to the writings and orations of John Pringle

hand in hand with the celebration of new visual technologies, from the spectacles above to microscopes, Lord Rosse's telescope, new printing technologies, and daguerreotypes, all of which Poe works into his tales and criticism.

I suggest that Poe conceived of these technological mediations as operating in tandem with and in a manner analogous to the sense organs. Like his predecessors, he saw perception as essentially active, involving subject and object in a dynamic interaction; further, he shared their notion of the "imperial imagination" capable of transforming and recreating the world through synthesis and unification. Yet he differed in making a place for optical devices, other technologies, and rational science as aids in these syntheses and novel creations.³⁴ At a first level, such a reflection is made possible by a shift from discussions of the mind terms of faculties and powers (as was still the case for Coleridge) to materialist theories of the brain, nerves, and senses. Key loci for this shift were in materialist medicine, phrenology, and the ferocious debates about natural history between natural theology and progressivist histories of nature.³⁵

Natural Theology presented the adaptation between sense organs and external nature as proof of God's predetermined design. Though not always opposed to the idea of God's involvement in nature, materialists and transformists increasingly understood the organism as the product of constant alteration, an unfolding of natural laws without

34 Many terms of this argument are inspired by Crary 1990 (as in note 1), according to which the *detrterritorialization of vision* in the 1830s and 40s made it available to measurement, commodification, and discipline by society-wide forces of social control and domination. In an argument which explicitly harkens back to Marx's theory of class exploitation (mediated through readings of Debord and Foucault), Crary suggests that vision was *estranged* from its previous location as the individual's mastering link to the external world and *appropriated* by spectacle and technocratic discipline. Many theories of "subjective vision" that led to the dismantling of the classical model of vision are associated with romanticism, notably Goethe and Coleridge. Yet the higher synthesis towards which the romantics aspired – including Hegel and the young Marx – is in Crary's account critically redirected into an analysis of modernity as alienation. Rather than recapitulate this master narrative of alienation, I offer Poe's alternative synthesis as one among many in this time to recognize the dissolving powers of new technologies, but which also saw them as offering possibilities for a newly harmonized order of humans and nature. Crary's discussion of Cezanne in the penultimate chapter of his more recent *Suspensions of Perception*, "Reinventing Synthesis", suggests a slight turn in a similar direction, away from what could be read as *Techniques'* technological determinism (following a pessimistic reading of Foucault and Debord) towards a more open (Deleuzian) view of the possibilities of subjects – artists, at least – to produce novel combinations within the constraints of a given technological and discursive a priori. See Jonathan Crary, *Suspensions of Perception: Attention, Spectacle, and Modern Culture* (Cambridge, Mass.: MIT Press, 1999).

35 See Adrian J. Desmond, *The Politics of Evolution: Morphology, Medicine, and Reform in Radical London, Science and Its Conceptual Foundations* (Chicago: University of Chicago Press, 1989); John C. Greene, *The Death of Adam: Evolution and Its Impact on Western Thought* (Ames: Iowa State University Press, 1959); James A. Secord, *Victorian Sensation: The Extraordinary Publication, Reception, and Secret Authorship of Vestiges of the Natural History of Creation* (Chicago: University of Chicago Press, 2000); Ludmilla Jordanova, "Nature's Powers: A Reading of Lamarck's Distinction between Creation and Production," in *History, Humanity and Evolution: Essays for John C. Greene*, ed. James R. Moore (Cambridge: Cambridge University Press, 1989), 71-98.

need for divine oversight. Characteristic themes in such philosophies – including vital and at times imponderable fluids, variable sense organs, and differing degrees of complexity – would appear in Poe's idiosyncratic philosophy of nature and perception. Poe at times cited Lamarck, who saw nature as an irregular chain of organized beings progressing from less to greater complexity. Although Lamarck denied the conclusions of Gall's phrenological system, he nevertheless lauded his assumption that the intelligence, memory, and sensation must each be attributed to specific organs, the product of a long development and constant interaction with the external milieu. As new needs arise in the organism's environment, new habits are acquired to satisfy them. New habits reinforce and develop new organs, because "all parts of the body which are vigorously and constantly used, acquire a characteristic development and strength of function."³⁶ Thus organs of sense and activity are adapted to their environment, not through a single divine act, but through a constant force of production and change.

Natural historians writing in English borrowed from the nexus of concepts at the centre of Lamarck's zoological philosophy. Robert Chambers' anonymously published *Vestiges of the Natural History of Creation*, a page-turning epic of living species, the earth, solar system, and universe presented many arguments aligned with Lamarck. Despite its portrayal of the constant development of species, *Vestiges* offered no sense of an active modification of perceptual givens by means of the sense organs or mind. Chambers promoted Gall's phrenology – "the only [system] founded upon nature, or which even pretends to or admits of that necessary basis" – and his location of different kinds of ideas (size, weight, colour) in different parts of the brain; his description of perception was firmly empiricist, claiming that the senses "are simply media, and, as Locke has shown, the only media through which ideas respecting the external world reach the brain."³⁷ Although Chambers recognized the importance for processes of adaptation of an interaction between the organs of sense and the outside world, the characteristics of the latter are in no way shaped by the former.

A similar empiricism – although involving other kinds of perceptions – is found in *Etherology*, by the American J. Stanley Grimes, who wrote within the same broad field of popular progressive natural philosophy as *Vestiges* and, like many other support-

36 Jean Baptiste Pierre Antoine de Monet de Lamarck, *Zoological Philosophy: An Exposition with Regard to the Natural History of Animals* (Chicago: University of Chicago Press, 1984), 69, 369.

