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An Inquiry into Paul Cézanne

The Role of the Artist in Studies of Perception and Consciousness

Introduction

An intriguing element of Paul Cézanne's legacy is that while he aligned his paintings with the classical Renaissance tradition of Western art, his innovative body of work ushered in a decisive break with the standards of that tradition in the twentieth century. The many ways in which Cézanne's representational system deviates from the pluralistic art of the twentieth century suggests that probing his allegiance to classicism offers a unique vantage point for studying visual art, perception, and consciousness. It is for this reason that this paper examines Cézanne's contributions from both the painterly and the cognitive science perspectives, asking what artists in fact contribute to our studies in these areas.

What must be stressed in approaching the bridge Cézanne was so instrumental in building is that Cézanne considered any artistic style governed by fundamental principles of communicative expression as classical. Thus, from his perspective, his turn toward the classical masters was not one that emphasized blind imitation or simply copying their work.[2] To the contrary, Cézanne believed that the artist's success in solving technical problems should guide the artist in rendering his or her personal sensation[3] (Rewald, 1995; Shiff, 1984).

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[2] Cézanne expressed his allegiance to classicism when he wrote to the art critic Roger Marx, 'one does not put oneself in place of the past, one only adds a new link' (Rewald, 1995, p. 275). He also spoke of his distaste for strictly imitating the classical masters in a 1905 letter to Emile Bernard, saying: 'The Louvre is the book in which we learn to read. We must not, however, be satisfied with retaining the beautiful formulas of our illustrious predecessors. Let us go forth to study beautiful nature, let us try to free our minds from them, let us strive to express ourselves according to our personal temperament. Time and reflection, moreover, modify little by little our vision, and at last comprehension comes to us' (Rewald, 1995, p. 315).

[3] It is important to recognize that Cézanne had a tremendous respect for the way old masters looked for new problems to solve and for how they solved problems as they worked. This explains Cézanne's stress on the need to respect previous masters' skills while bringing one's own eye to one's efforts. Richard Shiff has an illuminating discussion on this (Shiff, 1984).

Paul Cézanne and his art are examined in this paper by adapting, rather than adopting, Semir Zeki's idea that 'artists are neurologists, studying the brain with techniques that are unique to them . . .'[4] (Zeki, 1998, p. 80). Before outlining where this discussion diverges from Zeki it should be emphasized that there is no dispute that what is generally referred to as the visual brain is V1 plus the specialized visual areas with which it connects directly and indirectly (Zeki, 1998). Rather, I would propose that how a painter 'sees' cannot be captured in terms of a localized picture of processing in the visual brain. In other words, as Paul Cézanne's work clearly demonstrates, an artist does not passively 'see', so much as the artist relates to what he or she sees while painting — and thus actively coordinates various areas of the brain while seeing and creating.

This element of 'active seeing' will be used to explain the three areas in which this discussion diverges from Zeki's premises, as outlined in his article *Art and the Brain*.[5] First, while Zeki suggests that the question art can illuminate is 'why do we see?',[6] I will emphasize that if this question is narrowly approached it can fail to include key elements related to artistic perception, artistic practice, and artistic products — elements that are essential to any comprehensive study relating art to vision, perception, and consciousness.[7] Second, while Zeki claims that 'many [artists] still hold the common but erroneous belief that one sees with the eye rather than with the cerebral cortex' (Zeki, 1998, p. 80), this paper will

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[4] Zeki writes: 'I hold the somewhat unusual view that artists are neurologists, studying the brain with techniques that are unique to them and reaching interesting but unspecified conclusions about the organization of the brain. Or, rather, that they are exploiting the characteristics of the parallel processing-perceptual systems of the brain to create their works' (Zeki, 1998, p. 80).

[5] The *Art in the Brain* essay was first published in *Daedalus*, *Proceedings of the American Academy of Arts and Sciences* and then reprinted in the *Journal of Consciousness Studies*. Page numbers noted in this paper are from the JCS version of the paper. It should be noted that Zeki's book *Inner Vision: An Exploration of Art and the Brain* was published in 1999, shortly after this paper was written. The book reiterates the arguments in the essay and likewise fails to address the weaknesses inherent within the neuro-reductionistic approach Zeki's theory uses (Zeki, 1998; 1999a; 1999b).

[6] According to Zeki, the reason connections between the functions of art and the functions of the visual brain have not yet been made is that our conception of vision and the visual process has been dictated by simple but powerful facts derived from anatomy and pathology. He writes: 'These facts spoke in favour of one conclusion to which neurologists were ineluctably driven, and that conclusion inhibited them, as well as art historians and critics, from asking the single most important question about vision that one can ask: Why do we see at all?' Zeki then goes on to claim that it is the answer to that question that immediately reveals a parallel between the functions of art and the functions of the brain, and indeed ineluctably drives us to another conclusion — that the overall function of art is an extension of the function of the brain (Zeki, 1998, p. 78). I am asserting that Zeki has not brought enough emphasis to how seeing changes over time and how the practice of art informs the entire brain over time.

[7] In Joachim Gasquet's *Cézanne*, Gasquet recalls Cézanne's view on what artists do and reports that Cézanne saw seeing as a complex activity: 'One has to go beyond feeling, get past it, have the nerve to give it objective shape and be willing to put down squarely what one sees by sacrificing what one feels — by having already sacrificed what one feels . . . . You see, it's enough to feel . . . feeling never gets lost . . . I'm not against it. On the contrary, I often say . . . An art which does not have emotion as its principle is not an art . . . Emotion is the principle, the beginning and the end; the craft, the objective, the execution is in the middle . . . That's where the slightest misplaced brush stroke upsets everything. If there's nothing but emotion for me in it, I send your eye crooked . . . If I weave around your expression the whole infinite network of little bits of blue and brown that are there, that combine there, I'll get your authentic look on my canvas' (Gasquet, 1927; Gasquet, 1927/1991, p. 213).

explain that this absurd simplification does not address how the artist uses the term 'eye' as a metaphor for the intuitive process of visual apprehension. Finally, this paper will question whether Zeki's definition of the function of art extends far enough to include the actual 'seeing' the artist brings to artmaking. According to Zeki, the general function of art is:

> [A] search for the constant, lasting, essential, and enduring features of objects and surfaces, faces, situations, and so on, which allows us not only to acquire knowledge about the particular object, or face, or condition represented on the canvas but to generalize, based on that, about many other objects and thus acquire knowledge about a wide category of objects or faces (Zeki, 1998, p. 79).

