

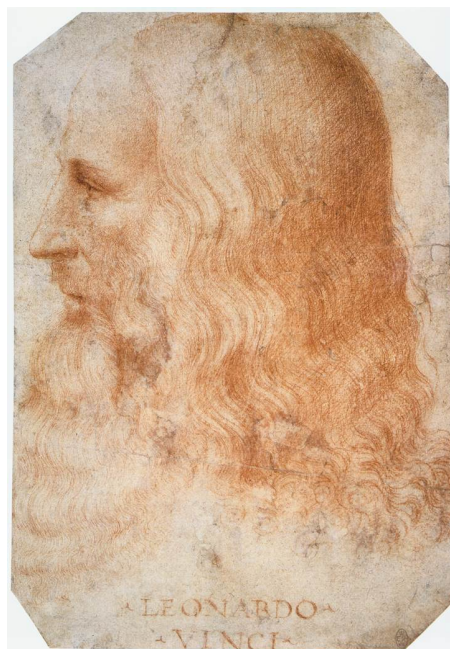
# The Role of Visual Literacy in the Birth of Observational Science

Deborah Curtiss

## Abstract

*De Humani Corporis Fabrica*, a seven-volume opus by Andreas Vesalius, published in 1543, is possibly the most elegant synthesis of science and visual art in the history of humankind. Today, the frontiers of discovery in the 21st century reside in the minutiae of the human brain and the magnitude of the cosmos. Similarly, vision and visual literacy played an essential and inestimable role in the development and revelations of observational science in the Renaissance when some inquisitive individuals of the 1500s, notably Leonardo and Vesalius, delved into the constructs of human and animal anatomy. And others—such as Copernicus, Tycho Brahe, and Galileo—looked to the heavens to reveal its mysteries. A brief history of these developments is followed by a creative exposition of their influences upon me as a visual artist.

## Introduction and Visionary I



1515 Portrait by Francesco Melzi

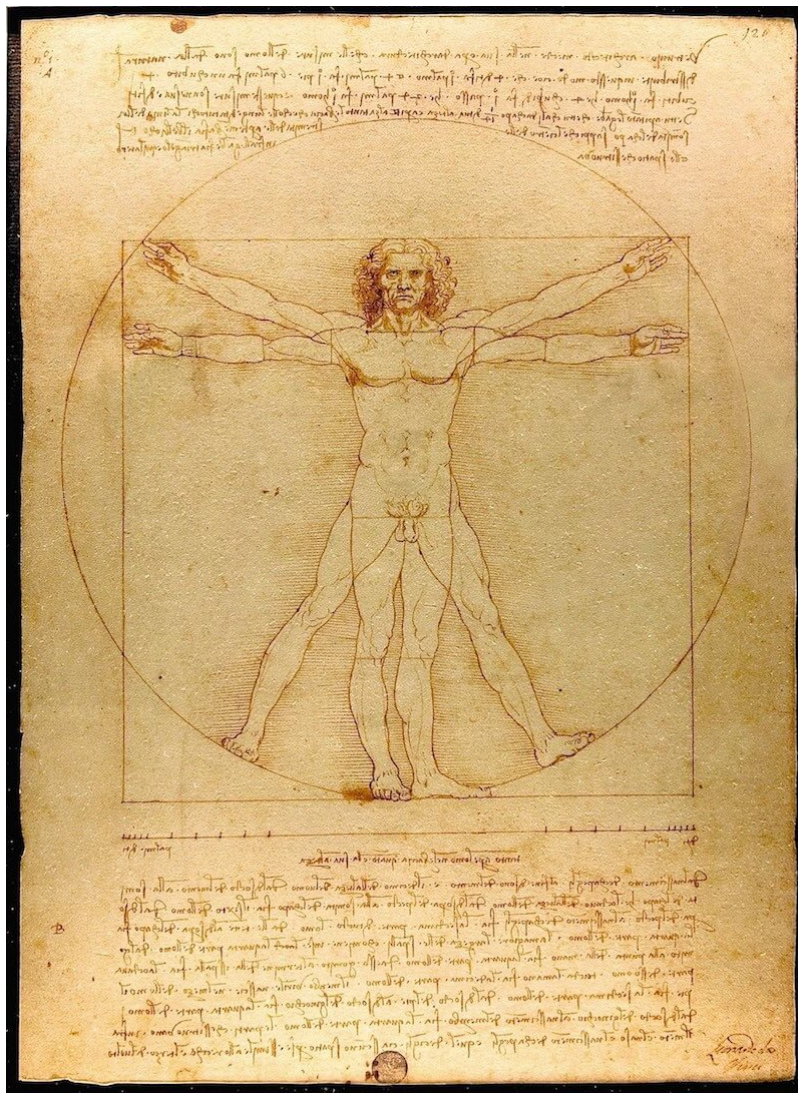
Throughout history, artists have attempted to render the world as they saw it, so to understand reality more clearly and more thoroughly. Awakening from the Middle Ages, no artist exemplifies this exploratory nature more than Leonardo da Vinci (1452-1519). With relentless pursuit, he scrutinized and recorded thousands of details about botany, the mechanics of motion, ballistics, cartography, and experiments with flight.