37 Robert Chambers, *Vestiges of the Natural History of Creation. With a Sequel* (New York: Harper & Brothers, 1857), 175. The 1857 edition notes that when called upon to recollect, these internal phreno-organs function in a way akin to a photochemical process: "There is a particular state of each of these faculties, when the ideas of objects once formed by it are revived or reproduced, a process which seems to be intimately allied with some of the phenomena of the new science of photography, when images impressed by reflection of the sun's rays upon sensitive paper are, after a temporary obliteration, resuscitated on the sheet being exposed to the fumes of mercury" (176).

ers of phrenology and mesmerism, shared its narrative of constant improvement.³⁸ The book, reviewed favourably by Poe in 1841, sought to unite the physical theory of ethers along with the “abundant and indisputable facts about mesmerism” into a single coherent philosophical system. The book relies heavily on the writings of mesmerist Chauncey Townshend and John Elliotson, president of the London Phrenological Society. Grimes’ claim to innovation was to link mesmerism to phrenology and to *mainstream physics* by means of the doctrine of ether or Etherium. For the link between animal magnetism and imponderables he cites no less an authority than Pierre-Simon Laplace, whose students were multiplying Newton’s ether with ethers for heat, electricity, and magnetism, and whose report to the Academy of Sciences for the Commission on Animal Magnetism of 1784, Grimes shows, was far less negative than has been believed. Acknowledging that our inability to perceive an invisible agent may be due simply to the inadequacy of our instruments and nerves, Laplace had argued: “We are so far from being acquainted with all the agents of nature, and their different modes of action, that it would be quite unphilosophical to deny the existence of the phenomena [of magnetism], merely because they are inexplicable in the present state of our knowledge.”³⁹ With this support from the author of the *Celestial Mechanics*, Grimes argues for the existence of “etherium” by analogy with ordinary magnetic force and its ability to pass through solid media:

“Light cannot penetrate boards and stone wall, but magnetic force can do so; for a magnet affects iron filings through such obstacles, almost as if there was nothing in the way; and so also does gravitation. It is plain that if we could perceive through the medium of this magnetic force instead of light, we could see through boards and walls as easily as the magnet operates through them; for the magnet operates in the dark just as well as in the light [...] It, therefore, requires no stretch of the imagination to admit a modification of ethereal force which affects the brain and its organs, and produces Con-

38 J. Stanley Grimes and W. G. Le Duc, *Etherology, and the Phreno-Philosophy of Mesmerism and Magic Eloquence: Including a New Philosophy of Sleep and of Consciousness, with a Review of the Pretensions of Phreno-Magnetism, Electro-Biology, &C. Revised and edited* (ed. Boston, Cambridge: J. Munroe and Company, 1850). The review attributed to Poe is Edgar Allan Poe, “Review of Grimes’s *Etherology* (a),” *The Evening Mirror*, no. December 5 (1844): 2.

39 Indeed, against the reading of the Commission of 1784 as definitively ruling out any explanation of animal magnetism except one referring to the imagination and self-delusion of believers, Laplace’s comment is worth quoting at length: “The singular phenomena which result from the external sensibility of the nerves in particular individuals, have given birth to various opinions relative to the existence of a new agent, which has been denominated animal magnetism; to the action of the common magnetism; to the influence of the sun and moon in some nervous affection; and, lastly, to the impressions which may be experienced from the proximity of the metals, or of a running water. It is very natural to suppose that the action of these causes is very feeble, and that it may be easily disturbed by accidental circumstances; but because, in some cases, it has not been manifested at all, *we are not to conclude it has no existence.*” (italics mine). Pierre-Simon Laplace from Commission of 1784, from Elliotson’s *Human Physiology*, quoted in Grimes 1850 (as in note 38).

sciousness and Clairvoyance in a subject who is, by the process of ethereal induction, brought into communication with it”. (171)

Light reaches the consciousness only through the medium of the senses; but in certain sensitive or sensitized individuals, “the emanation passes directly to the brain through the skull, or through the feet, or hands, or sides, or through any other part where the insulation [of each of the senses from the other senses] is especially weakened” (172). Clairvoyance becomes a fact of natural philosophy if we allow that the “phreno-organs” which receive the impressions of the senses may be stimulated by ethereal vibrations which proceed along different “avenues” than the senses. Just like Grimes, Poe would identify thought, life, and the imponderables of physics as variable forms of a single ubiquitous fluid.

Arguably the most important reference in Poe’s immediate context for the natural history of the sense organs was Emmanuel Swedenborg, who began his public life as a respectable and influential natural historian: he developed the concept of “the economy of nature” and significantly directed the study of organs in natural history away from the classification of forms toward a comparison in terms of functions. This scientific respectability may be surprising to those who know him through his role in founding the New Jerusalem Church and his descriptions of mystical voyages to other planets and non-human intelligences. In these later writings, Swedenborg explained how the world of matter visible to our material senses hides an invisible world, populated with the souls of the dead (angels), of which we will be aware if we develop *spiritual eyes*; his earlier physiological work sought the organ by which the soul was joined to the body. Swedenborgians understood mesmeric induction as establishing the conditions for communication between this world and the world of the dead. In the context of thinking about the senses, the key contribution of Swedenborgianism was to take the assumption present in germ in other physiologists – that our perception of the world is shaped by the specific forms of our senses – a giant step further: with other senses, they held, we would perceive other worlds. We may even now be surrounded by invisible worlds filled with beings invisible to us.⁴⁰ Such themes were widespread in the 1830s and 40s in New England, especially in the heady transcendentalist atmospheres of Boston.⁴¹

40 A line can be traced from this “mystical” view of the role of the senses in creating a world to gestalt psychology and most notably J. Von Uexküll’s neo-Lamarckian understanding of human and animal worlds as shaped by their specific perceptual organs. See Jakob von Uexküll and Georg Kriszat, *Streifzüge Durch Umwelten Von Tieren Und Menschen; Ein Bilderbuch Unsichtbarer Welten* (Berlin: J. Springer, 1934). The fact that the young Uexküll studied with Marey in Paris suggests a connection with readings of Marey’s conception of the early cinema and the graphic method as granting access to hidden perceptual worlds.

