Neurobiology and the Art of Walking in Paris

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PREFACE:

Shortly before his execution for being a Nazi collaborationist writer, the Frenchman Robert Brasillach observed that "Paris is most beautiful when one is about to leave it." To more safely experience this ultimate aesthetic state beyond ordinary beauty, to glimpse the sublime in Paris today, is a worthy goal of anyone who seeks to walk in a different sensory world from that of a mere tourist.

Like Brasillach, whose terror subserved cortical arousal and thus catalyzed his awareness, Paris can appear more beautiful and have even greater significance for those who know the city’s dark side. NO PARADISE IS COMPLETE WITHOUT ITS “SNAKE” -- something fearful which acts as a kind of “attention searchlight” that inspires both dread and exhilaration beyond reason’s grasp. After being awakened by the stark realities of 9/11, today’s all-seeing visitor seeking a Paris filled with meaning must sense the ‘duende” – the evil spirits, the dark-sounding undertones of Occupation history. The cumulative echo-chamber effect of imagining the sinister empowers and enables one to apprehend the fearful delight of the sublime.

This discussion identifies the neural machinery involved in reaching the sublime. However, illustrating how some salient stimuli may enhance our brain’s perception of beauty will not guarantee that all travelers in Paris can routinely witness the sublime or experience perfection. But it might explain how knowledge of the shadows from the Occupation (or the French Revolution and other painful poignant periods of Parisian history) can forge brain-links that evoke visceral feelings and a rich swirl of darker associations, thus providing the sensory magic needed to optimize travel in the City of Light.

AUTOBIOGRAPHICAL INTRODUCTION:
In March 2003, we moved into an apartment in Paris near the beautiful Hotel Lutetia. One afternoon on a whim I entered the hotel and asked some of the staff what had happened here during the Occupation of Paris. No employees there could — or would — answer my question. Later, I discovered many chilling details about what the Germans at this hotel did in Occupied Paris: The Lutetia was the headquarters of the Abwehr, the best of the seven intelligence agencies for Hitler’s Germany, which made many arrests, supervised the brothels of Paris, ran a majority of the black market activity in Paris, et cetera. (1aa)

Armed with this information, I felt compelled to return to the Lutetia. Months before, I had “seen” the hotel, but my deeper feelings were not aroused. Now, after learning the hotel’s WW II psycho-historical framework, something was alerted inside me. The iniquity in this beautiful building’s vile past made me feel a slight thrill of danger. As a more informed and receptive visitor, I felt an amplified awareness, based on the cognitive dissonance that resulted from the space-time interrelationship of both repulsive and attractive stimuli taken together at the same time.

This multilayered aesthetic jolt made me ask myself: why did encountering the past dark spirits of this site trigger the sublime experience now? And, if the city’s villainous past beckoned me to see behind the veil of ordinary tourism here, could there be more deeply meaningful things waiting to be discovered in other walks I take in Paris? Armed with this historically-informed spirit of adventure, I have, in fact, often encountered the city’s endless capacity to surprise me with similar absent/present paradoxes, as detailed in my Walking Guide to Occupied Paris. (1aa) Moreover, whenever a particularly strong sense of place induced both wince-making and pleasing effects in me, the contained perceptual tension of simultaneously knowing the shifting chiaroscuro of the city’s dark/light history repeatedly fired my imagination. It called up all sorts of emotions and contexts. Thus I discovered the sublime benefits of historical insight: to be harmlessly bombarded with conflicting images of good and evil allowed me to appreciate with vicarious joy the infernal dance of beauty and the macabre. It was like I could almost hear the exquisite shouting which occurred when the Occupier’s violent erotic encounters elicited the
two simultaneous sensations of pain and pleasure.

Furthermore, as a physician, I also began to wonder about the neural machinery involved when our brain crosses a certain aesthetic threshold and climbs the ladder to the sublime. After our brain conjures up a titillating, historically accurate image beyond the geographical reality, how does it reboot that magnificent mental “Aha!” in the here and now?

I - INTRODUCTORY SPECULATIONS ABOUT SCIENCE AND THE SUBLIME

As scientists wonder about the depths of infinity, they frequently find themselves having to describe phenomena whose vast dimensionality is beyond previous experience and common sense. Imagine astronomers, for example, who mentally transport themselves beyond the everyday world as they peer through the Hubble Telescope. Like Kant centuries before, they experience the sublime as a “feeling generated by a confrontation of the mind with an object that defies assimilation by the senses, an object that threatens to overwhelm our perceptual and imaginative capacities. Such is the cosmos.” (1a 113)

Contemporary physicists who routinely challenge the classical view of a rational and mechanistic world likewise must contemplate the sublime because the sublime provides “the aesthetic justification for the transcendent impulses that sometimes accompany discussions of one of the central tenets of quantum physics, the idea that ‘the physical world is one unbroken, undissectable, dynamic whole’.” (1a 107) And surely one does not have to be a scientist to experience the reality of being part of the greater whole, and thus to feel the sublime, what Einstein referred to as “cosmic religious feeling.”

Feeling the sublime elicits “a harmony between the world and our cognitive and creative capacities that not only forms the basis for the unity of the human subject as a whole but also signals ... a link that cannot be translated into reasoned argument but can only be felt.” (1a 123) Feelings, or “affects” as they are technically called, “emerge largely from ancient ‘basements’ of the brain” while “our most sophisticated cognitions” arise from the cortical roof. “They also
operate by different principles, such as ‘information processing’ versus ‘state-control regulation’. They share some brain chemistries, but others (e.g., certain neuropeptides) are uniquely emotional. All artistic creations require great cognitive skills, but works that do not stimulate our feelings communicate little. In art as in life, affects motivate cognitive richness like torches illuminate darkness.” (1b 22)

Affect (the positive and negative feelings side of emotions) forms the foundations of human mental life. The ancient emotional systems of the brain color and integrate consciousness. “Affect is the fuel of the cognitive mind, allowing it access to the sublime.” And “raw affects are ancient idea-less forms of consciousness composed of brain and bodily processes of kaleidoscopic complexity – as dynamically beautiful as the universe envisioned through Hubble portals.” While neuroscientists do not completely understand how neural activity creates emotional affects, it is now clear that the same areas of the brain that “regulate visible emotional behaviors are largely the same as those that generate invisible emotional feelings. In the future this may be the scientific gateway for understanding how feelings are constructed from fluctuating brain dynamics. In a metaphoric sense, this is not much different than physicists having to accept that light has both particulate and wave characteristics.” (1b 23-24)

[NOTE Regarding THE NEUROBIOLOGY OF AESTHETICS:
Can neuroscience explain how our brain experiences the sublime while traveling in Paris? Before trying to answer this question about the art of travel as something designed to enhance aesthetic consciousness, some readers may want to review Appendix I that details recent discoveries about the neurobiology of aesthetics. Briefly, readers will find in Appendix I that (A) neurocognitive research about beauty has led to various theories, but (B) these theories do not take into account all the variables concerning the sublime, and (C) the brains of women and men may use different processing strategies regarding beauty. In the case of art-specific psychological processes, the most important general mechanisms have been identified (9y 18) and indeed might also be evoked when we view and mentally interact...
II. HOW DO HUMAN BRAINS CLIMB THE LADDER TO THE SUBLIME?