To an unprecedented degree, Leonardo's mastery of perspective made accurate drawings possible, which was, as in rendering the world as he saw it, equally essential in the study of anatomy. The invention of mass printing, just a few years prior to Leonardo's birth, enabled reproduction of his studies to inform others and inspire subsequent investigators.



Page from Leonardo's sketchbooks, his "study" of a fetus in the womb (c. 1510)

Leonardo's anatomy studies were not perfect, however. Upon review, the 16th century physician, Giralamo Cardena, considered Leonardo's forays into anatomy, "very beautiful and most worthy of such a famous artist, but indeed useless." [i] Even so, Leonardo was an artist whose inquisitive nature and exquisite utilization of expressive line, set a high bar for both art and science ever after.



Leonardo's Vitruvian Man

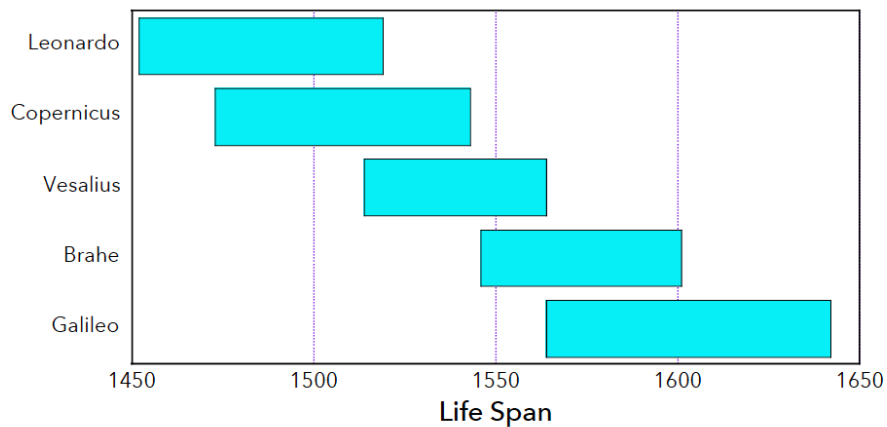
Prior to the 19th century (and, most notably, the invention of photography), an artist's objective was as much to know nature as it was to comment upon it through the language of art. One can argue that such searchings persist today, but have largely been taken over by scientific exploration, invention, and discovery.

The theme of the IVLA conference, 2015, "Visual Literacy and Technology: From Sight to Insight," exemplifies the vast distance we have traveled from simple visual observation with the naked eye, through a multitude of devices to assist and expand the visible, to using sophisticated digital technologies to postulate and verify increasingly smaller—or more remote—phenomena of the universe in which we all dwell.

In much that I do as an artist and writer, it is to celebrate the importance of visual expression as the first literacy—which predates written literacy by some thirty-thousand years. And, along the way, to appreciate the key

visionaries who have propelled leaps forward.