41 See Robert C. Fuller, *Mesmerism and the American Cure of Souls* (Philadelphia: University of Pennsylvania Press, 1982); Vincent Buranelli, *The Wizard from Vienna: Franz Anton Mesmer* (New York: Coward McCann & Geoghegan, 1975) with an appendix on Poe. Swedenborg’s influence on Romantics from Blake and Baudelaire (whose neo-platonic doctrine of “correspond-

Poe's "Mesmeric Revelation" develops a theory of sense organs and cosmic order that points in a Swedenborgian direction; it also integrates dimensions of materialist natural history and physics.⁴² In this story, the heightened powers of thought of a mesmerized patient, in dialog with a mesmerist identified by the initial P., give insight to the mysteries of life and death. The patient unfolds a cosmology much like that later developed in *Eureka*. A key notion is the luminiferous ether. Although ether is usually understood as made of particles, the mesmerized subject asks us to imagine particles so minuscule, a substance so rarefied, that it ceases to be material – that it passes over into the condition of spirit. This "unparticled matter" is the medium for the motions of God. While alive, humans have organized bodies and excessively crude "rudimentary senses," which allow us to perceive and work with unrarefied matter, but this matter is not all that there is. "Organs are contrivances by which the individual is brought into sensible relation with particular classes and forms of matter, to the exclusion of other classes and forms. The organs of man are adapted to his rudimental condition, and to that only."⁴³ At death we lose our bodies, and thus liberated from our "idiosyncratic organs" we have "nearly unlimited perception. To rudimental beings, organs are the cages necessary to confine them until fledged." But these sensory prisons are adapted to our location in the universe.

"The multitudinous conglomeration of rare matter into nebulae, planets, suns, and other bodies which are neither nebulae, suns, nor planets, is for the sole purpose of supplying pabulum for the idiosyncrasy of the organs of an infinity of rudimental beings[...] Each of these is tenanted by a distinct variety of organic rudimental, thinking creatures. In all, the organs vary with the features of the place tenanted". (412)

The reason that this infinity of intelligent creatures with its infinity of perceiving organs exists is as an *impediment* to the course of the Divine Volition, or the motion of the unparticled ether. Why should such impediment – which is manifested as *pain* – be necessary? "The pain of the primitive life of Earth, is the sole basis of the bliss of the ultimate life in Heaven" (412). In this mesmeric theodicy, suffering is needed as a polarity, which allows death to be a state of perfect happiness.

Our organs are adapted to our planet and state of life, just as "There are many things on the Earth, which would be nihility to the inhabitants of Venus – many things visible and tangible in Venus, which we could not be brought to appreciate as existing at all." The specific forms of matter present on each planet are adapted to the senses of the beings that inhabit it; but substance itself is only "the perception, in thinking beings, of

the adaptation of matter to their organization." For beings without bodies, however – the "inorganic beings" or *angels* – "the unparticled matter is substance; that is to say, the whole of what we term "space" is to them the truest substantiality" (412). With other senses, we would inhabit another world, perceiving other phenomena and other features. After death, without rudimentary organs, we experience nothing, except the Volition of God (which is everything: space itself). The material configuration of our senses is what allows us to experience matter and in a strong sense constructs our world.

V. Daguerre and the technological a priori

According to Michel Foucault, the concepts and statements existing in an era's archive constitute the historical a priori which set the limits for what can be thought at a given time. We might call the combination of evolving sense organs and their technological enhancements the *physiological* and *technological* a priori, which enable certain modes of conceptualization and exclude others, setting the conditions of possibility for specific perceptual experiences. In 1839, a new device, the Daguerreotype, took part in a redefinition of the field of possible perceptions and the ways these were conceived in relation to the natural world. The sketch above of Poe's theory of organs and their mechanical extensions lets us see his brief but much-cited announcement on the Daguerreotype in a new light. On its surface, the text seems to offer straightforward acclaim for the new device's ability to present an accurate image of the natural world:⁴⁴

"All language must fall short of conveying any just idea of the truth, and this will not appear so wonderful when we reflect that the source of vision itself has been, in this instance, the designer. Perhaps, if we imagine the distinctness with which an object is reflected in a positively perfect mirror, we come as near the reality as by any other means. For, in truth, the Daguerreotyped plate is infinitely (we use the term advisedly) is infinitely more accurate in its representation than any painting by human hands. If we examine a work of ordinary art, by means of a powerful microscope, all traces of resemblance to nature will disappear – but the closest scrutiny of the photogenic drawing discloses only a more absolute truth, a more perfect identity of aspect with the thing represented. The variations of shade, and the gradations of both linear and aerial perspective are those of truth itself in the supremeness of its perfection".⁴⁵

ances" owes much to the Swede) through to the Russian avant-garde of the 1920s and Helen Keller is a crucial but neglected subplot of European and American cultural history.

⁴² Poe's "A Tale of the Ragged Mountains" and "The Facts in the Case of M.Valdemar" likewise stage scenes of mesmerism; the latter in particular shows traces of a literary strategy to mesmerize the reader borrowing established techniques. See discussion in Fuller 1982 (as in note 41).

⁴³ Poe 1927 (as in note 2), 411.

⁴⁴ The passage's inclusion in a widely-used art history textbook containing writings on photography guarantees its continued status as a point of reference. See Alan Trachtenberg, *Classic Essays on Photography* (New Haven, Conn.: Leete's Island Books, 1980).

⁴⁵ From *Alexander's Weekly Messenger*, Jan. 15th (1840): 2. See discussion in Lorraine Daston and Peter Galison, "The Image of Objectivity", *Representations* 40 (Fall 1992) 81-128; thanks to Lorraine Daston for suggesting a link between Poe's text and the romantic obsession with "worlds".

The quote seems an unproblematic statement of faith in the power of machines to excel fallible human perceptions. But let us look more closely. The first sentence's conclusion, "the source of vision has been, in this instance, the designer," implies that God himself has had a hand in the drawing of the image on the silver plate, a notion echoed by the "infinitely," which he repeats and uses "advisedly," drawing our attention to its metaphysical implications: the machine creates "infinitely more accurate" representations than human hands.

