

Art & Physics I



Dr Clare Z

William Blake, mystic and artist, “. . . tried to awaken the West from the trance cast by linear perspective in the arts and determinist logic in the sciences.” Shlain

He warned that materialistic science was destroying imagination. Blake was also a poet and one of his most well-known works is:

*To see the World in a Grain of Sand
And a Heaven in a Wild Flower,
Hold Infinity in the palm of your hand
And Eternity in an hour.*

This is not only mystical and imaginative but correlates with a late twentieth century holographic perspective in science and can be described by the quantum concept of entanglement.

Christian Huygens claimed that light behaves as waves, while Newton described light as corpuscular or in particles that shoot in a straight line through space.

In 1801, Thomas Young showed that light behaves as waves. Prior to all three of these scientists, the painter Francesco Grimaldi thought that light could flow around objects.

He was noticing the fringes of interference patterns of light as waveforms although he had no way to use mathematics to prove this—he painted it instead.

Two centuries earlier, Leonardo da Vinci claimed that light travels as waves.

At the speed of light, space continues to contract until there is height and depth but no length. Traveling at half the speed of light, objects appear to elongate vertically, tops begin to curve with increased speed and everything arches.

Edouard Manet created an uproar in 1863 when he unveiled *Le Déjeuner sur l'herbe* (*Luncheon on the Grass*).

Many art critics consider this moment the beginning of modern art. Manet had violated laws of perspective and eliminated a middle ground. He lit up the painting from different directions.



In a special train traveling at half the speed of light objects appear to be flattening, background moves closer to the foreground contacting the middle ground; perspective is flattened.

These same illusions were used in reference to Manet's *Le Dejeuner sur l'herbe*.
Width is contracted and height is increased and curved.
Shadows are less crisp; contrasts lessen.

The painting made no sense to most and was considered immoral, as well.

Manet challenged Aristotle's logic and Euclid's geometry calling into question reason and perspective.

In *Music in the Tuileries*, Manet curved the tree trunks, and he also curved and camouflaged the horizon line. “The elucidation of the concept of ‘curved spacetime’ and its place in the physical world was still fifty years away, but in the 1860s this prescient artist anticipated the idea and tantalized his puzzled viewer.” Shlain



In 1874, Manet's horizon line floats off the canvas in *Boating*. His contemporary, Edgar Degas also avoided using a horizon or vanishing point. They were more concerned with capturing a moment in time.



Paul Cézanne devoted himself to the study of space, light, and matter. Cézanne's "sense of timelessness" and his "abandonment of the convention of linear light" were precognitive when one considers how physicists would revise space, time, and light. Shlain

In his later works, light became ever more diffuse.

Cézanne discards the idea of capturing transient effects.

In the world he paints there is no time of day—no noon, no early morning or evening. There are no gray days, foggy days, no "effects" of season or weather. His forms exist in a universal light in the sense of directed rays from a single source, not even the sun. It is not light as an optical phenomenon to be investigated and experimented with. It is uniform and enduring light, steady, strong, clear and revealing, not a light that flows over objects and not a light that consumes them. It is light integral to the canvas; it is "painted in" with every stroke of color. It is static and timeless light.

— Art historian, John Canady

Artists and physicists had been arranging objects in space as if they had no affect on the surrounding space. Cézanne showed that “*space was not empty*” by “interlocking broad planes of space with equally broad planes of mass” (Shlain). He also had multiple perspectives with points of view that were not in alignment with the “notion of a privileged place to stand and view the painting” evident in *Still Life with Fruit Basket*. Shlain

The otherwise straight line of the table is broken and discontinuous. He viewed his scenes from the “entire periphery of vision” modernizing preliterate and pre-Renaissance art that had included this sort of naïve view of the world.



“Manet first curved the straight line of the horizon, Monet blurred his straight boundaries, and Cézanne splintered the straight edge of his tables.” Shlain

By *seeing* in new non-Euclidian ways, people could begin to *think* in new ways as well. “It would take the elegant calculations of an Einstein years later to provide the proof in black and white of what had been stunningly accurate artistic hunches expressed in form and color.”