As will be shown, this conclusion fails to acknowledge the degree to which an artist informs art. For a painter, for example, touching paint to canvas is very much connected to seeing. This means the art that *we* see includes *many* faculties and, *for the artist*, its success is based on the kind of seeing that Richard Gregory introduces when he speaks of the importance of touch to vision[8] (Gregory, 1997). As Gregory points out, the essential problem the brain needs to solve visually is that any given retinal image could be produced by an infinity of sizes and shapes and distances of objects, yet normally we see just one stable object (Gregory, 1997).

In sum, artists face the problems of seeing directly in their projects and, as will be shown, artists face the problems of seeing regardless of whether the representational system of choice is totally abstract or one that attempts to render objects we see in the physical world. Moreover, since retinal images can be interpreted in multiple ways, and since artists could be said to specialize in wrestling with the problems of seeing that concern all of us, it is essential that when we evaluate art in cognitive terms we clearly recognize that the artist, too, evaluates hypotheses. When the artist does so the artist's eye and the artist's brain work together. More important, when ascertaining how the artist functions as a neurologist, one must not lose sight of the degree to which an artist is involved with what is going on when making art on many levels. The creation is not comprehensively defined using terms like abstract, formal, or objective. Nor can we say that it is a totally subjective endeavour in which one relates to essential and enduring features. Rather the applied research the artist is doing is an activity that brings a concrete — and a very relational form — to his or her consciousness. The artist — in this case Paul Cézanne — also presents this form to the consciousness of others.

The Eye

Paul Cézanne's (1839–1906) body of work shows how an individual's perceptual knowledge can deviate from the weight of history, learned formulae, and conventional ideas and can nonetheless still be informed by the context of his time. Among the radical changes of the nineteenth century that informed his

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[8] Gregory writes: 'The brain's task is not to see retinal images, but to relate signals from the eyes to objects of the external world, as essentially known by touch. Exploratory touch is very important to vision' (Gregory, 1997, p. 6).

development are (1) scientific ideas related to vision and colour, (2) radical social changes, and (3) discussions on the value of bringing an 'innocent eye' to one's painting process. While the importance of these complex influences on Cézanne's work is beyond the scope of this paper, the impact of societal changes, new technologies, and the revisions we find in both nineteenth-century art practice and the empirical knowledge base of that time should not be underestimated.[9]

The area I want to emphasize here is that while Cézanne asserted 'the eye educates itself by contact with nature' (Gasquet, 1927, p. 163; 1927/1991), the idea of the 'innocent eye' tended to be understood in terms that are somewhat less active and developmental. John Ruskin's 1857 book, The Elements of Drawing, conveys how this idea was frequently presented. Ruskin writes:

> The whole technical power of painting depends on our recovery of what may be called the *innocence of the eye*; that is to say, of a childish perception of [these] flat stains of colour; merely as such, without consciousness of what they signify — as a blind man would see them if suddenly gifted with sight (in Smith, 1995, p. 28).

Ruskin's view of the 'innocent eye' has increasingly permeated theories of art and has diffused the complexity of seeing in painting since the nineteenth century. Given that the value of the 'innocent eye' is often implicitly valued at this point in time, it is important to explore this idea in light of recent scientific information about seeing and vision before looking at Cézanne's oeuvre and working process.

An excellent starting point is an essay by the neurologist Oliver Sacks, 'To See and Not See', in which he compares the experience of a fifty-year-old man, Virgil, who had his sight restored after being almost totally blind since the age of six with the seeing of the artist, Paul Cézanne, writing:[10]

> As Virgil explored the rooms of his house, investigating so to speak, the visual construction of the world, I was reminded of an infant moving his hand to and fro before his eyes, waggling his head, turning it this way and that, in his primal construction of the world. Most of us have no sense of the immensity of this construction, for we perform it seamlessly, unconsciously, thousands of times every day, at a glance. But this is not so for a baby, it was not so for Virgil, and it is not so for, say, an artist who wants to experience his elemental perceptions afresh and anew. Cézanne once wrote, 'The same subject seen from a different angle gives a subject for study of the highest interest and so varied that I think I could be occupied for months without changing my place, simply bending more to the right or left' (Sacks, 1995, pp. 127–8).[11]

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[9] There are many references that speak of innovation and concerns related to nineteenth-century art and science (Helmholtz, 1995; Ione, in press; Ruskin, 1843; Smith, 1995; Wade, 1983).

[10] There are limited studies documenting how a blind person sees when given sight. To the best of my knowledge, the oldest reported case of a blind man being given sight was recorded in AD 1020 (Gregory, 1997). The first noteworthy recorded discussion is generally agreed to have resulted when the English philosopher John Locke (1632–1704) received a letter from his friend William Molyneux that concluded a formerly blind man would need experience with seeing to distinguish the shapes of a cube and a sphere if he had formerly only known them by touch. Locke, in his *Essay Concerning Human Understanding* (1690) agrees with Molyneux's conclusion. Additional well-known studies include: (1) a 1728 study by William Cheselden, where a thirteen-year-old boy was given sight (Senden, 1960), (2) *Space and Sight* by M. von Senden, which traces cases involving operations for the removal of lenses for blindness due to cataracts (Senden, 1960), and (3) Richard Gregory and Jean Wallace's research on S.B., who was successfully given corneal transplants at the age of 52 (Gregory & Wallace, 1963).