This hint of the supernatural in describing early photography is not unique to Poe. François Arago, in his translated and widely-distributed public speech announcing the Daguerreotype, given less than a year earlier at the Chamber of Deputies in Paris, upon which Poe has closely modelled (ahem) his own text, likewise set the new technology in the realm of the marvellous. Arago directly referred to research in natural magic and alchemy as precursors, identifying Della Porta as a member of his own newly-minted profession, a "physicien." In a digression in a footnote about the unpredictable uses of new inventions, Arago rhapsodized about the power of the microscope to reveal "billions and billions of microscopic animalcules" and the telescope's power to "discover myriad new worlds."⁴⁶ Poe's notice applies similar claims to the daguerreotype. Examining the photographic plate with a powerful microscope, he claims, "discloses only a more absolute truth" than that available to the naked eye. The level of detail available to the ordinary human senses gives way to another order of reality when aided by technological extensions of the senses.

Poe's claim takes on a new depth in the light of its resemblance to a recurrent structure in his poems and fiction. Many of his best-known tales feature the unearthing of powerful forces, memories, crimes, or secrets which had been thought buried; likewise, his stories often employ what David Ketterer has called the aesthetic of the *arabesque*, in which intricate visible details draw the attention of both protagonist and reader into an order of perception that discloses a hidden reality, another world within this one – the constant presence, as Poe put it, of a "dream within a dream," of "beginning eternally behind beginning."⁴⁷ This recurrent narrative structure bears epistemological weight. The

⁴⁶ Ibid, 25. Michael J. Crowe, *The Extraterrestrial Life Debate 1750-1900: The Idea of a Plurality of Worlds from Kant to Lowell* (Cambridge: Cambridge University Press, 1986) alludes to Arago's flirtation with the rhetoric of multiple worlds, presumably with this passage, as well as the introductory pages of Arago's *Popular Astronomy*, in mind. American readers may find Arago's "billions and billions" strangely familiar, and with good reason; this very phrase was a running joke in the 1980s made at the expense of Carl Sagan, who uttered the same expression of the mathematical sublime in his popular science series, *Cosmos*, in the late 1970s. Arago's presentation of the Daguerreotype, like his *Astronomie Populaire*, and his close ally Humboldt's *Cosmos*, are the direct precursors in form, intention, and audience of Sagan's later version. Poe's *Eureka* should also be placed within the history of popular cosmologies, a form which exploded in a range of versions in the first half of the nineteenth century.

⁴⁷ See Ketterer 1974 (as in note 9), as well as Poe's burial and unearthing tales which include "The Tell-Tale Heart"; "The Cask of Amontillado"; "Premature Burial"; "The Murders in the Rue Morgue"; and "Berenice."

contradictory perspectives found throughout Poe's oeuvre, or within a single work, can be understood as modes of partially perceiving aspects of the world (or other worlds entirely); to perceive these aspects specific conditions or techniques – such as literary or optical devices – are needed. His discussion of the daguerreotype thus participates in the logic of the *uncanny*. The immediately visible surface of things may on closer look – or with altered perceptual organs – reveal a hidden order of reality. Our rudimentary capacities do not allow us to see the infinite detail of nature's forms; the daguerreotype captures, and the microscope unveils, a glimpse of these, a glimpse which must necessarily appear not as a mimetic copy of the familiar world as we know it, but as the image of alternate, indelibly strange world – though one to which we might, eventually, adapt.

But Poe leaves an opening for yet another reading of his text on the daguerreotype. His final paragraph sounds like a typical expression of the mechanical sublime:

"The results of the invention cannot, even remotely, be seen – but all experience, in matters of philosophical discovery, teaches us that, in such discovery, it is the unforeseen upon which we must calculate most largely. It is a theorem almost demonstrated, that the consequences of any new scientific invention will, at the present day exceed, by very much, the wildest expectations of the most imaginative".

It is difficult to know whether he has even *seen* a daguerreotype at the point of his writing; this fact may be irrelevant, as the passage is a condensation if not a downright plagiarism of Arago's discourse. The latter wrote that "when observers apply a new instrument to the study of nature, that which they hoped to gain from it is always insignificant in comparison with the succession of discoveries which the instrument originates. In this domain, we must count most particularly on the *unforeseen* [*l'imprevu*]." ⁴⁸ Poe made use of the same idea, and similar hyperbole, in the final lines of an article he wrote four years later in the *New York Sun*: "This is unquestionably the most stupendous, the most interesting, and the most important undertaking, ever accomplished or even undertaken by man. What magnificent events may ensue, it would be useless now to think of determining" (123). The latter article, however, must emphatically not be taken seriously: it is now known as "The Balloon Hoax," and made use of closely detailed technological descriptions of a machine that never existed (a hot-air balloon that crossed the Atlantic ocean), as well as the rhetoric of the technological sublime, to dupe an overly credulous and machine-obsessed public about an event that never took place. The satirical hyperbole of its last line seems to echo the excess of his statement about the Daguerreotype's "truth itself in the supremacy of its perfection." Has Poe here, as he does so often, gone "over the top", carrying himself away with his own rhetoric? If so, has he done so on purpose?

⁴⁸ Arago in his "Discours sur la Daguerreotype" held at the Chamber of Deputies on June 15, 1839. See Louis Jacques Mandé Daguerre, François Arago, Joseph Louis Gay-Lussac and Nicéphore Niépce, *Historique Et Description Des Procédés Du Daguerreotype Et Du Diorama*. Nouv. éd., corr., et augm. du portrait de l'auteur (ed. Paris: A. Giroux et cie, 1839), 24.

