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Art and Science: A Marriage Made in Heaven?



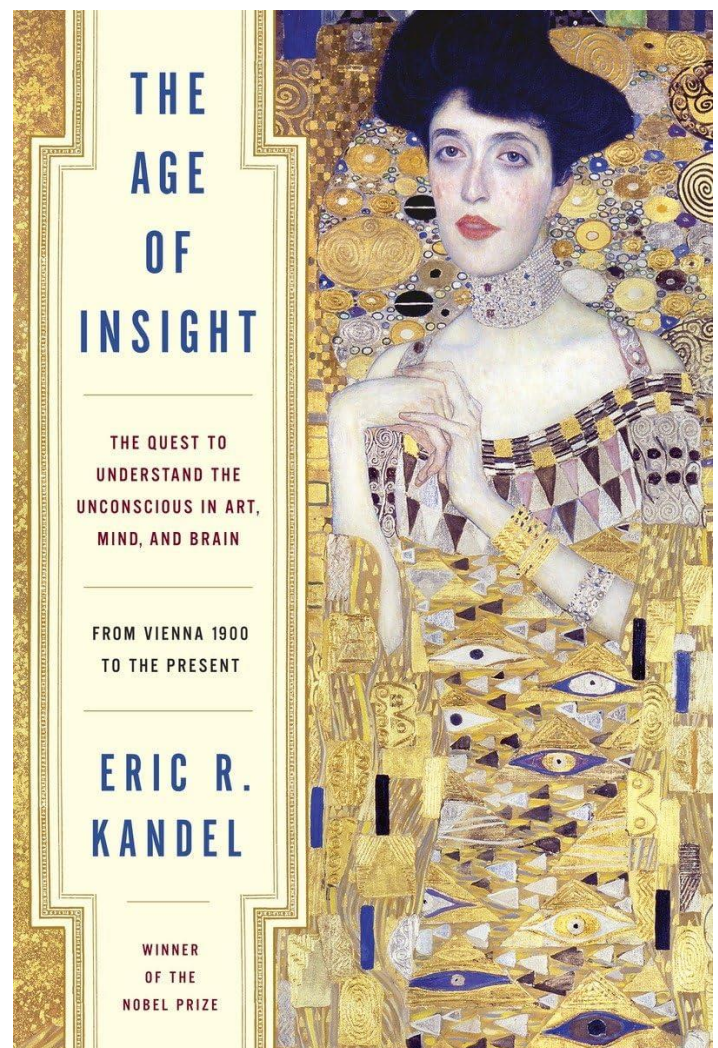
By **Raymond Barglow** January 25, 2013

The Age of Insight: The Quest to Understand the Unconscious in Art, Mind, and Brain, from Vienna 1900 to the Present

by Eric Kandel

Random House, 2012

At the turn of the past century, Vienna—even more than Berlin, Paris, or London—stood out as the European city most friendly to radical innovation of every kind. In science and art, economics and politics, and architecture and urban design, new paths into the future began in Vienna. Meanwhile, the Hapsburg Empire, ruled from Vienna and split by rivalries of social class and ethnic identity, approached the edge of collapse. Helping us to understand this era, which introduced the modern world that we inhabit today, is Eric Kandel's book, *The*



Age of Insight. Kandel seeks to integrate cultural history with psychoanalysis and neuroscience, and if there is anyone who can bridge these disciplines, it is this author, whose life history has involved him deeply in all three. Born into a Viennese Jewish

family in 1929, Kandel escaped the city in 1939, less than a year after Austria was annexed to Germany. His family settled in Brooklyn, where he graduated from high school in 1944. After attending Harvard, where he majored in history and literature, Kandel went to the New York University Medical School, completed a residency in psychiatry, and pursued an interest in the neurobiological bases of learning and memory. In 2000, he received a Nobel Prize for research on the physiological basis of memory.

Neuroscience, Kandel argues, can help to close the traditional gap between scientific and nonscientific forms of inquiry. To be sure, conceptual boundaries that are often taken for granted—for example, the boundaries between science, art, and spirituality—can get in the way of an integrated understanding of the world we inhabit. On the other hand, the truths we seek in the arts and humanities may lie beyond the explanatory reach of natural science. I find it unlikely that neuroscience can fulfill the promise that Kandel holds out for it.