Shlain

Before Einstein's revelation of relativity, the Western view of object permanence was taken for granted.

Piaget's studies indicate "an infant's rudimentary perceptions of time and space and those experienced by an observer traveling at lightspeed" are very similar. Shlain

A child's very nature does not allow the experience of a Cartesian split of inner and outer. A systematic enculturation and repression results in the unconscious hidden material present in adults.

Carl Jung noted that the source of magical thinking and archetypal symbology exist in a universal pool from which children, indigenous peoples, and inspired adults draw their creativity.

“The Western academic tradition, based on alphabet literacy and perspective, imposed upon the eye a linear method of seeing the world. While the eye functions naturally to let light and color in from the outside, line and form derive from notions influenced by what we already know; they are then projected *out* from the eye upon the world—the opposite process for appreciating color. We have a name for almost every form and shape we see.”

“In Sanskrit, the word for ‘form’ and ‘name’ was even the same. What we see is preconditioned by what we saw in the past, so that knowledge of the names of things prevents us from seeing new things afresh.”

Shlain

The repression of children is evident in art until the modern era when Edouard Manet painted *Boy with Sword* and the *Fifer*.



Pierre-Auguste Renoir and Edgar Degas began painting children, and Pablo Picasso painted the age group that was missing in images until then—ages five to fifteen.

But it was Henri Rousseau who first painted *as a child*. Self-taught, he used his imagination and dreams to paint the visions of a child-man.

Werner Haftmann stated that Rousseau:

“... was wholly under the spell of his own magic; he lost himself so completely in his pictorial world that sometimes he had to fling open the window in order to escape the eyes that were staring at him from out of the prehistoric plants of his strange mythical forests.”



Cambridge mathematician, Charles Dodgson (Lewis Carroll), authored *Alice's Adventure's in Wonderland* forty years before the special theory of relativity. In Wonderland, laws of sequence are violated and reality is relative to the observer.

Distortions of space and time, the non-permanence of objects, and their plasticity, are integral to the story. In Carroll's *Through the Looking Glass*, the rabbit is heard to say, "The faster I go, the behinder I get"—a situation peculiar to spacetime at the speed of light.



Children's art and so-called primitive art have a great deal in common—both tend to create their own world rather than simply “match” it. Their art is holistic with no single perspective. It may be looked at from many directions with no reference to a background.

Space is not static and measurable, so each object fills its own space and may have magical powers.

Space was thought to be “flat, homogenous, and inert,” was separate from time, and had no interaction with “objects placed in it.”

Shlain

The ether was believed to be a motionless backdrop against which time could be measured.

Einstein showed that “there is not one privileged inertial frame—or place in the ether—that is at absolute rest” and that “the speed of light is constant for all observers regardless of how fast and in which direction they are moving.”

Shlain

“The emergence of nonrational styles of art merely served as the introduction to the unimaginable notions of space, time, and light that were to occur in the new physics in the early years of the new century.” Shlain

“Einstein’s realization that light (which is color) is the quintessence of the universe paralleled the apotheosis* of light by the artists. Before Einstein made his discovery, Claude Monet announced that ‘the real subject of every painting is light.’ Echoing this sentiment, Einstein later commented, ‘For the rest of my life I want to reflect on what light is’.” Shlain