As with many of Poe's works, his text on the Daguerreotype appears more complex than it did at first glance. Should we read it as an affirmation of faith in the divine exactitude of mechanical devices of observation, an expression of wonder at a new technique of natural magic, of awe at the visible contemplation of another world? Or should we instead dismiss the text as a thinly-veiled plagiarism? If so, is it simply the mechanical cut-and paste and repetition of an existing literary style, or is it a deliberate satire, implying the opposite of its surface meaning – i.e., that the daguerreotype, like the other celebrated inventions of his age, is just another gimmick which puffs the vanity of modern man? The multiple and frequently contradictory voices within and between Poe's texts may themselves be expressions of the multiplicity of phenomenal worlds constructed by variable technologies: rhetorical styles, forms, and genres are perception-shaping templates, on the order of mind-altering drugs and optical technologies, which shift the limits of ordinary faculties.⁴⁹ We might speak of the regular shifts of frame, scale, and attention accomplished by literary forms as analogous to those brought by drugs and optical devices – as another set of *microscopiates* and *telescopiates*.⁵⁰

VI. Literary and cosmic constructivism in a technological key

To use Coleridge's terms once more, the modifications of perception brought by optical devices can be seen as technological alterations or enhancements of the *primary imagination*, the living principle which shapes experience of the world from moment to moment. The real concern of Coleridge's definition, however, is the *secondary imagination* – the power responsible for the creation of poetry which “dissolves, diffuses, dissipates, in order to re-create.” If the notion of a mechanical enhancement of the primary imagination by means of optical devices is a scandal to Coleridge's philosophy, Poe's critical manifesto, “The Philosophy of Composition”, does similar violence to his “secondary imagination.” Poe's text does reiterate key notions of romantic criticism: he makes the *unity* of the poem its fundamental criterion; likewise, he holds that the best poems aim to produce an experience of “the ideal beauty.” Yet “The Philosophy” presents poetic production not as a spontaneous process of growth, but as a methodical procedure of calculating reason, comparable to the rational work of an engineer.

According to Kant, a work of genius cannot be explained or produced by following an algorithm: “genius cannot indicate scientifically how it brings about its product, but rather gives the rule as *nature*. Hence, where an author owes a product to his gen-

ius, he does not himself know how the *ideas* for it have entered into his head, nor has he it in his power to invent the like at pleasure, or methodically, and communicate the same to others in such precepts as would put them in a position to produce similar products.”⁵¹ Poe's “Philosophy” tries to do exactly what Kant says cannot be done, explaining his “ingenious” poem “The Raven” as the product of a method which obeys a set of fixed, repeatable rules, claiming that his own mode of poetic production is just as mechanical as that by which Babbage's calculating engine, discussed in his “Maelzel's Chess Player,” produces its tables: “It is my design to render it manifest that no one point in its composition is referable either to accident or intuition – that the work proceeded step by step, to its completion with the precision and rigid consequence of a mathematical problem.”⁵² The title itself recalls Andrew Ure's *Philosophy of Manufactures*, a manifesto for rationalizing industrial production. Further, the term “composition” was used not only for the assembly of ideas and diction in the appropriate meter, but for the physical act of assembling words and lines out of individual elements of steel type, a process repeatedly referenced in Poe's tales and prose.⁵³

Directly contradicting the organic conception of poetry, as well as *Lyrical Ballads'* definition of poetry as “the spontaneous overflow of powerful emotion,” Poe presents himself as a sort of poetic automaton, offering a “peek behind the scenes” at “the wheels and pinions” of the poetic factory. The essay lends itself to a wonderful range of interpretations: it has been read as a mild satire, a hoax, a publicity stunt, and as the founding text of symbolist poetry. In the light of this undecideability, the surface meaning of the text may deserve to be given as much consideration as any other. Viewed from this angle, “The Philosophy” is just what it appears to be: an engineering manual, written by a cadet of West Point, analyzing the mode of construction best adapted to a sublime work of art. The poem is an efficient, rationally constructed machine to realize a goal: an emotional effect on its readers and hearers.

The degree of this effect, Poe argues, depends upon the poem's *unity*, the coherence of each part in light of the single end chosen at the outset. This principle is, well, consistent with Poe's claims elsewhere.⁵⁴ In *Eureka* (1848), this principle of unity underlies the development of the cosmos as a whole: just as the Preface to this *Essay on the Material and Spiritual Universe* declares that “it is as a Poem only that I wish this work to be judged after I am dead,” so too does he repeat that “*The Universe*[...] in the supremeness of its

49 “Multiplicity of phenomenal worlds” comes from Paul Hoyningen-Heune, *Reconstructing Scientific Revolutions: Thomas S. Kuhn's Philosophy of Science* (Chicago: University of Chicago Press, 1993).

50 Or, to go from the ridiculous to the inane, *daguerreoin*.

51 Immanuel Kant, *The Critique of Judgement*. Translated by James Creed Meredith (Oxford: Oxford University Press, 1952), 169.

52 Edgar Allan Poe, “The Philosophy of Composition,” in Poe 1927 (as in note 2), 813. For further discussion, see Tresch 2002 (as in note 26).

53 See Poe's tales “X-ing a Paragrab”, “Some Notes on Secret Writing”, in which typesetting, usually experienced by readers as the transparent vessel for the author's thoughts, is brought to the foreground and made abundantly visible.

54 Cf. Scott Peeples, “Usher and Unity”, in *The Cambridge Companion to Poe*, ed. Kevin J. Hayes (Cambridge: Cambridge University Press, 2002).

symmetry, is but the most sublime of poems" (300). Yet just as the "organic" unity of the "Raven" was the result of a mechanical process, Poe's poetic explanation of the fundamental principles of the living organism of the cosmos incorporates mechanistic philosophies of nature and concrete visual technologies.

After asking in one of his earliest sonnets how a poet "should love" science⁵⁵, his later work, *Eureka* answers: "Symmetry and consistency are convertible terms: – thus Poetry and Truth are one" (300). *Eureka* takes the fixed universe of Kepler, Newton, and Laplace and sets it into motion as a temporally unfolding process from a first unity, to a maximum of complexity and relation, followed by an apocalyptic return to the primary unity. The essay is dedicated "with respect really unassumed" to Alexander von Humboldt, but contains mathematical and geometric demonstrations about the original distribution of matter in the universe. This cosmos is presented in mechanical terms, but also as a living, breathing being – he speaks of the "throb of the heart Divine" – and as a "beautifully true" work of art. The story of creation begins with a first, perfectly unified particle, undifferentiated, unique, which then radiates itself outward to the confines of the (finite) universe in successive waves of particles; this division introduces, in opposition to unity or attraction, the reciprocal principle of *relation* or repulsion. The principle of attraction is associated with matter, while repulsion is equated with the *ether*, to which he also refers "the various phenomena of electricity, heat, light, magnetism; and more – of vitality, consciousness, and thought – in a word, of spirituality" (302). After the complete emanation of the matter of the original particle, immediately the principle of attraction begins drawing matter back towards the centre. Along the way, however, in a process already sketched by the nebular hypothesis of Kant, Laplace, and Comte, it leaves behind residues of matter congealing at regular intervals, which become the planets in orbit.⁵⁶ Attraction and repulsion continue to work against each other, each growing stronger in proportion to the other's growth, a testament to "the absolute reciprocity of adaptation" among all elements of the "Divine construction" (292). So as matter gradually condenses, electricity, vitality, and spirituality also increase, with consequences for the development of life forms.