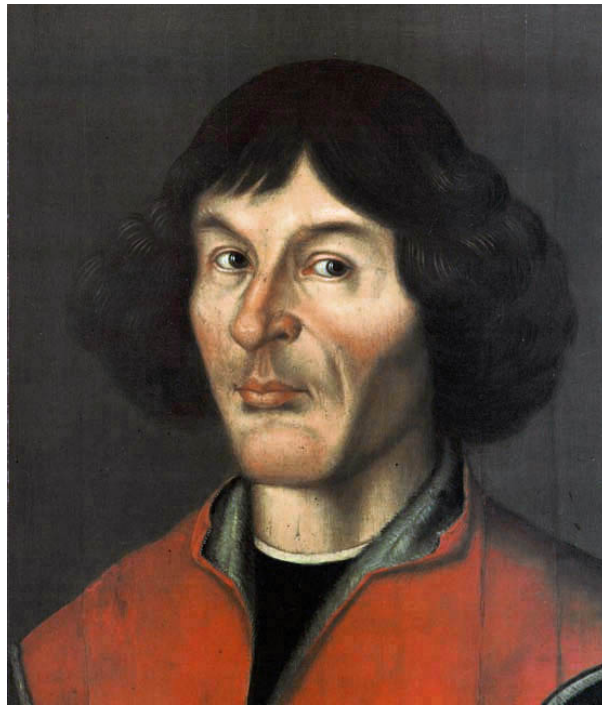
In this paper, I identify several individuals whose degree of visual literacy—“the complex interdependence of, and proper match between, *res* (things) and *verba* (words) and *pictura* (pictures) as a necessary foundation for a true description”[ii]—was unquestionably central to their life’s work. I have selected five such visionaries who lived within two centuries, from 1450 to 1650:



Prior to their explorations, the greatest authorities, who held sway beyond Leonardo’s time, and well into Galileo’s, were Aristotle (384–322 BCE), who purported that the universe was fixed and unchanging; and the physician, Galen (c.129–c.200 BCE), who never had the opportunity to dissect a human body, and drew conclusions about human anatomy from animals available to him.

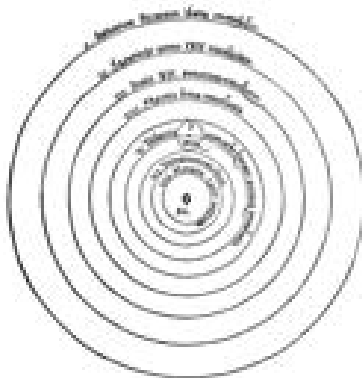
## Visionary II

My second visionary is Nicolaus Copernicus (1473–1543), a Polish polyglot scholar, physician, mathematician, and astronomer, of Prussian descent who had a doctorate in (Roman Catholic) canon law. He also served as a translator, diplomat, governor, and economist. Relying on nothing more than his intellect, naked eye, and antique measuring instruments (quadrant and triquetrum) to observe and calculate the movement of the sun, planets, and stars, this polymath formulated a model that placed the sun rather than the earth at the center of the universe.



Nicolaus Copernicus portrait from Town Hall in Toruń, 1580, artist unknown, via Wikicommons.

Although it was around 1514 that Copernicus arrived at his heliocentric model, he continued to refine it, and resisted openly publishing his views, "...to which he would expose himself on account of the novelty and incomprehensibility of his theses." [iii] In truth, he knew his theory's controversial nature within the Roman Church, so he waited to publish *On the Revolutions of the Celestial Spheres* until just before his death in 1543.



A diagram from Copernicus's *De revolutionibus orbium coelestium* (1543). By designating the earth not the center of the universe, but merely another planet, he triggered what is known as "the Copernican Revolution," which in turn became known as "the grand Scientific Revolution."

### **Visionary III**





A posthumous portrait of Andreas Vesalius by Pierre Poncet, via Wikicommons.