Art and Science, Vienna 1900

Central European culture changed fundamentally near the beginning of the past century, introducing new ways of thinking about and representing human life and the world. Essential to this transformation, Kandel argues, was an upsurge of interest in scientific inquiry, particularly in the area of medicine. In Vienna, the leading figure in medical science was Carl von Rokitansky, a physician and anatomist who insisted that medical theory and practice be made thoroughly evidence-based. He served as the dean of the medical school, presided over the Physician's Society of Vienna for over a quarter century, and advised the government in the era of Austrian high liberalism. Kandel is convinced that Rokitansky's scientific worldview was widely influential:

The five giants [Sigmund Freud, the author Arthur Schnitzler, and the painters Gustav Klimt, Oskar Kokoschka, and Egon Schiele] who emerged from Vienna 1900 could trace their immense accomplishments in psychoanalysis, literature, and art—directly or indirectly—to the scientific influence of Rokitansky's view that surface appearances are deceptive and that to obtain the truth, we need to go deep below the surface.

It is true that the Secessionist Movement that Klimt helped to found in 1897 turned away from visually realistic representation, conceding that enterprise to the field of photography. Art's new, modernist paradigm, Kandel writes, sought truth no longer in life's outward appearances, but rather in the private "inner world" of the psyche. Kandel submits that science facilitated this transformation: "Klimt's use of biological symbols to convey the truth beneath the surface was paralleled in the work of Sigmund Freud, Arthur Schnitzler, Oskar Kokoschka, and Egon Schiele."



Berta Zuckerkandl Salon. Credit: Mahler Foundation

Kandel eloquently tells the story of the many social affiliations that connected Vienna's scientific and nonscientific communities. Gustav Klimt, for example, attended Berta Zuckerkandl's salon in Vienna, where the city's artists, writers, and scientists gathered. There Klimt met Zuckerkandl's husband, a medical colleague of Dr. Rokitansky, who introduced Klimt to biology and Darwinian evolution. As a result, Kandel suggests, Klimt began to paint images of cells and other biological forms into his canvases, as he does in the portrait "Adele Bloch-Bauer I," which appears on the cover of Kandel's book.