Sacks, of course, is attempting to explain that we achieve perceptual constancy — the correlation of all the different appearances, the transforms of objects — very early, in the first months of life.[12] (Sacks, 1995). When thinking about this in terms of an artist as a neurologist it is particularly important to consider Sacks' words in light of (1) how painting relates to seeing in general and (2) how achieving perceptual constancy is defined in Zeki's view of art and the brain.

Turning first to Zeki we find he acknowledges that the organism must be exposed to visual stimuli after birth and theorizes that in time a stored record is acquired through learning about the world. This idea of a stored memory, however, fails to address how (and why) visual artists optically engage with their products as they move them toward completion. Moreover, while Zeki correctly asserts that we 'see' with the brain, his static analysis does not address the degree of interactive 'looking' that artists use when they develop their ever-expanding pictorial vocabularies. The ongoing trials, experiments, and the innovations that are a part of the artist's evolving process speak directly to factors we must weigh when we ask how painting relates to seeing in general and how people who were once blind and then given sight differ from artists.

The primary issue from an artist's standpoint is not that the formerly blind do not have access to a stored record. Rather, visual artists spend years evaluating how to manipulate their tools so that they can convey what is of interest to them effectively — and then more effectively. For painters this exploration is one that constantly brings sight, touch, cognition, and emotions together as novel solutions are actively developed to encode information. Indeed, what makes powerful art exciting is that the solutions are not memorized models that have settled into our brains.

To the contrary, history shows that the creative work artists produce includes an experientially created record that, among other things, precisely shows how artists have learned to expand their means of expression over and over and over again. Frequently and repeatedly we find examples of perceptual and technical growth in a single artist when we examine the artist's oeuvre over the course of a productive lifetime. We also encounter evidence demonstrating how innovative artists break with learned conventions for seeing and representation. Perhaps of greatest importance is that when artists break with conventions and develop new tools to enable them to be better communicators they often bring new ways of perceiving the world to the attention of others.

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[11] About a month before Cézanne died in September 1906, Cézanne expressed this thought in a letter to his son, writing: 'I must tell you that as a painter I am becoming more clear-sighted before nature . . . Here on the bank of the river the motifs multiply, the same subject seen from a different angle offers subject for study for the most powerful interest for months without changing place, by turning now more to the right, now more to the left' (Rewald, 1995, p. 327).

[12] 'By about the age of one month, kids blink if something moves toward their eyes on a collision course. By three months they use visual motion to construct boundaries of objects. By seven months they also use shading, perspective, interposition (in which one object partially occludes another), and prior familiarity with objects to construct depth and shape. By one year they . . . proceed to learn names for the objects, actions, and relations they construct. . . . Kids aren't taught how to see . . . Every normal child, without being taught, reinvents the visual world; and all do it much the same way' (Hoffman, 1998, pp. 12–13).

The larger point here is that the eye of a painter, like Paul Cézanne, who continues to deepen his visual knowledge base as he continues to look anew, is contextually different from the eye of a blind person as well as from that of the innocent child's eye. Relating the artist's eye to the perceptual constancy Sacks mentions and the so-called 'stains' on the canvas Ruskin referred to above leads me to suggest that when we look closely at Cézanne's 'stains' we can quickly perceive that they are more than just stains on the canvases. Cézanne's stains, if we call them that, show how he first reaches out to capture something vital and vibrant and then finds a means of expression that translates this vitality to those who view his markings. Thus Cézanne's so-called innocent eye is more aptly defined as an 'open' but yet 'practiced' eye. He used it to aid him as he developed the techniques he needed to solve the problems that arose in encoding his vision and sensation onto the flat surface the canvas provided.

What must be stressed here is that the logic of Cézanne's visual decision-making process, often referred to in his letters (Rewald, 1995), was both deliberate and exploratory. We only need look at canvases at various stages of completion and at different periods of his life to see his active approach and the visual logic he employed.[13] Moreover, his open yet guided process suggests the word intuitive is appropriate — and also suggests we should use this word with great care. Carefully examining his canvases is the most effective way to conceptualize how Cézanne proceeded and what he meant when he said:

> There are two things in a painter: the eye and the brain, and they need to help each other, you have to work on their mutual development, but in a painter's way: on the eye by looking at things through nature; on the brain, by the logic of organized sensations which provides the means of expression . . . The eye must concentrate, grasp the subject, and the brain will find a means to express it (Gasquet, 1927/1991, p. 222).

Cézanne's many unfinished compositions offer the best reference points for perceiving his process and how his eyes and brain worked in tandem. First of all, it is well documented that Cézanne slowly built up the paint and the colour relationships on the canvas overall and the partially worked canvases effectively illustrate how he perceived the canvas as a whole when he worked. In addition, when we compare canvases from different periods of his life we see the early stages of several innovations that were not fully realized until late in his career. In sum, the work itself clearly articulates that Cézanne never stopped using his eyes to see his paintings and he never stopped using his brain to adjust how he painted. Over time, and through much trial and error, he was able to develop the innovative visual syntax that led his peers to see him as radical in his time. In fact his various experiments brought about the unique qualities that made the work revolutionary and now allows us to perceive how *he* used paint to denote his perceptions and sensations over the course of his life.

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[13] Reproduction of Cézanne's paintings can be found at several web sites. Some good ones include: http://metalab.unc.edu/wm/paint/auth/Cézanne/, http://sunsite.auc.dk/cgfa/Cézanne/index.html and http://www.artchive.com/artchive/C/Cézanne.html#images.