Neuroscience research potentially applicable to how humans experience a sublime state might include recent discoveries about: (A) the placebo effect and the role of foregrounding, (B) the emotional brain’s surveillance system, (C) brain paths during orgasm, meditation, and travelling with heightened awareness, (D) the neural processing of fearful information, and (E) the neuropsychology of reading.

(A) The Placebo Effect and the Role of Foregrounding:
Stephen A. Schwartz (7) reviewed some physiological studies and stated “that our brain activity alters in anticipation of an event, and that the more numinous, the more emotional the stimulus, the stronger the response.” For example, he mentioned one study by Radkin (8). While Radkin’s study does not address sublimity, it found that physiological responses to emotion appear to be responsible for, or additive to, the placebo effect. Thus, under the “no pain – no gain” logic, people can have a pleasant experience even if they have been subjected to very unpleasant stimuli when they are told to expect benefits from the pain of their treatment.

Does such placebo effect research relate to how humans experience the sublime? As is detailed in part (B) below, the more emotionally important the stimulus, the more attention it triggers. Many scientists believe that a main purpose of emotion is to serve humans as a signal – the more dangerous the stimuli, the more the greater our attention (and the more likely it is that neurochemicals will be released in the appropriate networks, neuronal firing rates will change, as might coordination and connections between neurons). The idea that an emotional jolt deriving from a sense of unease can accentuate
appreciation of beauty might, in a way, be similar to the neurobiology of the placebo effect.

For example, neuroscientists propose that “placebo effects are involved in plenty of situations, including beauty judgments and the like, for the psychological component is crucial in these cases. In the same way placebos modulate pain, they can also modulate any subjective experience.” (8a)

Intuitively, optimism must be involved in placebo responses. Recent functional Magnetic Resonance Imaging (fMRI) studies trace “the neurobiological basis of optimism to the amygdala and the rostral part of the anterior cingulate cortex. The amygdala is, of course, one of the emotional processing centers of the brain; the anterior cingulate cortex maintains strong connections with the amygdala and may be particularly important for all kinds of emotionally vested decision-making processes.” (9p 173-174) The ability to look into the future or the past is “a cognitive capacity that is unique to humans, with its basis in the derived structuro-functional anatomy of the right prefrontal cortex. This sort of contemplative optimism is neither an emotion nor a sense, but registers most clearly as a ‘feeling’. As Antonio Damasio has aptly described them, feelings are ‘interactive perceptions,’ and certainly the feeling of optimism is one that incorporates multiple perceptions.” (9p 274) Perhaps the human ability to feel optimistic may also relate to our ability to experience the sublime.

[ANATOMICAL NOTE FOR SPECIALIST READERS: The specific areas of the brain involved in placebo analgesia (PA) [pain relief] during human experimental pain investigations have been recently reviewed by analyzing nine fMRI studies and two Positron Emission Tomography (PET) studies. This meta-analysis suggested that modulatory cortical
networks involved in PA, like the rostral anterior cingulate cortex (rACC) and prefrontal cortices, largely overlap those involved in the regulation of emotional processes. “This suggests a functional-anatomical relationship between PA and emotional regulation in which top-down modulation of the pain or emotional network is implemented. We suggest that the placebo phenomenon may be applied to any emotional experience, in terms of a reduction in negative emotions.” (8b)]

(B) The Emotional Brain’s Surveillance System:

Marcus et al (9) have analyzed the human emotional brain’s “surveillance system,” something that might also influence how a traveler can experience the sublime. The brain’s surveillance system comes into play in the face of novel or threatening circumstances that require evaluation, interrupt habitual dispositions, and prompt learning to deal with the new circumstances (9, 56). When alerted by the surveillance system, one becomes more attentive, especially when faced with novel circumstances, and heightened states of anxiety. In the area of politics, for example, Marcus et al state that one’s surveillance system is activated when one has “a sense of unease that makes people think more critically about the political choices before them” (9, 58,60,89). Anxiety thus penetrates “ordinary partisan blinders.” During governmental elections, for instance, reading newspaper reports and learning about the political candidates’ positions is also best stimulated not by enthusiasm for the candidates but by a “sense of lurking danger (or perhaps novelty.”)(9, 90) In the American presidential political campaign of 1988, for example, a TV ad that deliberately induced anxiety prompted citizens to pay attention to the furloughed convict Willie Horton. Horton represented a particularly useful and unsettling emotional symbol of the threat of crime, and the ad promoted a general sense of unease about the U.S. presidential candidate Michael Dukakis.
Similarly, while Marcus et al do not develop this line of thinking about neuroaesthetics, if visitors feel a sense of lurking danger about a particular beautiful location in Paris -- like my experience at the Hotel Lutetia -- might they too be moved to experience the sublime? Feeling a slight sense of danger stimulates observation with fresh eyes, thus preventing an appreciator from becoming jaded or blasé.

[ANATOMICAL NOTE: Neuroscientists usually identify the amygdala as the part of the brain that “performs an emotional surveillance of the world you inhabit, gauges the emotional significance of everything you see, and decides whether it is trivial and humdrum or something worth getting emotional over. If the latter, the amygdala tells the hypothalamus to activate the autonomic nervous system in proportion to the arousal worthiness of the triggering sight – it could be anything from mildly interesting to downright terrifying. Thus the amygdala is able to create a ‘salience landscape’ of your world, with hills and valleys corresponding to high and low salience.” (9j 148) Furthermore, “there are known back projections from the amygdala and other limbic structures (such as the nucleus accumbens) to almost every visual area in the hierarchy of visual processing.” As these projections also play a role in mediating the visual “Aha” (9j 206), they please us because the brain’s visual centers are wired up to the limbic reward mechanisms as well. (9j 228) The more-rational prefrontal cortex may also be involved in the sublime Aha that comes from knowing the history of occupied Paris. It is the prefrontal cortex that makes creative associations between seemingly unrelated sensations and ideas. “Once this overlapping of ideas occurs, cortical cells start to form connections that have never existed before, wiring themselves into entirely new networks. And then, after the insight has been generated, the prefrontal cortex is able to identify it.” (9L 130)]

(C) Brain Paths during Orgasm, Meditation, and Travel at its Best:
Perhaps the pathway to achieving the sublime may use neural mechanisms similar to those by which sexual gratification is heightened or elongated. For example, when orgasm is combined with hypoxia (e.g., by reducing cerebral blood flow or via other ways of intentionally restricting oxygen to the brain), the orgasmic intensity is supposedly even more powerful than the rush from cocaine. (9a) Hanged criminals frequently exhibit spontaneous erections, thus indicating that something neurochemical may also be at work in lesser degrees of cerebral hypoxia. Whether or not being swallowed up by blackness is an exquisite pleasure, the neurobiology of sexual asphyxia has not yet been definitively elucidated in scientific experiments. (9b) Perhaps the lack of oxygen and/or the buildup of carbon dioxide causes a decrease in cerebral inhibition of the brain centers where sexual activity is controlled. “Achieving orgasm, brain imaging studies show, involves more than heightened arousal. It requires a release of inhibitions engineered by a shutdown of the brain’s center of vigilance in both sexes and a widespread neural power failure in females.” (9c)