"Not merely the manifestation of vitality, but its importance, consequences, and elevation of character, keep pace, very closely, with the heterogeneity, or complexity, of the animal structure[...] We thus reach the proposition that the importance of the development of the terrestrial vitality proceeds equably with the terrestrial condensation". (267)

55 "Sonnet to Science", see Poe 1927 (as in note 2), 34.

56 See Jacques Merleau-Ponty, *La Science De L'univers À L'âge Du Positivisme: Etude Sur Les Origines De La Cosmologie Contemporain* (Paris: Vrin, 1983); Simon Schaffer, "The Science of Progress" in *History, Humanity and Evolution: Essays for John C. Greene*, ed. James R. Moore (Cambridge: Cambridge University Press, 1989), 131-164 on John Pringle Nichol, one of Poe's main targets in *Eureka* and author of the sub-Vestigis cosmology, *The Architecture of the Heavens*.

New, more vigorous, more complex, and more spiritual beings emerge over time; these are beings of an increasingly rarefied matter, which increasingly approach the pure ethereality of angels. Eventually, however, the system reaches its destination. Matter, drawing ever nearer to toward the site of the original Unity, progressively expels electricity, until all that remains is the final particle – "Matter without Attraction and without Repulsion – in other words, Matter without Matter – in other words, again, *Matter no more*." This "globe of globes" will then disappear, and "God will remain all in all." But, as in Stoic cosmology, this conclusion and destruction is only the prelude to another expansion of the universe, "a novel Universe swelling into existence, then subsiding into nothingness," over and over, *ad infinitum* (307-8).

The essay concludes by affirming that we are part of this divine being which is the universe – that we are part of God, despite our imperfection. Human creations try to approximate the original Unity of the universe and develop our divine nature. The amount of pleasure we get from a work of art depends on its proximity to the divine perfection of *reciprocal adaptation*.

"In the construction of plot, for example, in fictitious literature, we should aim at so arranging the incidents that we shall not be able to determine, of any one of them, whether it depends from any one other or upholds it. In this sense, of course, perfection of plot is really, or practically, unattainable – but only because it is a finite intelligence that constructs. The plots of God are perfect. The Universe is a plot of God". (292)

His search for the perfectly crafted plot thus has a higher purpose, one that reaches an apotheosis in *Eureka* – a dense, self-reflexive attempt to approximate in poetry divine unity and adaptation.

But as in "The Philosophy," Poe portrays the work of the imagination to synthesize and unify nature in highly physical, mechanical terms. The first page of the essay offers us an exemplary romantic scene of a sensitive observer with an open prospect:

"He who from the top of Aetna casts his eyes leisurely around, is affected chiefly by the extent and diversity of the scene. Only by a rapid whirling on his heel could he hope to comprehend the panorama in the sublimity of its oneness. But as on the summit of Aetna, no man has thought of whirling on his heel, so no man has ever taken into his brain the full uniqueness of his prospect".⁵⁷

In other words what is needed is to *see the universe as a whole*, in a single "*coup d'oeil*": "We require," he writes, "something like a mental gyration on the heel. We need so rapid a revolution of all things about the central point of sight that, while the minutiae vanish altogether, even the more conspicuous objects become blended into one[...] A man, in this view, becomes Mankind; Mankind a member of the cosmical family of Inteligences" (213). As we know from the previous discussion, such a cosmic perception would indeed bring our knowledge nearer to that of other members of this family – e.g.,

57 *Eureka*, in Poe/Beaver 1976 (as in note 9), 211.

angels. Note, however, that this approach to a more spiritual vantage is grounded in the quantitative and the material. Later in the text he details the scope of his project from the top of another imaginary mountain, from which the viewer sees about 40 miles in each direction, an area of 5000 square miles: “– yet the entire panorama would comprehend no more than one 40,000th part of the mere surface of the globe.” To see the entire surface of the planet (to say nothing of the entire universe) in a succession of panoramas of this scale would require “9 years and 48 days” (285). Like the “metal gyration” (which functions according to a logic of successive superimposition of views like the phenakistiscope), the specular integration which allows one to grasp a series of natural landscapes as a coherent individuality is presented here as a visual technology – a purgatorial Power Point display, somewhere between the internal and the external, the mental and the physical.⁵⁸

Humboldt's first volume of *Cosmos* had appeared a year before *Eureka*. Poe refers to this work at several points, admiring its daring attempt to grasp the universe in its completeness. Nevertheless he criticizes Humboldt's excessive interest in singularities: “the mere multiplicity of these points occasions, necessarily, an amount of detail, and thus an involution of idea, which preclude all individuality of impression” (212). *Eureka*, Poe's own cosmogram, aims at condensing the variations of the universe to its most concise, most poetic expression. He shared this ambition with the Prussian explorer, whose innovations in forms of representation and observation – graphs of isolines, synoptic tableaux, and above all landscape portraits – were technologies for presenting a maximum of content and producing the emotional state appropriate to them.⁵⁹

As Poe put it, humans' “omniprevalent aspirations at perfection, are but the spiritual, coincident with the material, struggles towards the original Unity” (308). We have considered his technical reframing of perception, along with his equally technical, unifying constructivism in poetry and cosmology. Now we consider Poe's *technopoeisis* as an external, material endeavour. From this perspective, worldmaking is no longer limited to the interior landscape of the mind. In several of his later tales, the angelic artist enters

directly into the natural landscape and technologically remakes it as a more perfect second nature.