For example, looking at the techniques Cézanne invented and then refined over time, we see how he developed the technical solutions that no one had pre-defined for him. We also discover that he never settled into a fixed technical method that would lead him to characterize qualities in a singular fashion. To the contrary, he constantly experimented with possibilities. The deeply studied oil compositions, for instance, offer a stark contrast to the spontaneous simplicity of Cézanne's watercolours. Yet with each medium Cézanne shows that his 'open' eye slowly comprehended — i.e., learned — how to coordinate seeing with touching. It is not just that he was looking at what was in nature, which was important to the way he approached his work. Rather, Cézanne, like painters in general, was also looking at what he was building on the canvas. His process of decoding what he wanted to communicate and then encoding it in paint was an activity that depended on his deepening of the eye/brain combination. As noted, there were areas of consistency within this. For example, when we look at the unfinished works we see he always worked on the canvas as a whole as he visualized the path toward the overall 'look' of the finished painting.

In summary, as a painter Cézanne repeatedly combined his hands and his sensations with his eyes, brain, and mind to bring his unique vision onto the flat picture plane. This paper will turn to specific works later in this discussion. At this point two ideas are important to keep in mind. First, since no one had ever painted his way before him, the complex painting techniques he developed to convey what he 'saw' were not prescribed methods others could teach him. Second, his paintings are concrete forms and were formed as a part of a dynamic, experiential, and embodied activity. His canvases did not serve as a means to translate abstract ideas into an aesthetic form. Instead they recorded a process through which he (1) systemized the particular elements that came to define his style, (2) learned to coordinate what he saw with what his materials could do, (3) learned to push the materials to their limits and, finally, (4) continually found ways to perceptually deepen all he wanted to express with paint. Thus, Cézanne's paintings record his way of combining constancy with a complex and vitally informed visual expression and this relationship cannot be underplayed when reviewing his work. For example, despite the fact that he painted *Mont Sainte Victoire* over forty times (Figure 2 is a relatively late rendition), the constancy of the subject does not connote a fixed quality of expression. It is never visually repetitive. Instead the freshness of each piece shows the degree to which he carefully studied his goals, brought a 'new' eye to each day of painting, and also brought particular intentions to his painting process.[14]

We can optimally appreciate the visual richness and carefully developed complexity within Cézanne's body of work when we look at his style as it developed

[14] Richard Wollheim and Paul Smith have both cogently argued that artists fulfill two roles in painting. On the one hand, an artist is involved with the task of making the painting and, as such, is the agent of production. On the other hand, the artist is also a spectator, being among those who view the painting. This gives the painter an active role in formulating what the spectators (including the painter) see. The consequence of this, as both Wollheim and Smith assert, is that an artist's style matures as he or she develops modes that aid his or her expression (Wollheim, 1987; Smith 1995). Cézanne himself said that the means of expression are acquired through long experience (Rewald, 1995).

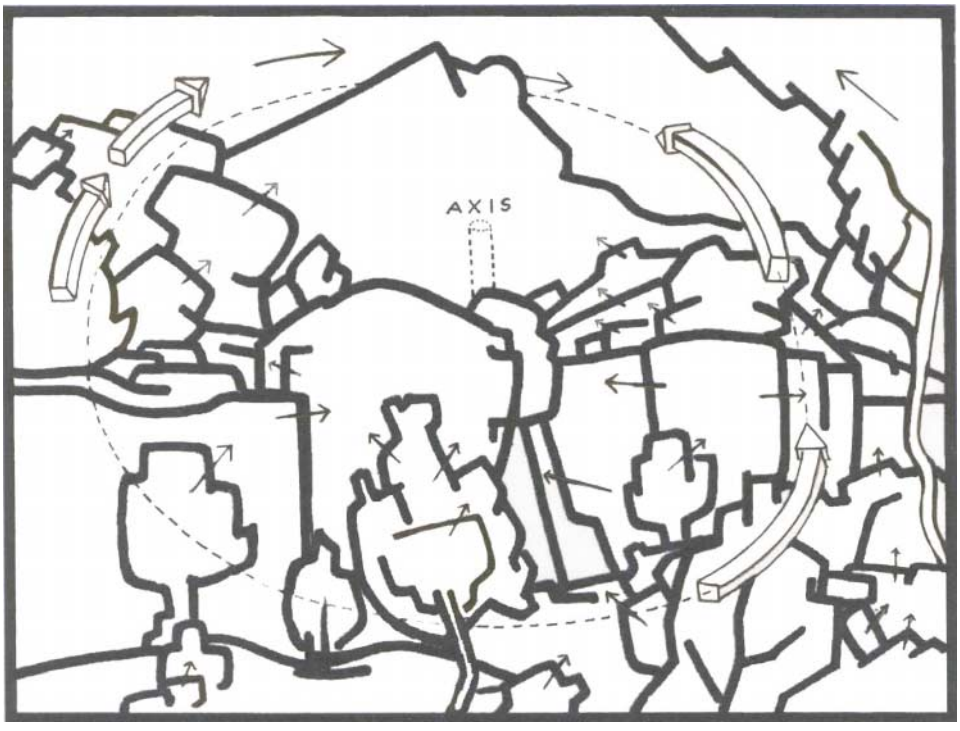

Figure 1

An illustration of the principle of organization Loran applies to *Mont Sainte Victoire Seen from the Bibemus Quarry* (Figure 2 is a reproduction of this painting).

The diagram shows planes and volumes moving around an imaginary central axis. The axis is indicated with dotted lines. The heavy arrows represent the circular path moving from the foreground into the distance and returning again. The small arrows indicate the endless movements and counter-movements from one overlapping plane to another. The essential planes have been indicated in the diagram without departing too much from the overall appearance of the painting.

over time. Many paintings completed in the mid 1860s, for example, were characterized as palette knife pictures and offer an extraordinary testimony to Cézanne's early abilities (Gowing, 1988). Each of these portraits is said to have been finished in an afternoon and their roughness is said to show the force of his temperament at this time.[15] Lawrence Gowing claims the group marks the invention of modern expressionism — and more, saying that

[15] These pieces include a *Self-Portrait* (V. 18), *Portrait of Anthony Valabrèque* (V. 126), *Portraits of Uncle Dominique* (V. 76, V. 80, V. 82), *Portrait of Louis-Auguste Cézanne, Father of the Artist reading l' Evénement* (V. 91)*, The Man with the Cotton Cap (Uncle Dominique)* (V. 73)*, The Lawyer (Uncle Dominque)* (V. 74)*, and the Portrait of Marie Cézanne, Sister of the Artist* (V. 89) [V. = L. Venturi, a standard catalogue of Cézanne's work] (Gowing, 1988).