In the same year as Copernicus's death, 1543, when he was but 28 years old, Andreas Vesalius (1514[iv]-1564) published *On the Fabric of the Human Body*. Compiled by this physician, anatomist, and appreciator of art and artists, the work comprises one of the most influential books on human anatomy, and is revered by medical professionals and artists to this day. Vesalius himself refers to his magnum opus on anatomy as "the book of man that tells no lies.... Humans get things wrong. Nature does not lie."[v]



Detail from  
frontispiece of  
*De Humani Corporis  
Fabrica*  
(1543)







was employed by Vesalius. But that view has been disputed and, in 2008, found to have no merit.[vi] It's generally accepted that Vesalius hired some extraordinarily adept artists, but all others remain anonymous.

As the father of modern anatomy studies, Vesalius—unlike his astronomer notables—for a time received support from the popes and rulers of his day, and served as personal physician to Emperor Charles V. When he subsequently came under the scrutiny of the Inquisition, Philip II sent him on a pilgrimage to Jerusalem. During his return, he became ill, died, and was buried on Corfu. But there was no taking back his gifts of the tools and techniques to override the ignorance of the past, correct errors in his own work, and inspire the medical research and treatment industries that thrive in today's world.

## Visionary IV

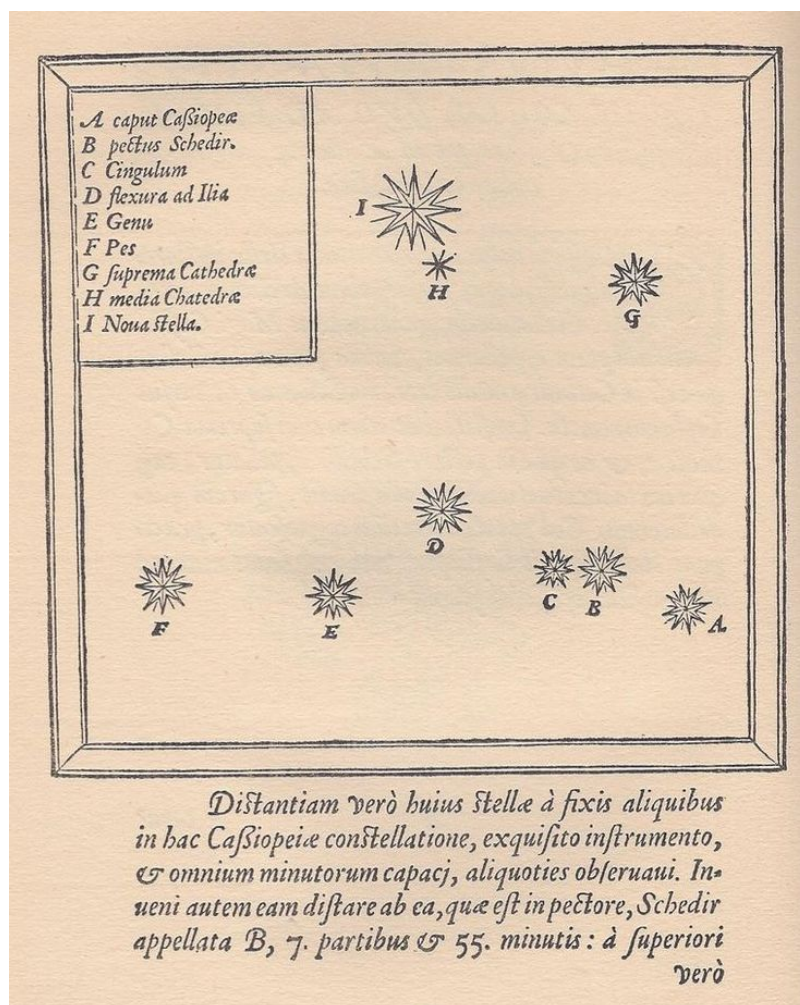


Portrait of Tycho Brahe by Eduard Ender (1822-1883)  
via Wikicommons

Meanwhile, in astronomy, Copernicus's theories were rejected and reviled by the church. Even the Danish astronomer, Tycho Brahe (1546-1601) spurned the heliocentric system. He thought the earth was too heavy to

move and, as a devout Roman Catholic, viewed the Copernican scheme of the heavens contradictory to the Bible, thus an unacceptable theory. His own postulation, known as the Tychonic system, was that the five known planets (Mercury, Venus, Mars, Jupiter, and Saturn) revolved around the sun, while the sun and the moon revolved about the earth.