New research about the brain in orgasm as well as in meditation has discovered two neural routes to non-duality: right brain and left brain paths. The left “path calls us to transcend the body and the other path draws us to focus into the body, on the present moment, hoping to achieve transcendent clarity. It’s beautiful that both directions lead to the same place ... bliss” and, perhaps, arousal to a state of sublimity. (9d)

Regarding meditation, long ago Sufis discovered that travel itself can be a form of walking meditation, a spiritual nomadism designed to enhance consciousness. As pilgrims seeking meaningful coincidences and unveilings, we too can become polished like well-traveled gems. “The jewel that never leaves the mine is never polished, says the Sufi Saadi... Travel in itself can intoxicate the heart with the beauty of
theophanic presence. It’s a question of **practice** – the polishing of the jewel – removal of moss from the rolling stones.” (10e) Optimally we travelers can also reject acting like mere tourists who walk in a “dull mediocre trance state of grudging half-attention,” content to let a professional guide mediate our tour for us, as if we were just visiting a theme park. (10e) As self-reflective travelers, we in contrast are able to “notice the unexpected and to savour the miraculousness of the ordinary,” able to leave “the usual ruts and pathways” of our “habit driven lives.” (10e)

(D) Neural Processing of Fearful Stimuli:

Fear can be an inescapable dimension of some modern urban experiences. When faced with fearful stimuli, humans who know they are not in danger can enjoy the fight or flight response produced by the fearful stimulus. Many humans enjoy scary films and stories where unsafe ideas may be inspected without risk (because the film is able to hijack the viewer’s self-functions.). Filmgoers can thus actually savor the taste of fear, trepidation, and excitement. And while skydivers may dive to feel they are almost flying, certainly the ability to enjoy fear enables them to enjoy sky-diving even more. The same holds true for other fear-inducing sports and events. But can fright-inducement from reading WW2 history lead one to the sublime? Can it enhance the experience of beauty in Paris? This question about what happens in the brain by merely reading about something will be examined in section IIE. But first we must review the neural processing of fearful stimuli as it relates to the sublime.

Research about the neuropsychoanalysis of horror has found that the same brain circuit (especially the nucleus accumbens) is sensitive to both dread and desire. “We experience desire and fear as psychological opposites, but from the brain’s point of view they seem to share a common kernel that can be flexibly used for either one.” (9e) Furthermore, “core processes of fear and anxiety may overlap
with those of positive desires (and) positive and negative emotions may share psychological building blocks even though the final emotions are experienced as opposite.” (9e) [One might think, for example, of a depressed person’s “addiction” to sadness, while pining after something perceived as wonderful. Such a person who takes an antidepressant may then paradoxically miss the crying.]

In addition, the “tight interconnection between the amygdala and the hippocampus (and other brain structures) is why emotional experiences are memorable. Not surprisingly, the amygdala’s role takes place with the interplay of adrenaline, acetylcholine, and stress hormones. It’s interesting that fear emotions (anxiety, terror, worry, horror) and the enhanced memory of frightening events may take place in the amygdala below the conscious level, which makes sense because the amygdala must detect danger rapidly. Thinking involves coordinated interactions among huge numbers of neurons and synapses, which in turn take precious time. This is why we have reflexes in the lower parts of our brain, below the thinking cortex.” (9n 174-175) [Other brain regions studied by neuroscientists, such as the right inferior temporoparietal and anterior cingulate cortices, may also be important for navigating through virtual reality scenes and welding together emotions with body images and motor actions. (9v 253)]

HISTORICAL EXAMPLE: Dostoevsky had a sublime experience when he faced impending death during his mock execution by the Czar’s troops on 22 December 1849. The above-mentioned fear-related parts of his brain were probably involved in the spiritual awakening he experienced. After he miraculously survived, he “was in the throes of ecstatic revelation, awakened to the dazzling truth that life is the greatest of all blessings and each of us has within us the power to turn each moment into an ‘eternity of happiness’. … To a neurologist it is clear that as Dostoevsky stood on the scaffold, his adrenaline surged and his limbic system seared autobiographical memories into his hippocampus….How the brain handles rewards, big and small, is where
we should look for the lasting bliss that accompanies various types of spiritual experience.” (9n176 - 178)

[NEUROCHEMISTRY NOTE: The brain's serotonin-2 chemistry plays a role in fear processing. For example, the fact that terror can be provoked by hallucinogens like psilocybin or LSD (which mimic the actions of serotonin-2) “means that serotonin-2 receptors likely activate fear circuits directly, intertwining fear and mystical experience. Serotonin-2 receptors are integral to the heart’s response to stress, especially when the threat is inescapable. Animals lacking serotonin-2 receptors also lack normal fear responses, and stress enhances fear behavior in laboratory animals by sensitizing their brain’s serotonin-2 receptors.” Other things connect fear and the serotonin-2 receptor, such as low serotonin-2 activity in the limbic system which follows brain damage that renders someone incapable of feeling fear. “Different genetic types of serotonin-2 make some of us vulnerable to panic attacks.” (9n 245-246)

Neuroscientists at the University of Pittsburgh “administered PET scans to healthy subjects and showed them pictures of angry and fearful faces. The scans revealed that serotonin-2 activity helps the medial prefrontal cortex regulate the amygdala, which is deluged with information during fear and when we experience the adrenaline surge of fight-or-flight. The medial prefrontal region ... governs our visceral responses, shaping our reactions to fear; it may do so with the help of serotonin-2. All this shows that serotonin-2 receptors are an important component of the limbic circuitry and our experience of fear. It gives us a glimpse of how our survival instinct, fear, and the mystical are inextricably bound.” (9n 246)]

Thus, as foreshadowed in the 18th century by Edmund Burke's intuition that fear is a necessary component of the sublime (9k), the brain processing of what is fearful information likely plays a role in elevating the perception of beauty into a sublime experience. Even
when the cerebral cortex realizes that the fearful threat isn’t real (and thus passes the so-called aversion test), the threat signal has already signaled the hypothalamus to start the production of adrenaline, opioids, and endorphins, all of which enhance pleasure. “Adrenaline also increases visual acuity and other sensory thresholds, making the world a more intense and pleasurable place.” (9f) Perhaps then, the neural machinery involved in achieving the sublime is similar to one’s experience of spirituality, another mental activity which “arises from arousal, limbic, and reward systems that evolved long before structures made the brain capable of language and reasoning. Neurologically, mystical feelings may not be so much beyond language as before language.” (9n 258)

[CAUTIONARY NOTE: It must be admitted that as of yet “materialist neuroscientists have not succeeded in providing a satisfactory neurobiological theory of how mind consciousness, self, and religious, spiritual, meditative experiences arise from the interactions between brain regions, neural circuits, and neurotransmitters.” (9o 292) But surely our conscious perception can be enhanced by our ability to pay attention. And clearly the “sensory components of aesthetic processing can be mentally stimulated using imagination.” (9z 29)]