Figure 2

Paul Cézanne (French, 1839–1906), *Mont Sainte Victoire Seen from the Bibemus Quarry* (c. 1897), oil on canvas, 65.1 x 80 cm.

Reproduced courtesy of The Baltimore Museum of Art: The Cone Collection, formed by Dr. Claribel Cone and Miss Etta Cone of Baltimore, Maryland. BMA 1950.196.

> This phase was not only the invention of modern expressionism, . . . [it included] the invention of *forme* in the French modernist sense — meaning the condition of paint that constitutes a pictorial structure. It is the discovery of an intrinsic structure inherent in the medium and the material . . . . Underneath the rudeness of Cézanne's way with paint in 1866 there was the idea of an order of structure that would be inherent in the paint-stuff (Gowing, 1988, p. 10).

Comparing compositional layout and paint application in these early works with what is conveyed in later canvases, we can also see how deliberately Cézanne wrestled with how to use paint to bring forms to life. For example, paintings of the later seventies and early eighties show that Cézanne had arrived at a consistent method by this time (Fry, 1966, p. 64). It was in the work during this interval that his pigment attains a particular density and resistance. We see an enamel or lacquer-like hardness and brilliance of surface. This is the result of his incessant repetitions and revisions of the form, particularly of the contours. Then, around 1885, a progressive change in how Cézanne handles paint begins to become

apparent. Hatched strokes are more loosely spaced and the impasto becomes thinner, having evidently been applied in a more liquid state.

Another noteworthy element is that Cézanne seemed to put off as long as possible covering the canvas. Even finished paintings are left with small interstices of white here and there. Additionally, the handwriting of the brush becomes looser and freer, perhaps due to his paintings in watercolour which became more numerous as he matured.[16] In sum, as we advance the chronology we find that Cézanne's materials become less and less pastose, his colours more and more liquid and transparent, more like watercolour. We also see that the change is gradual and that at times the thinner painting does not predominate, for there are returns to the old impasto (Fry, 1966).

The Eye, the Brain, and the Work

Cézanne's ability to break down form in a way that conveys a harmony and a brilliant radiance was a radical addition to art as a whole and it led many twentieth-century artists to further break down the painted form. The quite varied results of these later artists has led to much debate about Cézanne's contributions. For example, both the artist-turned-art-educator Erle Loran and the critic Clement Greenberg[17] open one door for beginning to approach the logic of Cézanne's expression and his view of the constancy of nature, which was an integral touchstone of his learning process. Greenberg speaks about the revelation Cézanne had at the age of forty as an attempt to 'save the key principles of Western painting — its concern for an ample and literal rendition of stereometric space — from the effects of Impressionistic colour'[18] (Greenberg, 1961, p. 50).

According to Greenberg, Cézanne did this because he sought

> [M]ore like the Florentines than like the Venetians he cherished — to achieve mass and volume first, and deep space as their by-product, which he thought he could do by connecting the Impressionistic method of registering variations of light into a way of indicating the variations in planar direction of solid surfaces. For traditional modelling in dark and light, he substituted modelling with the supposedly more natural — and Impressionistic — differences of warm and cool . . . The result was a kind of pictorial tension, the like of which had not been seen in the West since Late Roman

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[16] Writing about his watercolour, Roger Fry says: 'Cézanne felt so strongly of discovering always in the appearances of nature an underlying principle of geometric harmony. On his sheet of paper he noted only here and there, at scattered points in his composition, those sequences of plane which were most significant of structure; here, part of the contour of a mountain; there the relief of a wall, elsewhere part of the trunk of a tree or the general movement of a mass of foliage. He chose throughout the whole scene those pieces of modelling which became, as it were, the directing rhythmic phases of the total plasticity. One might compare the synthesis which Cézanne thus sought for to the phenomenon of crystallization in a saturated solution. He indicated, according to this comparison, the nuclei whence the crystallization was destined to radiate throughout the solution' (Fry, 1966, p. 64).

[17] Clement Greenberg is generally considered the critic who brought some measure of credibility to abstract painting. Given this, his opinion of Cézanne can be seen as a part of a larger story, one related to the kind of analysis he brings to the story of twentieth-century art.

[18] This frequently-quoted idea is related by Gasquet as follows: 'I wanted to make out of Impressionism something solid and lasting like the art of museums' (Gasquet, 1927, p. 164; 1927/1991).

> mosaic art. The overlapping little rectangles of pigment, laid on with no attempt to fuse their edges, brought depicted form toward the surface; at the same time the modelling and shaping performed by these same rectangles drew it back into illusionistic depth[19] (Greenberg, 1961, p. 52).

Loran likewise acknowledges the stereometric effect of Cézanne's compositions. Loran, however, stresses that Cézanne did not model form so much as light and further proposes that Cézanne's abandonment of traditional perspective was instrumental in developing the dynamic forms and unique techniques that resulted in the stereomorphic colouration we see. As a result, according to Loran, Cézanne

> [A]chieved light in the sense that modern painters give to the word, namely, the creation of an inner light that emanates from the colour relations in the picture itself, without regard for the mere copying of realistic effects of light and shade (Loran, 1943, p. 29).