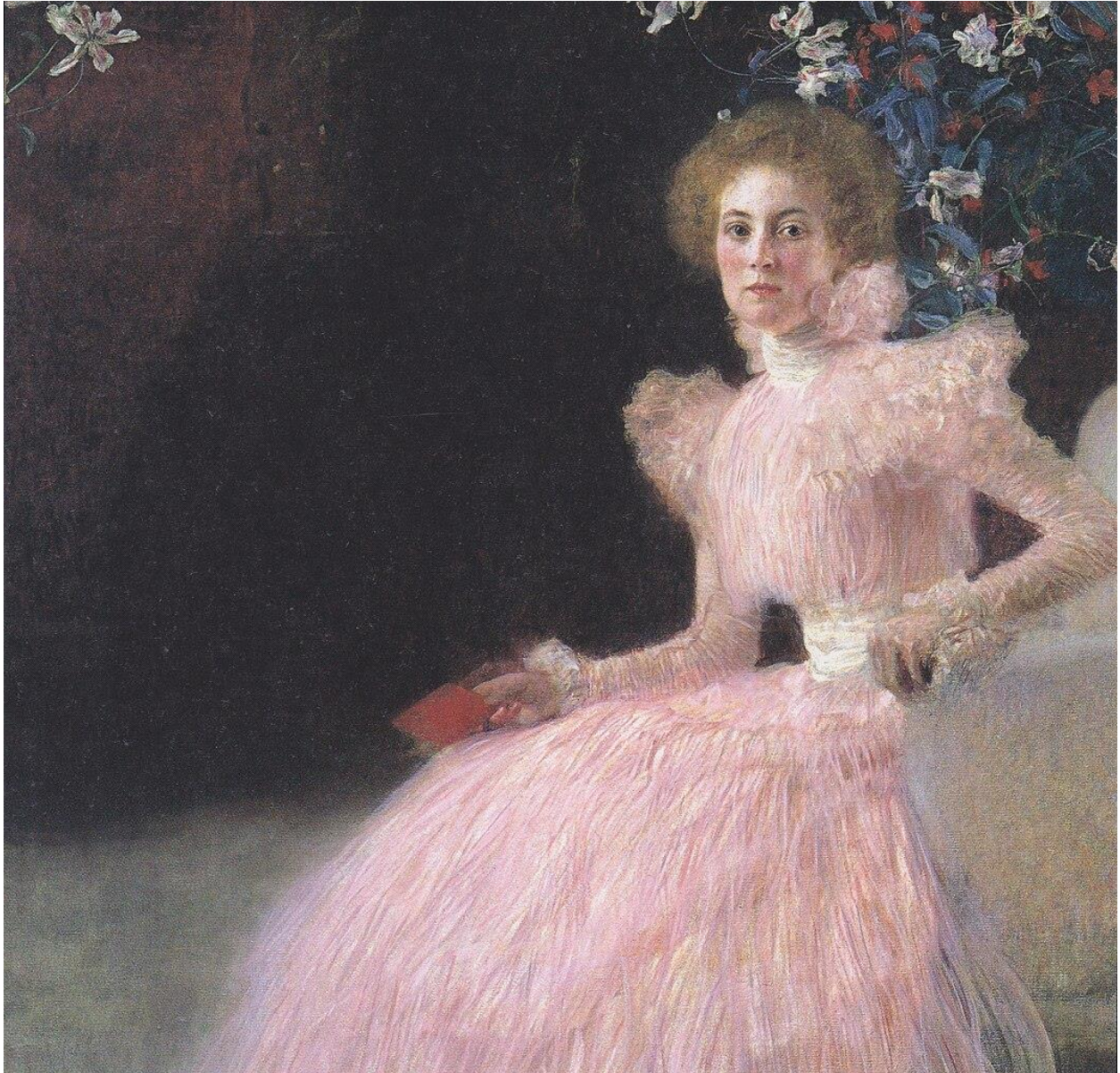


Klimt, Adele Bloch-Bauer I (1907). Credit: Wikimedia Commons/Neue Galerie

This portrait exhibits hallmark features of Klimt's Golden style: three-dimensional perspective is flattened out, and the outlines of the figure in the painting are nearly effaced in favor of an opulent display of her clothing and surroundings. Upon her dress, Kandel writes, are fertility symbols—"rectangular sperm and ovoid eggs"—that derive from Klimt's scientific interest.

Is Klimt's art influenced by the worldview of Vienna's scientific community, with its pursuit of "truth beneath the surface," as Kandel calls it? Perhaps, though a problem with this hypothesis is that in those of Klimt's paintings that include biomorphic forms (e.g., the cell imagery in the painting above), there is the *least* expression of the subjectivity or

inner life of the sitters for these paintings. And in those Klimt paintings where subjective life is *most* evident (e.g., the portrait of Sonia Knips below, done in the realistic manner that first made Klimt famous) there are no such biomorphic forms at all.



Klimt, Sonia Knips. Credit: Wikimedia Commons/Belvedere Museum

Klimt's Art Nouveau style (*Jugendstil* in German), as it developed in France and England as well as in Central Europe, typically flattened not only the physical surroundings of a portrait but the discernible subjectivity of the sitter as well. Klimt is no exception in this regard: the style renders opaque whatever the sitter may be thinking or feeling. The effect, as in the portrait of Adele Bloch-Bauer, is to make Klimt's

biomorphic motifs all the more striking, although their use aligns him not with the liberal scientific temper of his time but with an unscientific biological determinism that became popular in the art, education, and politics of fin-de-siècle Vienna.

Darwinism, as it was conveyed to Europe's German-speaking public through philosophers like Arthur Schopenhauer and artists like Max Klinger, was interpreted to mean that human fate is dictated by gender, heredity, and race. Klimt's art during this period was informed by identification of women with primal nature, not by science.