Tickling exemplifies a familiar way humans neurally process fearful stimuli – a phenomenon that may also apply to how a historically aware traveler experiences the sublime. Imagine that a huge adult approaches a child menacingly. “She is clearly outmatched, prey, completely at the mercy of a hulking Grendel. Some instinctive part of her – her inner primate, primed to flee from the terrors of eagles and jaguars and pythons (oh my!) – cannot help but interpret the situation this way. But then the monster turns out to be gentle. It deflates her expectation of danger. What might have been fangs and claws digging fatally into her ribs turns out to be nothing but firmly undulating fingers. And the child laughs.” The neural mechanism at
work in tickling involves fear exciting the insula in the temporal lobes plus the relay of messages to the anterior cingulate in the frontal lobes (where one actually feels the unpleasantness.) When the anterior cingulate does not get the ultimate fearful message from the insula that alarm is warranted, the result is laughter. (9j 39-40)

Nevertheless, sadness and laughter to a degree share the same neuronal support. (9v 257)

Perhaps experiencing the sublime piggybacks on the same neural circuits. (9j 39-40) Besides the brain regions mentioned in the above paragraph, another site “that has been implicated in assessing the reward value of a stimulus is the medial orbitofrontal cortex (OFC).” (9x 283) The medial OFC is sensitive to high brain processing frequency (the relative speed and ease of mental operations occurring at both the perceptual and conceptual levels), which “may in fact be used by the medial OFC as a cue to rapidly assess the reinforcing and rewarding properties of a stimulus – that the stimulus should be approached, acquired, or consumed.” (9x 285) A high processing frequency is “one possible route to aesthetic pleasure and, therefore” may be an important contributor to that sublime “combination of pleasantness, interest, tension, surprise, and awe” which we can experience in Paris.

[ANATOMICAL NOTE: Neuroscientists at McMaster University reviewed 93 neuroimaging studies and “showed that the most important part of the brain for aesthetic appraisal was the anterior insula, a part of the brain that sits within one of the deep folds of the cerebral cortex. This was a surprise. The anterior insula is typically associated with emotions of negative quality, such as disgust and pain, making it an unusual candidate for being the brain’s ‘aesthetic center.’ Why would a part of the brain known to be important for the processing of pain and disgust turn out to be the most important area for the appreciation of art?” (9m)
Our interpretation of the result “comes from cognitive theories of emotion that argue that aesthetic processing is, at its core, the appraisal of the value of an object -- in other words, an assessment of whether an object is ‘good for me’ or ‘bad for me.’ The nature of this appraisal depends very strongly on my current physiological state. The sight of chocolate cake will lead to positive aesthetic emotions if I’m famished but to feelings of disgust if I’m sick to my stomach. Objects that satisfy current physiological needs will lead to positive aesthetic emotions (e.g., pleasure). Those that oppose these needs will lead to negative emotions (e.g., repulsion).” (9m)

How does the anterior insula fit into this story? “In thinking about the contrast between internal and external environments, the anterior insula seems to be much more associated with the former than the latter. It is part of the brain’s “interoceptive” system, evaluating the state of the organs of our body. Other parts of the brain, then, respond directly to objects in the external environment: the sensory pathways of the brain. (One part of the cortex that seems particularly important for processing information across many sensory modalities is the orbitofrontal cortex.) Brain areas such as the anterior insula and orbitofrontal cortex that are activated by pleasant smells or tastes are also the parts of the brain that are active when we are awed by Renaissance paintings or Baroque concertos. There is virtually no evidence that artworks activate emotion areas distinct from those involved in appraising everyday objects important for survival. Hence, the most reasonable evolutionary hypothesis is that the aesthetic system of the brain evolved first for the appraisal of objects of biological importance, including food sources and suitable mates, and was later co-opted for artworks such as paintings and music. As much as philosophers like to believe that our brains contain a specialized system for the appreciation of artworks, research suggests that our brain’s responses to a piece of cake and a piece of music are in fact quite similar.” (9m)] {Relating to the the piece of cake analogy, our brains may therefore make us “need” the arts just like some of us “need” chocolate!} (See Appendix I)
How might the above anatomical note relate to the sublime and the art of travel in Paris? Delving into the darkest chapters about the Nazi occupation may help enhance our aesthetic navigation today because when the dreadful details tickle our brain, we feel them. Historical knowledge can thus prime and then transport our mind into an altered state, creating a tension of consciousnesses between the past and present. In this way our effervescent and emotional engagement with history can stimulate the combinatorial processing centers in our brain and enable us to emotionally empathize with people in societies and predicaments far distant from our own. If we try to judge others based on what they did in the past, we can only do so by putting ourselves in their place and making judgments on ourselves.

[ANATOMICAL NOTE REGARDING EMPATHY AND READING:]

Our brain’s ability to empathize arises from our “mirror neurons,” which have been well studied by neuroscientists. Mirror neurons enable humans to adopt another person’s conceptual vantage point. Specifically, “it is the dynamic interplay of signals from the frontal inhibitory circuits, mirror neurons (both frontal and parietal), and null signals from receptors that allow you to enjoy reciprocity with others while simultaneously preserving your individuality.” (9t 125) Mirror neurons allow humans to mutually enrich each other. Mirror neurons also account “for the powerful experience of absorption in artworks.” (9t 5)

In addition, perhaps my mirror neurons may have activated when I recalled the hotel’s dark history while revisiting the Lutetia. The absorption I experienced researching the Occupation history enabled me to empathize with the feelings and motives of certain characters. The “brain regions responsible for interpreting perceptual input are also those that represent an imagined perception. For example, the primary visual areas are activated when an object is merely imagined, a process that involves ‘running perception backward,’ or top down.”
Being an immersed experiencer, perhaps my comprehension was like “the vicarious experience of the described events through the integration and sequencing of traces from actual experience cued by the linguistic input.” (9u 241) “Evidence for the role of mirror neurons during reading, and their activation of empathy and other affective responses, is available from several studies.... Mirror neurons also appear to underlie our capacity to simulate the experiences of touch, feeling, and emotions.” (9u 242)

Clearly, when our own mirror neurons are powerfully stimulated by attention-grabbing tales from the Occupation, these ultra-normal stimuli can deliver an emotional wallop and thus arouse our emotional neural machinery enough for us to reach the sublime. As we mentally stand in other people’s shoes, we can see Occupied Paris through other people’s eyes and actually feel or understand what they felt. Their tales of fear and terror can be thrilling to us since we know we will not actually be harmed. By avoiding the physical pain, we experience what Edmund Burke called “a sort of delightful horror, a sort of tranquility tinged with terror; which as it belongs to self-preservation is one of the strongest of all the passions. Its object is the sublime”. (9k 136) Furthermore, as Burke wrote: “Whatever is fitted in any sort to excite the ideas of pain, and danger ... is a source of the sublime; that is, it is productive of the strongest emotion which the mind is capable of feeling.”(9k 39) This poetic use of pain shocks us into a deeper, more critically alert awareness of Paris as it was. It de-sequesters the grim and bloody past and generates a rupture in our usual touristic expectations. It offers an emancipatory space that allows us to reconfigure our interpretative strategies and extract morally informative meaning from our travel.