*highest point of development

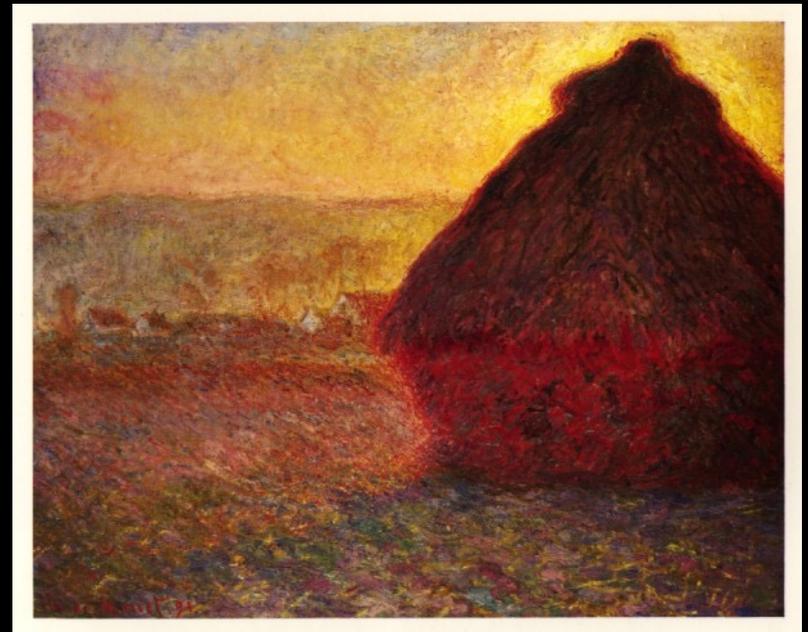
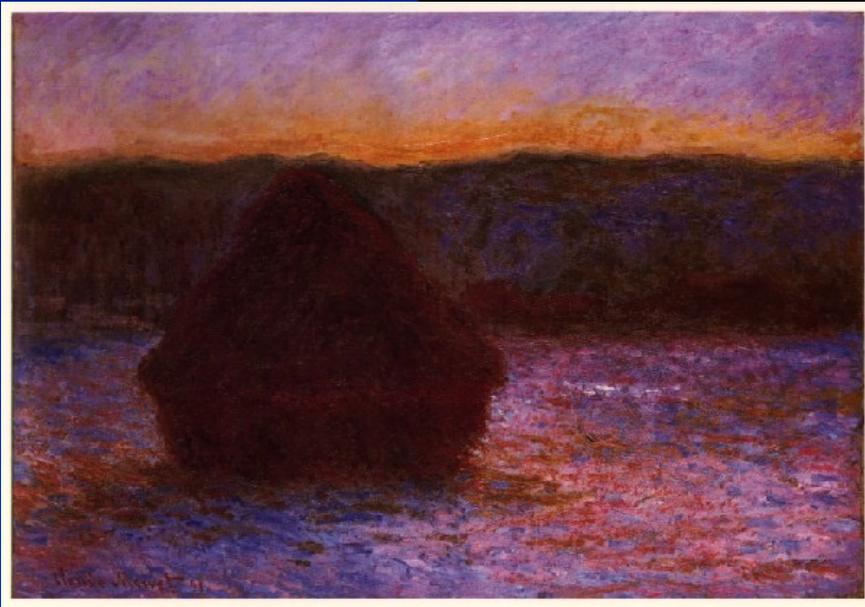
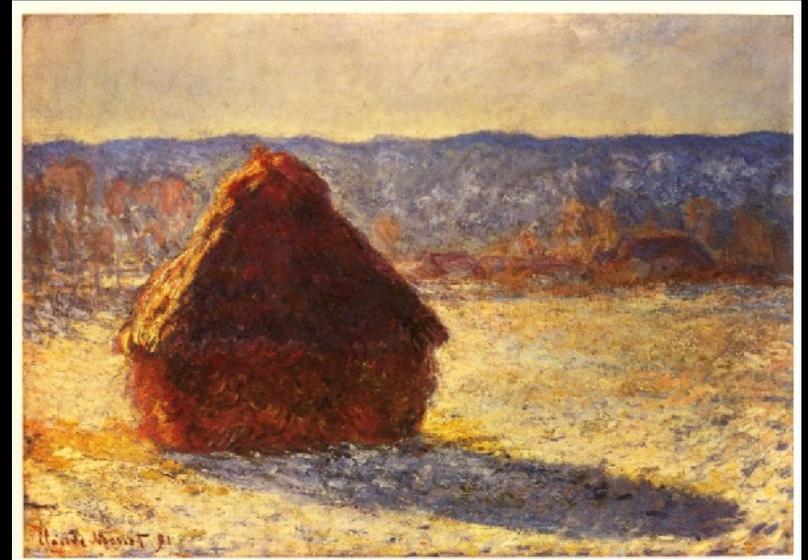
Claude Monet examined the dimension of time. Rather than capture a frozen moment of time, he introduced series painting.