VII. The angelic art of landscape gardening

Poe makes the romantic notion of poetry as the recreation of the world vibrantly physical in his spirit colloquy, “The Power of Words.” In this conversation between two ethereal beings, the ether, described as “the great medium of creation,” connects every physical phenomenon to the whole of nature; the sonic vibrations made by spoken words, therefore, have a physical force. As symbol and demonstration of this power, one of the angels sheds tears which give birth to a “wild star” whose “brilliant flowers are the dearest of all unfulfilled dreams,” and whose “raging volcanoes are the passions of the most turbulent and unhallowed of hearts.”⁶⁰ Poe proposes the physical matter and motion of words as a passageway between matter and thought.⁶¹ Another of Poe's last tales, “Von Kempelen's Experiment,” offers more figures for the physical interaction between mind and nature. It presents itself as a commentary on a news story with which the reader is presumed to be thoroughly familiar; by steps we realize that the event, already discussed by “Mr. Arago in his report to the Academy of Sciences,” is the discovery by one Von Kempelen of the means of transforming lead into gold: “He has succeeded in locating the long-sought Philosopher's Stone”, the final step of the alchemical work. Von Kempelen's experiment is at once technical (complicated apparatus and formulae were needed to combine and transmute various substances), spiritual (the success of the adept depended on his moral purity), and cosmogonic (the successful alchemist masters the secret of creation). The hoax mixes real facts into a fabrication: Poe quotes a fragment from Humphry Davy, which turns out to be an account of the psychological effects of nitrous oxide; the real Von Kempelen invented the chess-playing automaton, though Poe's deliberately mangled account associates him with the metronome, invented instead by the Turk's handler,

58 The phenakistiscope, created by Joseph Plateau in the 1820s, was a disk with slits cut into it at regular distances around the center, like the points of a clock, attached to a stick; beneath each slit was an image of a figure in sequential states of movement. With the images facing away from the eye, one looked through the uppermost slit at a mirror, and spun the wheel: the succession of figures passing by created the illusion of a single figure in movement. This visual toy was understood as relying on the newly recognized physiological principle of “persistence of vision.” Perceived objects left an “afterimage” on the retina which lasted long enough to fill the gap, as it were, between one time-slice of the moving object and the next. Cary has argued that such mechanically generated hallucinations demonstrate the frailty and indeed the artifactuality of human perception.

59 See John Tresch, “Even the Tools Will Be Free: Humboldt's Romantic Technologies,” in *The Heavens on Earth: Nineteenth Century Observatory Sciences*, ed. Charlotte Bigg and David Aubin (Forthcoming at Duke University Press).

60 See Terence Whalen, *Edgar Allan Poe and the Masses: The Political Economy of Literature in Antebellum America* (Princeton, N.J.: Princeton University Press, 1999), in which this means of recording “the power of words” is convincingly linked to Babbage's *Ninth Bridgewater Treatise*. Similarly, the physico-theology of Babbage's treatise compares strongly to *Eureka's*: the divine scale exceeds ours such that we haven't had enough time to see the cycle of apparent miracles repeat itself, an argument which follows from his demonstrations of the functioning of the difference engine. See Charles Babbage and Martin Campbell-Kelly, *The Works of Charles Babbage* (New York: New York University Press, 1989), vol. 9.

61 The dialectics between matter and mind (or spirit) are found in exceptionally condensed form in the opening paragraphs of “The Fall of the House of the Usher,” and anticipate Gaston Bachelard's understanding of the “applied rationalism” and “rational materialism” of modern science. See Gaston Bachelard, *Le Rationalisme Appliqué* (1.éd. Paris: Presses Universitaires de France, 1949).

Maelzel.⁶² In this modern alchemical allegory, life-like machines, chemistry, mind-altering substances, journalism, and contemporary science are playfully presented as different forms of a single power to recreate the world by technological means.

This obsessive scientist resembles the Faust of Goethe's Book II: the restless developer, unsatisfied with mere knowledge and seeking to rebuild the world physically from the ground up.⁶³ Goethe glossed his term the supernatural (*das Überirdische*) in the following way: "The artist, grateful to the nature which produced him, gives back to her a second nature, but one which has been felt, thought out, and humanly perfected."⁶⁴ *La lettre de Humboldt*, Roland Recht's essay on German romanticism's emphasis on specific artistic techniques to shape subjectivities, *landscape gardening* as a means of framing nature for an experience which is both cognitively and emotionally enriching: Humboldt's *Views of Nature* in three and four dimensions. The landscape garden was a key site for working out the imaginative, aesthetic, cartographical, and technological issues for the understanding of nature at this time.⁶⁵

Poe's late tale, "The Domain of Arnheim",⁶⁶ a fragment of which is entitled "The Landscape Garden," tells of the narrator's friend Ellison – a name which recalls the famous English mesmerist Elliotson – and his plan to realize his poetic ambitions in earth, stone, and plants. Beyond fantastic riches, Ellison possesses a wealth of other virtues, in particular a truly "spiritual" aspiration toward the ideal, and a supreme calling in the realm of poetry. Yet mere poetry is not enough.

"No definition had spoken of the landscape-gardener as of the poet; yet it seemed to my friend that the creation of the landscape-garden offered to the proper Muse the most magnificent of opportunities[...] And in the direction or concentration of this effort – or, more properly, in its adaptation to the eyes which were to behold it on earth – he perceived that he should be employing the best means – laboring to the greatest advantage – in the fulfillment, not only of his own destiny as a poet, but of the august purposes for which the Deity had implanted the poetic sentiment in man". (290, italics added)

62 See Gaby Wood, *Living Dolls: A Magical History of the Quest for Mechanical Life* (London: Faber and Faber, 2002); Simon Schaffer, "Enlightened Automata" in *The Sciences in Enlightened Europe*. (Chicago: University of Chicago Press, 1999), 126-65; Jessica Riskin, ed., *The Sistine Gap: Essays in the History and Philosophy of Artificial Life* (Chicago: University of Chicago, forthcoming).

63 See Marshall Berman, *All That Is Solid Melts into Air: The Experience of Modernity* (New York: Simon and Schuster, 1982) and its discussion of Faust as a real estate developer akin to Robert Moses (60-86).