Akin to the role of mirror neurons in our aesthetic appreciation of Paris, “art is probably one of the few areas of life where we voluntarily expose ourselves to unpleasant objects: mutilated bodies, violence,
dissonance, boring serial repetitions of the same notes, evil acts of behavior, disproportional bodies, unsettling streets with strange and sinister persons, and such.” (9y 22) Hence when we willfully find art that induces fear or displeasure – such as a Wax Museum’s Chamber of Horrors – we eventually discover that these dark elements can assert positive aesthetic value to a work of art. “Several neuroimaging studies indicate strongly that aesthetic values are predominantly computed by reward processes associated with such brain structures as the striatum, amygdala, orbitofrontal cortex, and the anterior cingulate.” (9y 23)

[ANATOMICAL NOTE: Our frontal lobe “system preserves empathy while preventing ‘overempathy,’ thus preserving your sense of identity.” When you watch a horror movie, for example, you allow “your brain to ascribe the physiological arousal to the external horror, rather than to some terrifying but intangible inner cause. The fact that you ‘know’ that it’s only a movie at some higher intellectual level doesn’t necessarily rule out this treatment; after all, you do feel fear when watching a horror movie even while recognizing that it’s ‘only a movie’.” (9j 282-283) As you simultaneously preserve your identity you ultimately feel safe. Your frontal lobe structures, your anterior cingulate, and other areas give you that self-awareness – “a trait that not only makes us human but also paradoxically makes us want to be more than merely human…Science tells us we are merely beasts, but we don't feel like that. We feel like angels trapped inside the bodies of beasts, forever craving transcendence.” (9j 291)]

Touring a Paris where many buildings harbor a secret, the history-detective in us asks what was going on in the minds of the occupier or the residents of occupied Paris. Even though you cannot actually feel what it is like to have been an occupier or a collaborator, our mirror neurons allow us to “project intentions, perceptions, and
beliefs into the minds of others. In so doing you are able to infer their feelings and intentions.” (9j 128)

Like being in a flight simulator, our mind’s interaction with the city’s history engages us in concerns that are intrinsically human and thus become indistinguishable from our own. “Empathy in literary response may involve not only simulating the feeling experienced by a character about which we are reading, but also such embodied experiences as touch or motor activation.” (9u 243) History can thus affect us and, as we perceive Paris through new eyes, it lets us understand ourselves better (9h), carve out the sublime, and so provide another road to the transcendent.

(E) The neuropsychology of reading:

Neuropsychologists have found that merely reading disturbing contextual information can accentuate art appreciation by provoking reflective thinking. Thus, like finally acknowledging the unmentioned giant gorilla in the living room, discovering the psycho-historical framework of World War II Paris through reading can disrupt the thoughtless appreciation of a mere tourist. (10d) The richness of felt meaning, such as can be evoked by a foregrounding in the history of the Occupation, probably arises in the amygdala. The amygdala coordinates “cortical arousal and vigilant attention for optimizing sensory and perceptual processing of stimuli’ such as “novel, ‘surprising’ or ‘ambiguous stimuli’.” (9u 238) This cortical processing “may then connect to emotional memories that provide alternative frameworks for assigning significance to the experience.” (9u 238) Admittedly, the initial response of the mirror neurons during reading may involve “a type of disinterest where the experience portrayed is considered in its own right independent of agency. Aesthetic disinterest (is) a concept that originates with Kant.” (9u 243)
Ultimately, however, even though a character during the Occupation whom we read about “is not physically present, but imagined, mirror neurons represent the character’s experience in the reader, replicating his feelings or motor actions.” (9u 243) Consequently, when we read about the dark history of a place, “we experience, even if only momentarily, a schema for action or feeling that makes its own demands on us for understanding. Its status as a vehicle for reflection and anticipation orients us, independently of the self, toward the implications of the narrative we are reading, although it may subsequently be linked to our intentions, goals, or feelings.” (9u 243)

Neuroscientists have found that our mirror-neuron framework “helps provide an account not only of how the body is implicated while reading, or how empathic responses to character are possible... While the implications of disinterestedness remain to be worked out in more detail, they provide another avenue for considering how literary response may be distinctive. Moments of foregrounding, or surprising turns in narrative, provide the grounds for disinterest, situating the experience in question as a prototype with its own distinctive laws of being and development.” (9u 244)

Most probably, to experience the sublime, to avoid disinterestedness, the reader needs to be endowed with a high empathic potential.

Neuroscience tells us that when we are processing language “we're actually engaging parts of the body and parts of the brain that are involved in action. So it seems like there’s an entire embodied or corporeal support for some quite conceptual processing, like language processing.” (9i)

III – INTUITIONS ABOUT WHY PARIS APPEARS MORE BEAUTIFUL BY KNOWING ITS DARK SIDE.
“Know how sublime it is, To suffer and be strong.” (Longfellow)

The ultimate aesthetic state beyond beauty has long been called the “sublime.” Centuries ago many have intuited that we can most readily experience the sublime when our self-preservation is threatened. Edmund Burke, for example, wrote “the idea of bodily pain, in all the modes and degrees of labour, pain, anguish, torment, is productive of the sublime, and nothing else in this sense can produce it.” For instance, in Paris when we link a hauntingly beautiful location, such as the Ritz Hotel at 15 Place Vendôme, with its dark collaborationist history, the experience unexpectedly makes us feel something uncanny – we achieve the sublime. We become awe-struck – an experience akin to Dostoevsky's after his mock execution. A similar discriminating awareness can also be especially intense when we are nearing the end of our time spent touring Paris. We suddenly find Paris filled with a light of a special quality, one that overcomes us with an urge to take more and more photos. Thus we become like the collaborationist Robert Brasillach and agree that “Paris is most beautiful when one is about to leave it.”

We may not understand why we sense the sublime after we confront the shadows, the dark silences, and the ghosts that haunt a particular building. We don’t think our way to feeling the sublime. Instead, we intuitively sense it and feel compelled to respond. This is precognitive, a non-rational experience. Nevertheless, being knowledgably exposed to the subterranean horror on which Occupied Paris rested can sublime our souls. As mentioned in the beginning of this essay: No paradise is complete without its snake! Like the stark realities of 9/11 in America, great terror catalyzes our awareness of the sublime because it evokes an uncanny quasi-perception that something fateful is at work, some force greater than ourselves: that fearful domain of the “mysterium tremendum et fascinans” which
inspires both dread and exhilaration beyond reason’s grasp. Darkness itself can leave spiritual footprints. Our sense of the sublime tends to persuade us, it tends to give us hope that our very existence is meaningful.

As good history-detectives, we take as a clue our intuition that beauty matters, that love and life are significant. By profoundly feeling the weight and burden of life during the Occupation, by listening to the “duende”, the dark sounding undertones in the music, we can become even more exquisitely stimulated by the operatic beauty of Paris. Meeting the duende evoked by the Occupation history of a particular location in Paris can dilate our mind's eye, it can create a spine-chilling bodily reaction that makes us cry or smile. As Federico Garcia Lorca wrote: “The duende is not in the throat; the duende climbs up inside you, from the soles of the feet....Everything that has black sounds in it has duende... A mysterious power which everyone senses and no philosopher explains.” It brings to the flâneur (i.e., an enlightened urban stroller in Paris) “unknown feelings of freshness, with the quality of something newly created, like a miracle, and it produces an almost religious enthusiasm.” (11, 48-62).