Klimt, Fish Blood (1898). Women are represented as immersed in nature, with no control over their path in life or destiny. Credit: Wikimedia Commons/public domain

Klimt's Rejection of the Science of His Time



Klimt wouldn't, in any event, have needed any scientific inspiration to create psychologically perceptive paintings. By 1900, artists had been looking beneath "the surface appearances" for centuries. For example, Rembrandt's late portraits and history paintings seem to provide a window into the subjectivity of his sitters. Rembrandt, of course, didn't explore subjectivity in just the same way that artists in Vienna did centuries later. But the innovations introduced by Klimt, for example, show no signs of influence by a scientific worldview.

Rembrandt, Self-Portrait (1669). Credit: Wikimedia Commons/National Gallery



Klimt, Medicine Hygieia (1901).

Credit: Wikimedia

Commons/public domain

In fact, Klimt found himself at odds with Vienna's scientific establishment when he was commissioned to paint the ceiling of the Great Hall of the city's university. The resulting works, "Medicine," "Justice," and "Philosophy," created between 1900 and 1907, were repudiated by the faculty as obscure, "pathological," and dismissive of the capacity of science to understand and better the world.

Instead of glorifying science, as the university community anticipated, Klimt mounted a rebellion against scientific rationalism, inspired possibly by Schopenhauer's view, quite popular at the time, of "the world as will, as blind force in an eternal circle of bringing forth, loving and dying."

Kokoschka and Science

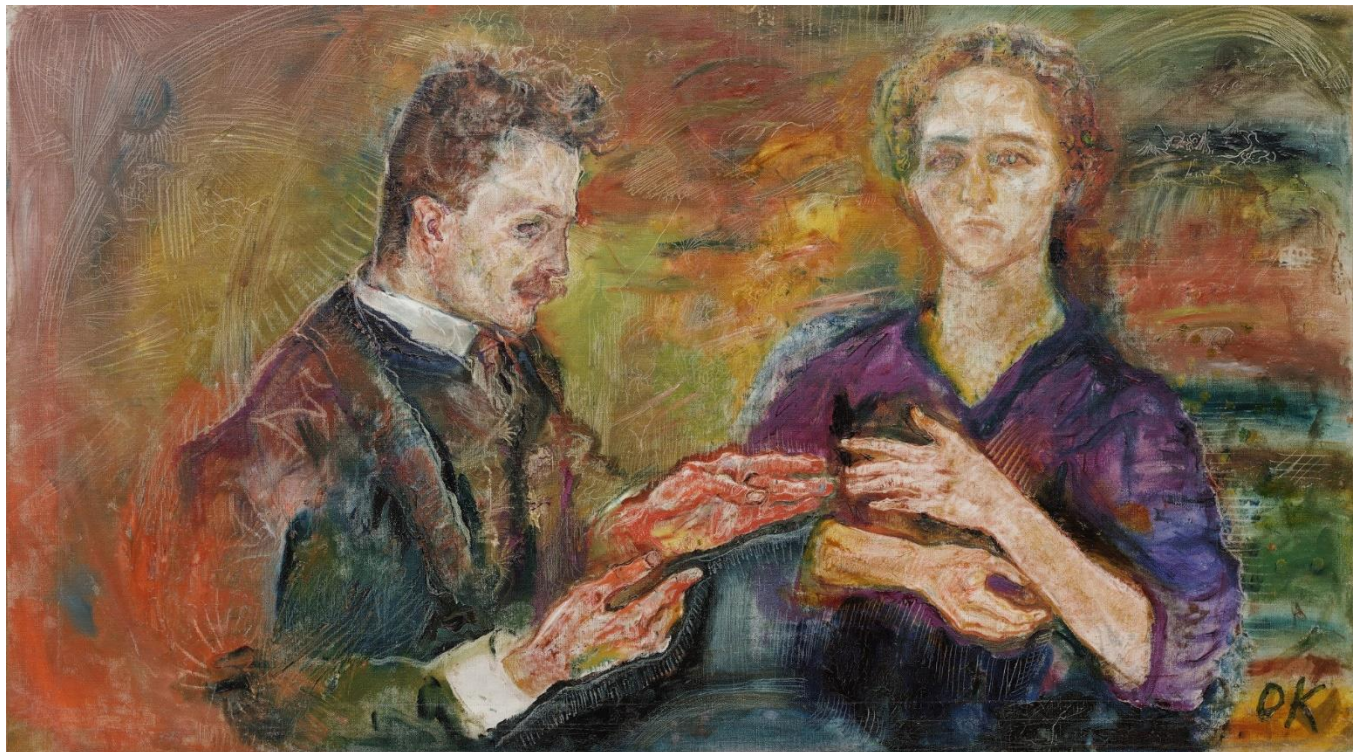
What about the other two visual artists whom Kandel discusses: Kokoschka and Schiele? Does their work show any sign of scientific influence? Schiele's art—his representations of child as well as adult sexuality, for example—is taboo-breaking but shows no interest in the explorations or insights of science. And although Kokoschka, like Klimt, found the trappings and rhetoric of science artistically useful, neither appears to have shared the rationalist worldview that scientists like Rokitansky advocated.