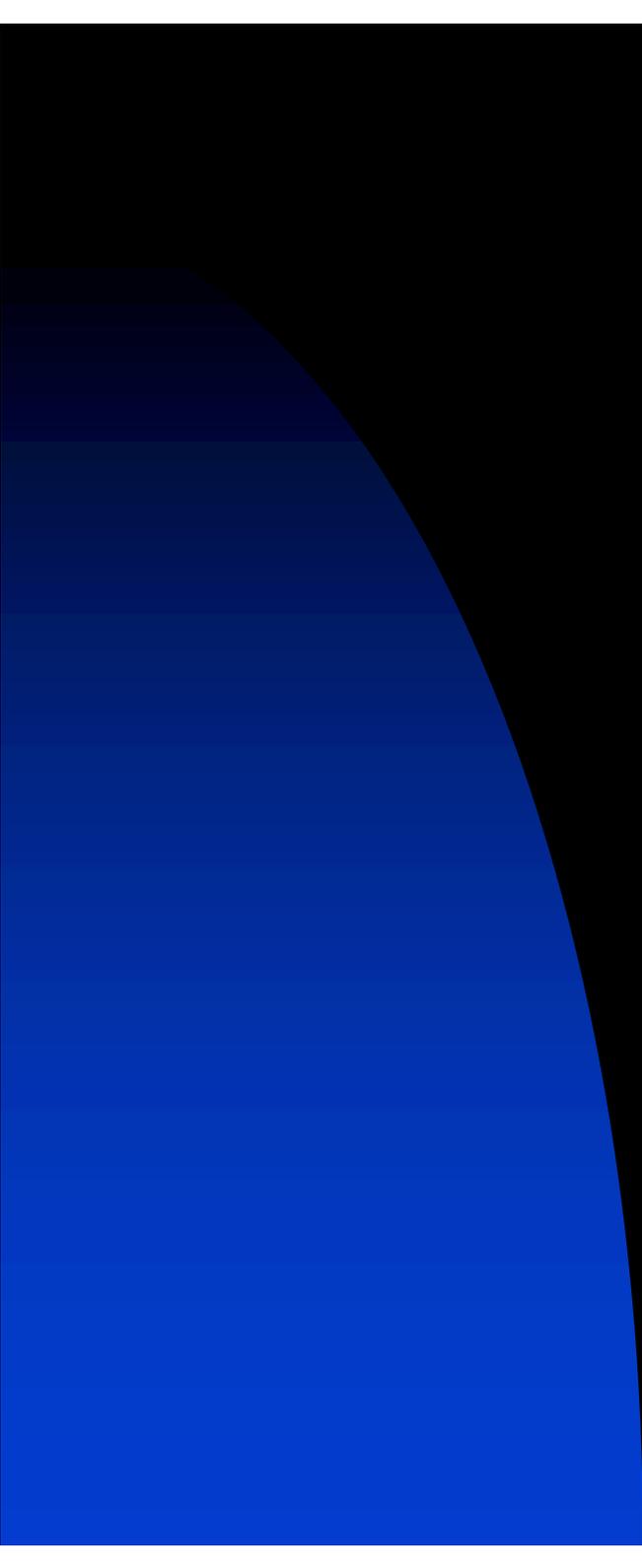
“Monet, a simple man with a child’s outlook on life, and no formal academic training, had seized upon a great truth about time before anyone else; an object must have duration besides the three extensions in space.”

Shlain

Monet painted at different times, in series, showing how an object changed through *time* even when viewed from the same place, while Cézanne moved his easel to different areas, different points in *space*, to view an object. “Both masters enlarged upon the idea of the double exposure first expressed in modern art by Manet, and each developed it using a different coordinate.”

Shlain





Spacetime is constructed in such a way that the distance traveled by light rays is always zero. Light rays . . . travel no distance whatever in spacetime. In the world of spacetime we are in contact with the stars.

Physicist Edward Harrison