Moreover, Loran's formal analysis of Cézanne's composition rests upon a dynamic analysis of how this painter developed compositional relationships (see Figures 1 and 2). The analysis, intended to illuminate how Cézanne saw the formal relationships on his canvases overall as he approached a painting, is not a universally accepted approach among art critics. In fact, many who reject Loran's approach do so for reasons that have nothing to do with Loran's deviation from classical linear perspective and classical themes. Rather, the concern is Loran's failure to address the inner psychology and the cultural context of the artist in this formal emphasis. For example, the art historian Rosalind E. Krauss writes:

> We all remember [Loran's diagrams] as something of a joke, . . . [Loran's] bizarre graphs of Cézanne's pictures, . . .the bodies of Madame Cézanne or the gardener sitting with folded arms, drained of everything but a set of their now brutishly definitive silhouettes, traced for them by Loran's own hand, each element notched in turn into the overall diagram of the picture plotted by means of the same myopic contour. The whole of this pictorial map was then vectored by a series of lines and arrows intended to reveal the hidden secrets of Cézanne's construction, the logic of a drawing that could create the experience of pyramid or cone while never dropping the ball in the smooth juggling act of maintaining the continuity of the surface planes (Krauss, 1994, p. 103).

Krauss concludes that Loran's approach, and its relationship to modernism, has been adopted in a way that does not give due credit to the optical unconscious, fantasy, and unexamined compulsions of the human involved. While I am not persuaded by her remarks, they do reveal that how we address paintings has a great

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[19] Greenberg continues: 'The Old Masters always took into account the tension between surface and illusion, between the physical facts of the medium and its figurative content — but in their need to conceal art with art, the last thing they wanted was to make an explicit point of this tension. Cézanne, in spite of himself, had been forced to make the tension explicit in his desire to rescue the tradition from — and at the same time with — Impressionistic means' (Greenberg, 1961, p. 53).

deal to do with the kinds of assumptions we bring to our analyses of art and, by extension, how we bring the brain and art together.[20]

Let me therefore propose that it might be useful — and perhaps is essential — to ask how we can put artists, in this case Cézanne, into a larger context. This question needs to be addressed from both a painterly and a cognitive perspective. From a painterly perspective I will ask what, if anything, is to be gained from looking at art in an enlarged context. From a cognitive perspective the critical element to consider is whether an analysis of art and the brain can aid us in developing a larger context.

Cézanne and Cognitive Research

What is to be gained from a painterly perspective is a greater understanding of what artists do, how the 'eye' of an artist evaluating options differs from that of a general viewer looking at a finished product, and where the limitations are when bringing scientific information to our studies of art, an area I will address in the conclusion. Before looking at what could be gained, we must first return to Zeki's theory.

While Zeki is to be applauded for recognizing the value in probing the 'artist as a neurologist', his conclusions nonetheless reveal some of the dangers inherent in applying a neuro-reductionistic vantage point to our studies in this area. This is not to say studies of the brain cannot facilitate our understanding of art. They can. But the kind of argument Zeki presents fails to include what artists in fact do. The importance of including art practice in our theories about art and the brain cannot be underestimated, especially if the claim is that the theory is biologically-based and supposes, as Zeki does, that 'artists are neurologists, studying the brain with techniques that are unique to them . . .' (Zeki, 1999a, p. 80).

Probing Zeki's somewhat limited and objectified characterization of Cézanne's work helps bracket elements that would have advanced Zeki's analysis of neural processing in artists and in general. He describes Cézanne's work as a 'painted epistemology' on the evidence that Cézanne supposedly shared Kant's views. What Zeki's conclusion seems to miss, however, is that each developing painting is a dynamic visual experience. Cézanne is not providing narrative statements that can be reduced to his view on nature, knowledge, knowing, or experience. To the contrary, each dynamic statement records a subtle interplay of sensory, cognitive, perceptual and emotive processes. Describing this interactive

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[20] Correlating Gasquet's characterization of Cézanne's beliefs with the views of later scholars, one often wonders whether what an artist does can ever be fully stated in a textual and/or theoretical analysis. Loran's diagrams, as Krauss notes, fail to capture the spirit of Cézanne's paintings. Krauss, on the other hand, seems to lose sight of how the intellectual element that is a part of her interpretive style would offend Cézanne, for, if Gasquet is to be believed, Cézanne himself remarked: 'The fact is one doesn't paint souls. One paints bodies; and when the bodies are well painted . . . the soul, if there is one, of every part of the body blazes out and shines through!' (Gasquet, 1927, p. 176; 1927/1991), and 'A picture doesn't represent anything, it doesn't need to represent anything in the first place but the colours . . . As for me, I hate that, all those stories, that psychology, that symbolism' (Gasquet, 1927, p. 185; 1927/1991).

process using words like a 'painted epistemology' suggests there is more of a fixed, static quality driving the activity than the range and the innovations within the work records.

The difficulty in grasping what the Kantian view misses is perhaps best explained by simply pointing out that Cézanne abhorred abstractions, especially in regard to art. As he explained in a 1905 letter to Emile Bernard, shortly before his death in 1906, he saw paintings as a concrete form of communication and as a form of education, writing:

> [P]ainters must devote themselves entirely to the study of nature and try to produce pictures which will be an education. Talking about art is almost useless . . . The man of letters expresses himself in abstractions whereas a painter, by means of drawing and colour, gives concrete form to his sensations and perceptions (Rewald, 1995, pp. 303–4).

Cézanne's clearly-stated preference for concrete painted statements is one reason to put Kantian abstractions aside and to use a non-epistemological approach when evaluating his work. Another is that he spoke better with paint than in words. This means that even his words must be read in terms of his work. Moreover, many, including Cézanne himself, have pointed out (Greenberg, 1961; Loran, 1943; Rewald, 1995) that Cézanne, like many artists, was more articulate with his brush than his words[21] (Gasquet, 1927/1991; Rewald, 1995). Even when the critic Greenberg wrote that 'Cézanne was one of the most intelligent painters about painting whose observations have been recorded' (Greenberg, 1961, p. 53), he quickly added that 'the master himself was more than a little confused in his theorizing about his art (Greenberg, 1961, p. 56).