64 Poe 1927 (as in note 2), 278.

65 The overdetermination of landscape gardening can be suggested by the many hats worn by the Captain in *Elective Affinities*, including soldier, cartographer, painter, engineer, and chemical complement to the unchained nature of the young Ottilie. See Johann Wolfgang von Goethe and David Constantine, *Elective Affinities: A Novel* (Oxford; New York: Oxford University Press, 1994).

66 Edgar Allan Poe, *The Domain of Arnheim*, in Poe 1927 (as in note 2), pp. 287-298.

The highest calling of the poet is to create a poem inscribed into the earth, to concentrate his efforts toward finding the best means to produce a chosen effect for a chosen audience, i.e. the work best adapted to the physical configuration of the human eye. But he notes that attempts to recreate nature simply as it is inevitably introduce a greater order than is found in the landscape itself; the artist is compelled to *improve* and add proportion where there is none, because of the irregularity of nature as it is: "No position can be attained on the wide surface of the natural earth, from which an artistical eye, looking steadily, will not find matter of offence in what is termed the "composition" of the landscape" (290; note "composition"). The narrator, however, speculates that what our eyes perceive as "unpicturesque" may well be perfectly adapted, by the art of the creator, to other eyes, to which "our disorder may seem order." These belong to the angels, "for whose death-refined appreciation of the beautiful may have been set in array by God the wide landscape-gardens of the hemispheres" (291). The earth is a pleasure garden designed for ethereal beings.

This thought sparks a new aesthetic ambition appropriate to the medium. What if, rather than either a perfect imitation of the *disorderly* order given by God, or the *too orderly* order created by human artists, Ellison wonders, we instead aimed at

A landscape whose combined vastness and definitiveness – whose united beauty, magnificence, and strangeness, shall convey the idea of care, or culture, or superintendence, on the part of beings superior, yet akin to humanity – then the sentiment of interest is preserved, while the art involved is made to assume the air of an intermediate or secondary nature – a nature which is not God, nor an emanation from God, but which still is nature in the sense of the handiwork of the angels that hover between man and God". (293)

Viewing this intermedium "between man and God" with human eyes may well give intimations of our future vistas when we will be released from the "cages" of our rudimentary senses. The narrator's description of the experience had by visitors to the Domain of Arnheim has strong resonances with a voyage into the afterworld, not unlike the closing sections of *The Narrative of Arthur Gordon Pym*. An empty boat awaits the visitor, who on entering it is immediately drawn by a gentle current through mazy crystal canyons and beds of flower-blossoms, "a panoramic cataract of rubies, sapphires, opals and golden onyxes, rolling silently out of the sky" – an arabesque landscape hallucinated into three dimensions. The artificial paradise of "The Domain of Arnheim" is a new nature designed for the eyes of angels but experienced by the eyes of humans as a combination of "beauty, magnificence, and *strangeness*," which appears cared for and cultivated by invis-

ble groundskeepers, “with an extent and novelty of beauty, so as to convey the sentiment of spiritual interference.”⁶⁷

This is a dream of re-engineering the world, to allow on earth a taste of the visions beheld by ethereal beings “refined” by death. Of course this is just a tale; Poe never built the Domain of Arnheim. But in his writings he adapted existing narrative templates and imagery with an eye to maximum unity and recomposed them to harness the power of words – a power multiplied by that of the steam press, the distribution system of the railroad, and the formidable engines of publicity. These machines were designed to alter readers’ perceptions. His tales produce experiences, which lurk as possibilities within everyday life – extraordinary, transformed worlds, which emerge from the fragile reality maintained by our finite senses and minds.

VIII. Conclusion: Technopoeisis in the age of mechanical romanticism

Nineteenth century theories of knowledge were haunted by a pair of complementary fantasies: a dream of floating above the system of nature, mastering its secrets and transforming it according to our will, and a nightmare of being just another element of nature, dominated and constricted by vast (social, physical, unconscious) forces beyond individual control. These poles are caricatured by two well-known architectural forms which appeared at the start of the century: the panorama, in which spectators were tempted with the promise of encompassing the earth’s landscapes in a single glance; and the panopticon, which placed human subjects in a field of complete and permanent visibility, constantly accessible to the gaze of a central and controlling power. The two place their subjects on opposite sides of a mirror, like the God and the puppet of Kleist’s *Marionette Theater*.

The panorama and the panopticon raise the question of the relation between human vision, technology, and nature. Do our machines enable us to construct the world, giving free reign to our senses and imagination; or do our machines construct us, limiting our thoughts, acts, and perceptions to a domain narrowly circumscribed and controllable by others? Instead of taking sides in this constantly-renewed debate, we might try instead to trace a variable *ethics of the observer* in relation to visual practices and technologies. As this paper has begun to do for one author and the characteristic technologies of his time, such a project would let us compare the theories of agency that accompany specific methods and technologies of knowing, the conceptions of freedom and constraint

67 Compare this three-dimensional dreamworld and its invisible helpers to the hidden network of passageways for groundskeepers, maintenance, and operations at Disneyworld – a twentieth century artificial paradise and direct inheritor of nineteenth century panoramic and phantasmagoric technologies.

attributed to them, and the variable relations they were understood to entertain with “the world in-itself.”

Poe’s vision of a new nature was grounded in reflection on the impact of new technologies and the most recent findings of the natural sciences. For these reasons he may have less in common with the world-weary idealism of his French admirers, like his translator and champion, Charles Baudelaire, than he does with contemporary projects like Humboldt’s cosmological science, François Arago’s political astronomy, and the polytechnical pantheism of the Saint-Simonians and Fourierists. For Poe, the artificial paradises of which Baudelaire spoke were not confined to an abstract, ideal realm; they were the product of active engagements with matter. Like Baudelaire, we can indeed read this product of the early American nation as a morbid prophet of industrial modernity, railing against the prisons of reason and its machines. But on closer inspection – or through the lenses of another era – we can see in Poe’s works a vision of science and technology as tools for artistic adaptation to a complex, engrossing, yet modifiable universe.