It's true that Kokoschka's friend Adolf Loos, an architect who helped him sell his paintings, characterized the painter's skill in scientific-sounding language. "Loos was convinced I had X-ray eyes," Kokoschka wrote. Indeed Roentgen's discovery of X-rays in Munich in 1895 received a lot of attention in the media and fed the public's fascination with concealment and unmasking. This popular interest in exposing "what lies beneath

the surface,” as an X-ray image does, gave critics like Adolph Loos a new way to advertise Kokoschka’s work to the world.

Yet Kokoschka’s paintings and drawings don’t look like X-ray images, and Kokoschka himself didn’t express an attraction to or sympathy with scientific methods or aims. Rather, as art historian Claude Cernuschi writes, “Connecting Kokoschka’s work with the transparency of X-rays, arguably, was a deliberate attempt on his part to capitalize on the powerful influence exerted by this discovery.” Kokoschka, and Schiele too, as historian Robert Jensen points out, were not above gaming the commercial art world in order to market their drawings and canvases. And one way to do that was to go along with an accounting of their artistic inquiry as scientifically minded.

Kandel regards the work of Sigmund Freud, Viennese founder of psychoanalysis, as scientifically inspired, and he gives a Freudian gloss to Kokoschka’s intention to “depict the inner life of his sitters” in his portrait of the art historians Hans Tietze and Erica Tietze-Conrat.



Kokoschka, Hans Tietze and Erica Tietze-Conrat (1909). Credit: WikiPaintings

The painting, according to Kandel, exhibits “distinctive sexualized gestures and bodily positions.... With their eyes looking in different directions, they seem to be caught in a

revealing, sexually charged conversation with their hands, a conversation that also involves the viewer. They emerge as two independent people, each with an inner direction and sexual needs.”

There is, as Kandel notes, a striking emotional intensity in the relationship between the figures in this double portrait, mediated by the prominent hands of the sitters, but why read their charged interaction in terms of sexual tension? Kandel writes that “the opposite poles of emotion—approach and avoidance—are invariably informed by sexuality or aggression; moreover such instinctual strivings are evident in children as well as adults.” But such orthodox psychoanalytic interpretation of the art of Kokoschka or Klimt or Schiele—interpretation that in any event doesn’t qualify as scientific—is not supported by the art itself, by its creators, or by those critics not predisposed to favor Freud’s metapsychology.

Kokoschka in fact appears to have had minimal interest in scientific method and regarded his own powers of observation as clairvoyant. His friend J.P. Hodin, an art historian, reported that “Kokoschka hated both Newton and Darwin.” In 1912 Kokoschka voiced his quite unscientific worldview in “On the Nature of Visions”: “Consciousness is the source of all things and of all conceptions. It is a sea ringed about by visions.”

The forces of science and art that Kandel finds mutually sympathetic in fin-de-siècle Vienna were actually at loggerheads. Historian Carl Schorske argues that in Vienna at this time there was a sharp conflict between two cultures, one that is “moral, political, and scientific,” and another that is “religious and aesthetic.” The former, embraced by thinkers and scientists like Rokitansky, derived from Enlightenment rationalism and nineteenth-century liberalism. The latter harked back to the Counter-Reformation and challenged liberal ideals of reason and objectivity in favor of feeling, instinct, and—among increasing numbers of Austrians—anti-Semitism and nationalism. Social democracy sought to combine these traditions, joining scientific analysis of the human condition to a yearning for freedom and social justice that would lift up the weak and establish authentic community.