[NEUROPHYSIOLOGY AND THE DUENDE: Can neuronal correlates of music relate the Duende to the neurobiology of the Sublime? Neuroscientists have found that chill-evoking musical excerpts co-occur “with activity changes in cortical and subcortical structures underlying emotional and vigilance changes (ventral striatum, midbrain, amygdala, orbitofrontal cortex, and ventromedial prefrontal cortex). Interestingly, some of these regions have previously been related to basic biological fulfillment (food, sex), or to positive feelings produced by pharmacological substances. This link between neural substrates underlying music-induced emotions and biologically determined emotions ... highlight the importance of music as a general source of pleasure and reward.” (10c 228) The sad emotions
connected with slow-tempo music in minor keys (perhaps like the duende) have been found to activate the cingulate cortex and the prefrontal cortex (left orbito- and mid-dorsolateral cortex) more than fast-tempo excerpts in major keys (which are predominantly connected to happy emotions). \(10c 228\) {Other musicians may wonder if it is just the tempo or the mode.}

The cumulative, echo-chamber effect of experiencing both the sinister and the sublime empowers us. The shocking conceptual contrasts endlessly titillate our attention. These violations of expectations at work give us a high. Goethe called this source of the sublime — the most overwhelming emotion our hearts are capable of feeling — the “selige Sehnsucht,” the blessed longing (for the Divine or, for a deeper quest.)

If we are enabled at all to apprehend the fearful delight of the sublime, it is “only by the perpetual instilling and drenching of the reality that surrounds us.” For example, J. M. W. Turner, the great, English Romantic painter whose expressionistic seascapes remain unmatched in their range and sublimity, found that he had to lash himself to the mast of the ship during violent storms to capture the sublime with his painting. He had to be in the middle of the tempest rather than outside it using his egocentric eye at a distance.

The darkness of Occupation history gives depth and contrast to the City of Light. The idealized portrait of World War Two France as a nation of resistors, exemplified by the numerous commemorative plaques erected in Paris, is, in the light of midday, devoid of the nuanced shades and hidden details where historical truth is found. For those flâneurs born too late to have experienced the Occupation, the fascinating questions raised by its dark history are not the dry details of battle dates and casualty numbers we learned in school, but rather the questions of how and why, of motives and rationales. It is in knowing the shadows that one can truly appreciate the beauty of the
light shed by present-day Paris.

[NOTE: Regarding the phenomenon of light/dark contrast enhancement, neuroscientists have long known that “the difference between light and dark areas is enhanced at their boundary. In a general sense, contrast enhancement also is a kind of feature extraction, the enhanced response to specific spatial features in a visual scene.” As a counterpart to contrast enhancement in space, contrast enhancement in time also exists. Contrast enhancement is just one way “that transforms the neural image into a form that is most appropriate to the operations of the brain in building visual perceptions and beyond.” (9s 61-65)]

Encountering the duality of dread and fascination can give us concrete visceral glimpses and lead us as conscious, cultural tourists (as distinct from mere corporeal wanderers) to a numinous experience. In doing so, we too can follow in the footsteps of some artists, authors, playwrights, and film-makers during the Occupation. For, “in spite of increasing hardship and increasing repression, culture flourished in Paris during the Nazi occupation, so long as it was not Jewish-inspired....the exuberant, artistic life was a way of asserting that military conquest could not subjugate French culture”. Indeed, “Beams of light lit up the panorama of these somber years, and their brilliance was all the greater because the painful circumstances of the age acted as a stimulant to activity.” (10, Chapter III, 36) No wonder Oscar Wilde wrote that “the darkness of evil...was much more interesting than the bright light of goodness.” (12, 222-223)

To truly love and appreciate Paris, to set one’s most sensitive sinews vibrating, one has to have looked with open eyes at its darkest sides. Like a good cinematographer, we have to alter the lighting, to vary the zoom, as we explore the enigmas of Paris. We have to have swum in its current of influences that run on different clocks, both past and present. Rotting trees matter as much to a forest’s ecology
as do its living trees! Chanel No. 5 perfume smells sublime precisely because one of its ingredients is a malodorous animal musk from a civet.

**NEUROPHYSIOLOGICAL NOTE:** This seemingly incongruent mixture of scents in Chanel No. 5 results in an entirely new and different odor perception for humans. The resulting smell has a “synthetic” property, that is, “a mixture of several smells makes a new unified smell. It is not ‘analytic,’ the way taste is: sweet and sour tastes sweet and sour rather than being a new unified taste.” (9s 32) Sensing the sublime fragrance of Chanel # 5 depends on the interaction of the smell molecules with the receptor molecules in the nose plus the olfactory cortex. Ultimately, of course, “it is the brain that creates the perception of ‘smell’ from the differences between the features of the different smell molecules.” (9s 86) More specifically, it is the orbitofrontal and anterior cingulate cortex that “represent the reward value of odour, in that the activations there correlate with the subjective pleasantness of odour.” (9s 116)

Likewise, with regard to foods consisting of both pleasant and unpleasant ingredients, “most people reject a food that causes pain in the mouth, particularly burning pain. However, many people learn to tolerate and prize the pain wrought by the capsaicin molecules in chili peppers as an essential part of the flavor of the foods they are in. This is an example of how the hardwired aversive behavioral responses at birth can be overcome by learning.” (9s 131) Neurogastronomists have identified many brain regions activated by liking a food: the left fusiform gyrus, the left parahippocampal gyrus, the right amygdala, the bilateral cingulate gyrus, the left caudate nucleus, and the right putamen. When we see a food we like, a mental image of it is distributed among different brain “regions and different modalities, a ‘multiregional multimodal image’ that represents emotional and motivational states rather than the perception of what is pictured.” (9s
Appreciating the reward value of a stimulus, such as a food we like, “is one of the key functions of the orbitofrontal cortex, the neocortical end station of the olfactory pathway.” (9s 173)

Perhaps the complex gestalt effect arising when these brain regions are activated may be similar to what happens when we experience the sublime. It has been known for a long time that “when a neuron carrying a signal causes an increase in signaling of another neuron to which it is synaptically connected, the two intensify their connection to make it more effective with further activation.” (9s 204-205)

Thus, like smelling Chanel No. 5, a similar unifying process (probably involving our “association” and prefrontal cortical areas) might occur when we conjure up a sublime experience. Knowing what the Occupation of Paris was really like can thus intensify how we appreciate the city's beauty today. Conceptual awareness of the historical underpinnings can transform the visual impact of Paris and build a united image of a new, unexpected environment, a hybrid space that provides us with a fuller sensory experience. If we have not come to terms with the city's faults and with its inconvenient details, we fail to mentally capture the splendor of Paris at its most sublime. Of course, we may have to encounter multiple exposures to the polar dyad before the collision of dark and light combines these opposites into a beautiful harmonic that generates sublimity. But it doesn't take the shine off Paris to know its dark side. We need something negative to push against in order to grow, to awaken, and to heighten the intensity of beauty. Like the beguiling adventure of standing between two different mirrors, it is this sort of totalizing reflection that makes us fall in love with Paris even as it perplexes us.