This explains why I have emphasized looking at the work itself, and perhaps explains why Cézanne's story is often filled with contradictions. For example, on the one hand, Cézanne wrote to Emile Bernard: 'I believe in the logical development of everything we see and feel through the study of nature and turn my attention to technical questions later'. Yet, on the other hand, Cézanne's work illustrates that he was nonetheless very aware of the materiality of paint, particularly from a technical standpoint (Gasquet, 1927/1991; Rewald, 1995). His accomplishments offer a clear record of this, documenting the degree to which he focussed on expanding his capacity to express his sensation outwardly, ever seeking new painterly skills.

In summary, Cézanne's paintings illustrate how he coordinated his mind, brain, eyes, and hands. They demonstrate how he solved particular problems of interest to him over time — and detail the degree to which he changed his painting style as he did so. Configurations he returned to often — e.g. *Mont Sainte Victoire*, still life compositions and the bathers — are so fresh and yet so deliberately re-produced

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[21] The ideas of the historian Lawrence Gowing offer some intriguing commentary. Gowing speaks of Cézanne's special vocabulary and how pictorial definitions took on a special importance in Cézanne's later years when he attempted to explain his work to others. Gowing writes: '"Harmony"' is evidently not merely the tonal accord which a painter like Manet might possess, but the structure of correspondences. "Temperament" meant the compulsive force with which real painters had to deploy such structures' (Gowing, 1988, p. 10).

that studying them individually, together, and visually allows us to see how Cézanne's exceptional body of work evolved over the course of his life as he developed ways to first decode what he wanted to communicate and then to encode these perceptions and sensations in paint.

Each series reflects the process of problem-solving and, of perhaps greater importance, shows how this painter engaged anew with each painterly challenge. We may not perceive this active process in any one piece, but each series provides us with multiple examples that serve as a kind of x-ray into the development of the percept and the nature of the problems. When looked at as a group the composite records how he developed the tools he needed to be an effective communicator. Indeed, his focus on conveying his own sensation in relation to the objective, physical world led him to pursue a particular kind of style. Still, as his painting progressed, it was with painterly techniques and ongoing exploration that he developed an understanding of how to vitally capture the particulars of interest to him. As a result, early paintings, like *The Railroad Cut*, show he was coarsely documenting the world, and a later painting, such as *Still Life with Apples and Peaches*, shows how far he has come. Comparing the works one can only be impressed by how his touch has gained facility and dynamically captures something vital and alive even when he is presenting a static still life scene on a canvas.

Conclusion

Overall Cézanne offers an example of how an artist actively 'sees' and suggests there are key modalities that Zeki's analysis of art and the brain fails to address. Cézanne, however, does not offer brain-based reference points we can point to directly since we have no direct neural data on Cézanne. Therefore, in closing, it is important to look beyond Cézanne and ask if brain studies can illuminate art at all. Can scientific research add to our understanding of how artists in general evaluate hypotheses, as Gregory puts it, and can the data gleaned from studying these activities somehow bring art and the brain together? Do brain studies combine with art to show the interplay of different sensory, cognitive, perceptive, and emotional components?

I would propose there is much we can learn from neural studies, but we need to draw conclusions carefully. Some of the elusive variables that must be weighed include (1) how to compare studies of non-artists with data on practicing artists and (2) how to incorporate our understandings of artists for whom we have no neural data. In Cézanne's case, for instance, we can easily see that the vision and craft brewing in the younger artist later emerged in the older and more practiced painter. Contemporary research studies, on the other hand, have looked at artists neurologically and thus offer evidential data that is connected to both art and the brain. For example, one recent study documented several differences between the seeing of non-artists and that of a practicing artist, concluding:

> The 'seeing' process for everyone takes place in the visual cortex at the back of the brain, which receives nerve signals representing light captured in the retina. At the same time, increased blood flows are evidence of increased brain activity. . . . thanks to photographs of scanned 'slices' of different brains, it is possible to see that, when

> drawing a face, non-artists in the experiment used only the back of the brain, while Mr Ocean [an artist] used mainly the frontal part of his brain . . . . where you find emotion, previous faces, painting experience, intentions and so on . . . in essence, the control subjects were simply trying to copy what they saw. But [the artist] was creating an abstracted representation of each photograph. He was *thinking* the portraits (Riding, 1999, see also Solso, 1999).

Oliver Sacks' work on 'The Case of the Colour-blind Painter' is another study in this area, and a particularly important one in terms of Zeki's ideas because Zeki also studied this patient. In fact, when we look at the conclusions Zeki drew from his work with this artist we can see how Zeki's conclusion seem to miss important modalities related to artistic creation, artistic perception, and artistic vision — especially in relation to the brain. For example, Zeki describes the brain of this artist, Jonathan I., by explaining that

> This particular patient was himself an artist and his drawings of a banana, a tomato, a cantaloupe and leaves, which he made from memory, show a nearly perfect ability to reproduce forms coupled to a highly defective colour system . . . Before his attack, the patient had a passion for Impressionist art and the paintings of Vermeer. After the attack, he ceased going to the galleries — the aesthetic quality of the works had become completely different (Zeki, 1999b, pp. 82–3).

Zeki also tells us that 'when area V4, the colour centre, is damaged the consequence is an inability to see the world in colour' and therefore 'It does no good to ask a patient with a V4 lesion to appreciate the complexities of fauvist art . . . . These are aesthetic experiences of which such patients are not capable.' Yet these descriptions, while accurate, do not capture the qualities that brought the art into existence in the first place. In Jonathan I.'s case, for example, Zeki's statements would have been more convincing (and seemed more relevant to art) if he had attempted to neurologically consider how Mr I.'s art changed in relation to his brain. Yet Zeki says nothing about this. Nor does he consider why this artist, who had long painted in a colour-filled, non-representational style did not lose his appreciation of art. He not only *remained a painter after losing his ability to see colour*, the neurological evidence shows that Jonathan I. was able to substantially remap his brain after the tragic accident that deprived him of colour vision.