The alienation from Enlightenment individualism and rationality in Vienna near the beginning of the twentieth century receives insufficient attention in Kandel’s book. The collapse of liberalism during this era was accompanied by a retreat on the part of

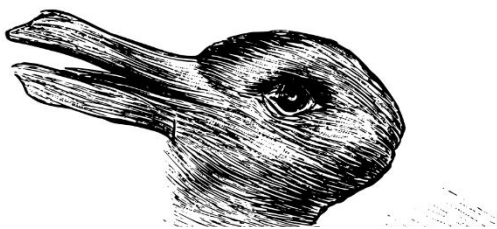
intellectuals and artists, many of whom were Jewish, away from political engagement into more subjective, intensely personal explorations. Their angst and despair fed into innovations that rejected inherited traditions and made Vienna a birthplace of modernity: a world capital of creativity in arts and letters, architecture, philosophy, and music.

Schorske does not, to be sure, offer a total explanation of spiritual crisis and cultural transformation in Vienna at this time, but he does capture an important historical dynamic. The existential anguish experienced by Vienna's artists and writers during this era, abandoning the comforting assumptions and traditions of the past, was invisible to the concepts of orthodox science.

Gestalt Psychology: A Scientific Approach to Art

Whereas the visual artists whom Kandel discusses do not appear to have been influenced significantly by Rokitansky's science, their contemporaries in the Vienna School of Art may have been so influenced; they did want to make their discipline rigorously scientific (*wissenschaftlich*). In Part II of his book, Kandel describes the school's innovative approach to art criticism that began with Alois Riegl in the late nineteenth century and culminated in the work of Ernst Kris and Ernst Gombrich in the 1930s and 1940s. At the core of their inquiry, explains Kandel, were the scientific

**Welche Tiere gleichen ein-
ander am meisten?**



*Duck-Rabbit Gestalt Image. Credit:
Fliegende Blaetter, October 23, 1892,
p. 147*

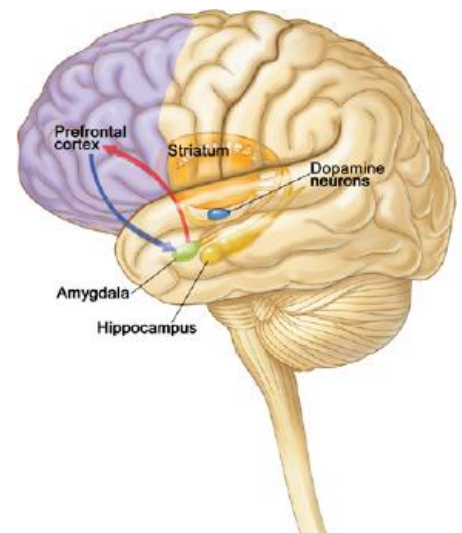
principles of Gestalt psychology, which hold that the data presented to us by a visible object require integration by the mind in order to make any sense at all, and that the human ability to "evaluate sensory information holistically and assign it meaning ... is largely inborn."

Indeed it's clear that our visual experience is not determined simply by the pattern of light rays that strikes our eyes, as is evident in an image that appeared in the German magazine *Fliegende Blätter* in 1892. The mind can read this image as either a duck or a rabbit. Every act of perception, Gestalt psychologists held, requires that the mind interpret the data presented to it. In this sense the perceptual world is not simply given to us, it is a world that we create.

Toward a Neuroscience of Art?

In Part III of his book, Kandel adds an underlay of neurobiological explanation to Gestalt psychology's account of the mind's processing of visual images. The visual system, he points out, "creates representations in the brain (in the form of neural codes) that require far, far more information than the modest amount the brain receives from the eyes. That additional information is created within the brain." Kandel reviews the myriad ways in which our brains generate our perceptions and thoughts, and he predicts that in the coming years, "neuroaesthetics" will advance this science even further. "One of the aspirations of this new science," he writes, "is that the insights it offers will lead us to a deeper understanding of ourselves by linking the biology of the mind to other areas of humanistic knowledge, including a better understanding of how we respond to and perhaps even create works of art."