A neuroscientist might amend the above sentence by saying that the visual mental image of Paris thus formed “is distinct from the sensory visual image that is projected onto the retina and transmitted through the thalamus to the visual cortex. The two images meet somewhere in
the primary and secondary association visual areas, a zone referred to as a buffer. This is where the bottom-up image that we see with our eyes meets the top down image that we imagine.” (9s 159) Most probably, however, the mental imaging involved in sublimity involves more brain areas than the visual cortex. And in doing so, we can also conclude that “the neurosciences cannot dispense with the humanities in their analyses of the brain. Equally, the humanities must reckon with scientific findings.” (13, 58)

APPENDIX I – THE NEUROBIOLOGY OF AESTHETICS

Appendix I details the evidence that (A) a brain-based theory of beauty exists, but (B) this theory does not take into account all the variables concerning the sublime, and (C) the brains of women and men apparently use different processing strategies regarding beauty.

(A) Zeki et al (1c) have tried to formulate a brain-based theory of beauty based on their research using functional Magnetic Resonance Imaging of the brains in humans who viewed paintings and listened to music and rated them according to how beautiful each sample seemed. Zeki et al observed that only one cortical area, a single region (field A1) of the medial orbito-frontal cortex (mOFC), was especially active during the experience of musical and visual beauty. [In contrast, judged-ugly stimuli evoked the lowest activity in the mOFC.] In fact, Zeki et al observed a linear relationship between the MRI signal and the declared intensity of the experience of beauty. As the strength of activation was related to the intensity of the experience alone, they concluded that “beauty” seemed to be based “exclusively on the perceiver rather than on the object,” thus verifying scientifically what the Greeks first metaphorically observed in the 3rd century BC: that beauty is in the eye of the beholder.
The definition Zeki et al proposed “takes aesthetics very much into the subjective, though quantifiable, arena; it applies only to an individual at a specific time and place since what is judged and experienced as beautiful at one moment and in one context by one subject may not be so experienced by another in a different context.” Their definition “makes it unnecessary to consider other factors such as up-bringing, culture, context, connoisseurship and monetary value in the definition of what constitutes the aesthetic appeal of a work of art, although all these factors may contribute to the experience of beauty.”

Zeki et al, however, cautioned that the above theory does not apply to all aesthetic experiences. They found that although only activity in the “A1 area of mOFC correlated with the experience of musical and visual beauty, the path to mOFC through the two domains was different.” As opposed to musical experience, “with experience of visual beauty, the caudate nucleus was very much co-active with A1 of mOFC as were the visual areas..., (hence) it is not the activation of mOFC alone that is a determinant of beauty; it is rather the co-activation of field A1 of mOFC with the specialized sensory and perceptive area, or areas, and possibly (in the case of visual stimuli) with the caudate nucleus as well.” [Thus, no one unique spot in the brain governs aesthetic experiences.]

Ultimately, Zeki et al broadened their “neurobiological definition of beauty given above to include not only activation of mOFC but also its co-activation with sensory areas that feed it. The interaction between these sensory areas, and other regions such as the caudate, and A1 of mOFC, and how activity in the latter is modulated by activity in the former remains a very interesting puzzle for the future.” (1c) Thus, rather than giving credit to just one unique spot in the brain that might govern aesthetic-experiences, an astounding extent of brain processes must be engaged and activated. [Other neuroscientists have come to similar conclusions. (9w 268)]

NOTE:
Zeki et al were careful to point out that their studies concerned the
"beautiful alone, not the sublime." Indeed the neurobiological basis for experiencing the sublime is probably not sharply localized to a few brain areas. The neural machinery involved is most likely far more complex. "When you look at a simple visual scene, your brain is constantly resolving ambiguities, testing hypotheses, searching for patterns, and comparing current information with memories and expectations." (9j 229) Furthermore, while neuroscientists know the brain’s reward system is connected to the visual neurons, mysteries remain: How, for instance, does the brain distinguish between mere visual pleasure (the “Aha!” of mere arousal) and the “Aha!” of a sublime, multi-dimensional aesthetic response to beauty? (9j 231) This aesthetic trajectory to the sublime probably involves “expectancy violations” when shivers are induced by learning the dark history of the site viewed. The brain regions whose activation correlates with physiological and subjective measures of thrills may be the same as those involved when listening to emotionally arousing music. (10a 94)

This quandary about how the brain imbues an object with meaning has been recently explored further by Steven Brown et al (9q). “Human neuroimaging studies have convincingly shown that the brain areas that mediate aesthetic responses to artworks overlap those that mediate the appraisal of objects of evolutionary importance, such as the desirability of food items or the attractiveness of mates.” (9q 250) Besides the OFC mentioned above, the anterior insula appears to be especially strongly activated during aesthetic appraisal. The anterior insula is a “paralimbic region associated with interoceptive awareness/insight, a sense of the ‘feeling self’, core affect, the subjective experience of emotions such as pain, sadness, anxiety and disgust, and the capacity to predictively anticipate the impact of emotional events on the body’s responses.” (9q 254) Thus the anterior insula, along with the orbitofrontal cortex (OFC), should probably be considered as playing a role when we experience the sublime, such as my emotional response elicited by seeing the beautiful Hotel Lutetia in Paris while being aware of its dark history. The neural processing of the sublime experience, as we have discussed above, most likely involves brain centers that promote selective attention and positive emotional responses. (9r 44)
How did the human brain evolve the ability to emotionally appraise objects, to appreciate art and beauty, and to make ordinary reality extraordinary? “It is reasonable to speculate that, to the extent that polysensory convergence of reward processing does occur in the OFC, it most likely evolved in the service of perceiving the quality of food sources, including their gustatory, olfactory, visual, and textural (somatosensory) features. This is strikingly similar to the reasoning that has been applied to the anterior insula/gustatory cortex, highlighting yet another deep similarity between the OFC and anterior insula.” (9q 256) Other brain areas more specifically process positive emotions (the ventral striatum/nucleus accumbens, the ventral tegmental area, the periaqueductal gray, and their associated dopaminergic and opiate transmitter systems) or negative emotions (the amygdala and the anterior/ventral insula. (9r 52) But the OFC focuses on “an assessment of ‘good for me’ vs. ‘bad for me’ and hence assign valence [positive or negative value] to the emotional appraisal of the stimulus. In addition, the OFC is a paralimbic area that is closely connected with mnemonic areas like the parahippocampal gyrus and the hippocampus, thus modulating the memorability of stimuli.... The importance of the OFC for the appreciation of art objects like symphonies and sculptures may derive evolutionarily from the function of this part of the cortex in making appraisals of the olfactory and gustatory properties of food sources.” (9r 52)