Several elements are important if we are to conceptualize Mr I.'s experience in relation to visual art in general. First, he continued to paint although he did not lose just his perception of colour, he also lost his sense of colour imagery, the ability to dream in colour and even his memory of colour. He continued to paint although colour ceased to be a part of his mental knowledge and his mind. More important, after a year or more of experiment and uncertainty, Mr I. moved into a strong and productive phase, as strong and productive as anything in his long artistic career. People applauded the black-and-white paintings he now produced and commented on what they characterized as a creative renewal. Perhaps of primary importance in terms of aesthetics is that very few people knew that this new phase was anything other than an expression of his artistic development. They failed to recognize that it was brought about by a calamitous loss (Sacks, 1995).

In summary, Zeki's approach is incomplete and perhaps misleading because he fails to explore the active relationship an artist forges with art, which includes something more complex and multifaceted than a Platonic Ideal suggests. In terms of this painter, who found new (and fulfilling) ways to communicate with paint, Zeki says that 'What is perhaps most interesting from the viewpoint of a Platonic Ideal, at least for colours, is that with V4 destroyed a patient can often not even imagine what colours "look" like; the stored memory record of the brain for colour is completely obliterated' (Zeki, 1999b, p. 83).

This conclusion neglects to factor in that the brain of the colour-blind artist changed as he derived a new world — with other ways of seeing, of imagination, and of sensibility. Had Zeki combined Mr I's artistic experience with the neurological evidence he might have perceived that Mr I. re-oriented his life and, as he continued to paint, his brain showed how plastic the cerebral cortex is. His colour-blind condition did not negate his creative practice. To the contrary,

> His initial sense of helplessness started to give way to a sense of resolution — he would paint in black and white, if he could not paint in colour; he would try to live in a black-and-white world as fully as he could. This resolution was strengthened by a singular experience about five weeks after his accident, as he was driving to the studio one morning. He saw the sunrise over the highway, the blazing reds all turned into black: 'The sun rose like a bomb, like some enormous nuclear explosion', he said later. 'Had anyone ever seen a sunrise in this way before?' Inspired by the sunrise, he started painting again — he started, indeed, with a black-and-white painting that he called Nuclear Sunrise, . . .'I felt if I couldn't go on painting,' he said later, 'I wouldn't want to go on at all' (Sacks, 1995, p. 14).

Clearly artists themselves give us insight into art and the brain. As they do so the work shows the open-ended process a visual artist uses. This open-ended process, in turn, explains that seeing is not simply about appreciating art and art is not simply an aesthetic object. Therefore, an adequate scientific explanation of art and the brain must go beyond an appreciation of aesthetic qualities and must also reflect on what a brain involved with the production of art reveals to us empirically. From this perspective neural studies can yield fruitful information. While more data is needed to form far-reaching conclusions, the data we now have has already indicated that (1) it is likely that artists and non-artists process differently when reproducing visual information (Solso, 1999) and that (2) cerebral 'mapping' may be drastically reorganized and revised 'not only following injuries or immobilizations, but in consequence of the special use or disuse of individual parts' (Sacks, 1995, p. 41).

What must be stressed in closing is that the open-ended nature of artistic discovery no doubt precludes reductive conclusions. Since discovery is at the heart of art practice it seems unlikely that we could ever reduce the experimental approach an artist uses to easily-definable brain functions and neural processes. There are too many variables we could never include in this kind of model. For example, we simply cannot predict how one's biological state may change — and be changed — by new forms of expression. Nor can we pretend to know what new tools will make possible. This does not mean we need to rest on philosophical

conclusions that will fill in the holes a reductive theory cannot address. Research continually shows we can broaden our understandings of all domains and, to date, researchers have shown that (1) our brains change as we use them, (2) art, too, changes over time, and (3) it appears that the brains of artists record the kind of work they do and how they do it. Undoubtedly, further studies can better connect the changes we see in art with neural functions and processes. Even still it is unlikely scientists will be able to establish hard-and-fast principles in this area given how artists work.

For example, it is unlikely hard-and-fast principles could decipher how to predict the 'laws of painting' Cézanne invented, particularly when we consider that ongoing painterly adjustments governed how he approached painting, and his approach shows that he never stopped inventing. What a study of Cézanne's brain might offer, if such a study were possible, is a better understanding of how our brains interpret the retinal images our eyes receive. Theoretical formulations that emphasize neural encoding in terms of Platonic Ideals, however, are likely to obscure the degree to which an artist's activity *is both active and cognitive*. Moreover, in the case of an innovative artist like Cézanne, interpreting his results in terms of 'stored memories' obscures the kind of seeing of interest to him. Cézanne was not attempting to transcribe what he had previously stored in his brain or what others had taught him. He was looking for ways to stretch beyond stored memories. His powerful canvases show this best, documenting a realization that deepened over time. In fact, almost two years before his death Cézanne summed up his work as an artist in a letter to his friend Louis Aurenche, writing:[22]

> You speak of my realization in art. I believe that I attain it more every day, although a bit laboriously. Because, if the strong feeling for nature — and certainly I have that vividly — is the necessary basis for all artistic conception on which rests the grandeur and beauty of all future work, the knowledge of the means of expressing our emotion is no less essential, and is only to be acquired through very long experience (Rewald, 1995, p. 299).

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[22] The following year, in a letter to Emile Bernard, Cézanne adds some perspective to the painterly experience, writing: 'It is, however, very painful to have to state that the improvement produced in the comprehension of nature from the point of view of the picture and the development of the means of expression is accompanied by old age and a weakening of the body' (Rewald, 1995, p. 315).

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