Kandel reviews the current state of research on this subject and cites, for example, the integrative role of the amygdala, "the brain's orchestrator of emotions." But will more knowledge of this kind cast appreciable light on either the experience or the creation of art? There is in Kandel's book a disconnect, I find, between the chapters about art and those that, replete with diagrams of the brain's activities, are about neurobiology. To be sure, when we are perceiving art or anything else in our environment, our brains are processing incoming physical data in very complex ways. But it doesn't follow from this fact that neuroscience, however refined it becomes in the future, will help to explain the *meaning* of a painting or drawing made by Klimt, Kokoschka, or Schiele.



Kandel, Interaction of prefrontal cortex, striatum, amygdala, and hippocampus

Once we've brought the insights of Gestalt psychology to bear on esthetic experience (which is what art historians like Kris and Gombrich did decades ago), it's not evident that neuroscience has anything significant to add. Consider, for example, Kokoschka's self-portrait done in 1918 at the end of the war. Although the face in this portrait is visually distorted—it's far removed from photographic accuracy—we immediately perceive it as a human face. Gestalt psychology tells us that holistic image processing makes facial recognition possible, even when that processing is based on very little

“realistic” visual input. And it is this capacity of the mind that enables an artist like Kokoschka to reshape the features of a face without making it unrecognizable.

In this way, Gestalt psychology helps to explain how Kokoschka is able to express subjectivity very differently from, say, how Rembrandt expresses it. And it is also true that the principles of Gestalt psychology can, in turn, be explained in neuroscientific terms, along the lines that Kandel suggests. But will such neuroscientific knowledge alter in any significant way our experience or understanding of this self-portrait?

Without invoking neurobiology, Kandel comments that in Kokoschka’s self-portrait, “His face and eyes express a sadness reflecting not only ... the loss of Alma Mahler three years earlier ... but also a physical injury sustained in the war, a stab

wound that pierced his left lung.” Although Kandel’s reading of this portrait in terms of events in the artist’s life is speculative, it is certainly *relevant* to what a viewer sees or might see in the painting. Also relevant are remarks on style: the thick layering of paint and the writhing brush strokes contribute to the expressive effect of Kokoschka’s self-portrait, as does his use of color—the extreme contrasts of light and shadow, the reddish tint of fingernails and ear, the watery shades of blue running into gray, muddy green, and black, including the inky splotches that intrude from the right. But if we now go on to tell a deeper scientific story about the Angstrom wave frequencies of the reflected light and their reception by the optical system of the brain, we’re abandoning the painting in favor of science that doesn’t help to explain a viewer’s experience.



Kokoschka, Self-Portrait. Credit: WikiPaintings

Art, Neuroscience, and Social History

While Kandel recognizes that “it is very unlikely that a complete unification of the biology of the mind and of aesthetics will occur in the foreseeable future,” he notes that “we are still at an extremely early stage in thinking about creativity and artistic skill in neural terms, but new avenues of investigation are opening.”

“What we require,” Kandel writes, “is a set of explanatory bridges across the chasm between art and science.” But art and neuroscience are not akin to points of geography that an engineering construction, however elaborate, can span. The apparent distance between the scientific and the artistic parts of Kandel’s book isn’t a consequence of the immaturity of neuroscience. The problem is, rather, that the *kind* of explanation that neuroscience offers does not mesh significantly with the *kinds* of accounts that we give in experiencing or talking about art.

This does not mean that art always travels along paths that have no connection with science. For there have often been convergences. Brunelleschi’s dome for the Florence cathedral is informed by his knowledge of engineering. Leonardo’s handling of light, shadow, and perspective draws upon his scientific studies. Rembrandt’s Anatomy Lesson of Dr. Tulp displays the human body as understood by seventeenth-century medical science. Homes designed by Frank Lloyd Wright express principles of ecology.

Such relationships did not, however, align science and the visual arts in Vienna at the turn of the past century. On the contrary, these two communities shared neither methods nor aims, at a time when the Hapsburg Empire was approaching the edge of collapse and Vienna’s intelligentsia was driven in divergent directions by centrifugal forces of class, ethnicity, and ideology. During these same decades, extremist nationalism and anti-Semitism were gaining momentum in Austria. Had there been more dialogue and affinity of the kind that Kandel projects in his book, European history might have taken a quite different course.