Furthermore, regarding evolutionary thinking about aesthetics, our brains have evolved an “ability to create an internal mental picture or model of the world in which we can rehearse forthcoming actions, without the risks or the penalties of doing them in the real world. There are even hints from brain-imaging studies by Harvard University psychologist Steve Kosslyn showing that your brain uses the same regions to imagine a scene as when you actually view one.” (9j 242) When artists creatively conjure up a visual image, they use back and forth connections between “the inner (ventromedial cortex) portion of the frontal lobes” and “parts of the temporal lobes concerned with visual memories.” Eventually, when “the self-amplifying echoes between these layers of visual processing reach a critical volume,
they get delivered as a final, kick-ass ‘Aha!’ to reward centers such as the septal nuclei and the nucleus accumbens.” (9j 243-244)]

(B)
In agreement with the nonlocalized nature of neuroaesthetic appreciation, Cinzia et al have pointed out that “notwithstanding the conceptual strength of Zeki’s parallelism [(2)], studying basic neural mechanisms underpinning the brain response to art and the ensuing aesthetic experience is a complex issue. For one thing, there is great heterogeneity across results from the investigations that have attempted to clarify the neural correlates associated with aesthetic experiences.” Perhaps anticipating the neurobiology of sublimity, they point out how important it is to distinguish “between emotions directly associated with aesthetics and the cognitive processes that may produce reward experiences in the beholder. This distinction highlights concepts of aesthetic pleasure and aesthetic appraisal, which can be related to the emotional and cognitive aspects of aesthetic experiences, respectively.”(3)

Thus, it has “been recently proposed that a crucial element of aesthetic experience of artworks consists of the activation of the embodied simulation of actions, emotions, and corporeal sensations, and that these mechanisms are universal. This proposal challenges more standard accounts of aesthetic experience privileging the primacy of cognition in our response to art. This hypothesis, echoing historical views put forward, among others, by the phenomenological tradition in philosophy, stresses the empathic nature of the relationship automatically established between artworks and beholders.” (3).

Can the sublime state of a flâneur (the French word for an enlightened urban stroller in Paris) ever be properly studied in subjects who participate in the experimental setting? Probably not, for as Cinzia et al (3) remind us, “it is difficult, in fact, to induce in the participants the proper mind-state, particularly in fMRI, MEG and EEG studies. For investigations dealing with very subtle human abilities, participants’ ‘attitude’ and intention play a crucial role in the classification of a
visual experience into an aesthetic one. Explicit judgments, therefore, are usually required to induce specific mind-states that, however, may mask basic neural processes.” (3)

Thus, it is tempting to propose that for modern flâneurs in Paris who experience the sublime, their subjective aesthetic appraisal is most likely mediated by core emotional centers and association processes, along with the A1 of mOFC region of the brain et cetera mentioned by Zeki et al. However, while evidence exists that art appreciation probably involves hyperactivation of both visual and emotional brain areas, sublimity itself has not yet been studied in any experimental laboratory. In summary, many neuroimaging “studies have confirmed that there is no single brain center for aesthetic preference, and that different component processes are associated with activity in different brain regions.” For example, the orbitofrontal cortex and caudate nucleus deal with the “reward value of aesthetically pleasing visual stimuli.” Activity in the anterior cingulate cortex “during aesthetic preference tasks is involved in the conscious awareness of emotional responses...Activity in the temporal pole seems to provide an emotional and mnemonic context for discussions about beauty.” (And finally, “making decisions about the beauty of visual stimuli has been associated with activity in frontopolar and lateral prefrontal regions.”) (10b 123)

Besides the other aspects of the neural machinery most likely involved with experiencing the sublime, we must be reminded that gender-related differences in the neural correlates of beauty have been observed in humans. For example, Cela-Conde et al, using magneto encephalography (MEG), identified differences and similarities in brain activity between male and female participants when rating the beauty of artistic and non-artistic visual stimuli. (4) The activity in parietal regions was bilateral (both left and right) when women judged the stimuli as beautiful, whereas the activity was lateralized to the right hemisphere in men. Thus, the brains of female and male travelers react differently during the visual appreciation of beauty.
The authors explained that the brains of women and men normally use two “separate processes that code and represent two different kinds of spatial relations among objects. Categorical spatial relations [which predominate in female brains] refer to positions of objects or their parts in broad categories of location regarding other elements, such as ‘above or below,’ ‘left or right,’ ‘in front or behind,’ ‘inside or outside.’ These categorical relations play a role in tasks that do not require a precise location. Conversely, coordinate spatial relations [which predominate in male brains] involve more precise metrical information about distances among objects…. Hence it appears that women and men engage different strategies of spatial analysis during aesthetic preference activity. Strongly lateralized activity in the right hemisphere suggests that men use coordinate-based strategies. Conversely, activity in both hemispheres, although mainly and longer in the left hemisphere, suggests women rely on categorical strategies more than men do.” (4)

What explains the sex-related differences in brain processes that evolved in humans regarding aesthetic preference? Cela-Conde et al cite Silverman’s and Eals’s “hunter-gatherer hypothesis” (HG-H) of gender differences in spatial abilities. (5 and 6) The latter authors “argue that the differences in spatial ability between men and women were associated with the division of labor between the sexes in hunting and gathering. Tracking animals and foraging for plant food involve different spatial scenarios and, hence, require different kinds of spatial skills. Silverman and Eals suggest that abilities involved in hunting include orientation in relation to objects and locations that may be in or out of view, and thus require cognitive transformations that allow keeping an accurate orientation while moving. Conversely, foraging requires recognizing and remembering the contents of varied object assemblies and the spatial relations between objects….Women tend to be more aware than men of objects around them, including those that seem irrelevant to the current task, whereas men out-perform women in navigation tasks. Men tend to solve some alternatives to the above navigation tasks by using orientation-based strategies involving distance concepts and cardinal directions, whereas women tend to base their activities on remembering the
location of landmarks and relative directions, such as ‘left from’ or ‘to the right of’” (4).

Cela-Conde et al also suggest two other hypotheses besides the HG-H to explain the different brain processing strategies for beauty in women and men: “It is generally accepted that the right parietal cortex is associated with global visual attention and the left with local attention. Perhaps women make use of both global and local features in making their judgments, whereas men only rely on global features. Another hypothesis could link our observations to language. Women obtain higher scores on a diversity of verbal and language tasks. Perhaps women are more likely to associate verbal labels than men, producing the lateralizing differences in neural activity. This hypothesis deserves further experimental work before seriously being taken into consideration.” (4)

[The brains of men and women also differ in other substantial ways, for example, the brain's ability to sense mystical experiences depends on serotonin-2 receptors and “men have more serotonin-2 receptors in their left brain. In theory this provides the opportunity for more serotonin-2 action. But we need to know more about the serotonin-2 puzzle before we can say more about brain chemistry, gender, and mystical experience.” (9n 245)

NOTE: A century ago in Paris, all flâneurs were male. Solitary, respectable women did not walk the streets. Even today, each gender experiences different freedoms and difficulties in the street. For a contemporary flâneuse (a female flâneur), the journey still starts with deciding what to wear. Sometimes a flâneuse may want to appear inconspicuous so she can see and understand more. “The edgy path of sensitivities and potential for embarrassment in the street, lying as it does between psychological territories of acceptable and unacceptable appearances” remains a primary concern. The tactility of walking for a flâneuse involves more bodily alertness than it does for a flâneur: she seeks a much more bodily and complex relationship with her surroundings in Paris. (4a 164,169,170)
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