Ensclosed on an island off the southeast coast of Denmark, the wealthy Tycho gathered together some of the best minds of the time, and compiled a vast quantity of observations of the heavens, including a catalog of 777 stars. He explained two other phenomena that helped to undermine the then common belief system in which no change could take place in the region of the stars because all was believed to be perfect and immutable.



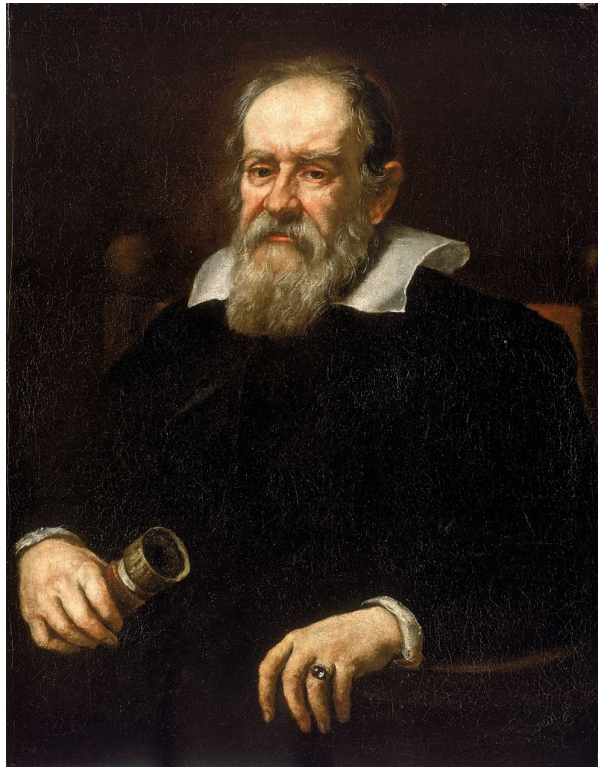
Star map of the constellation Cassiopeia showing the position of the supernova of 1572 (the topmost star, labelled I), from Tycho Brahe's *De nova stella*.

Tycho recorded, in 1572, the first observed new star, what we call today a super nova, thus proving that changes do take place in the stellar regions. As well, he observed comets, showing that they were solid bodies moving in

fixed courses through planetary space, which contradicted the older theory that held that each planet was encased in a solid and impenetrable sphere. Unable to publish his discoveries, Tycho gave his findings to one of his assistants, Johannes Kepler (1571-1630) who corroborated Tycho's discovery of the super nova.

As a German Lutheran, due to religious bigotry of the age, Kepler was under-valued by his contemporaries, even Galileo to whom he bequeathed much of his research. Nonetheless, Kepler lived an interesting and peripatetic life teaching mathematics and offering astrological readings to both religious leaders and royalty throughout Europe.

## Visionary V



Portrait of Galileo Galilei by Justus Sustermans, 1636,  
via Wikicommons

Galileo Galilei (1564-1642) was an Italian astronomer, physicist, engineer, philosopher, and mathematician who played a major role in the scientific revolution, and is widely regarded as one of the greatest scientists of all time. When Galileo learned that telescopes had been developed in the Netherlands in 1608, he mastered lens-making and created several telescopes for himself. He is the first of the astronomers noted herein to have help beyond the naked eye for viewing the heavens.

In 1610, he published *The Starry Messenger* to reveal his discoveries that the moon was not flat and smooth, but a sphere with mountains and craters; that Venus had phases like the moon, proving it rotated around the sun; and that Jupiter had moons revolving around it and not around the earth. In short, he concluded, beyond any doubt the reality of Copernicus's theory of our heliocentric solar system.



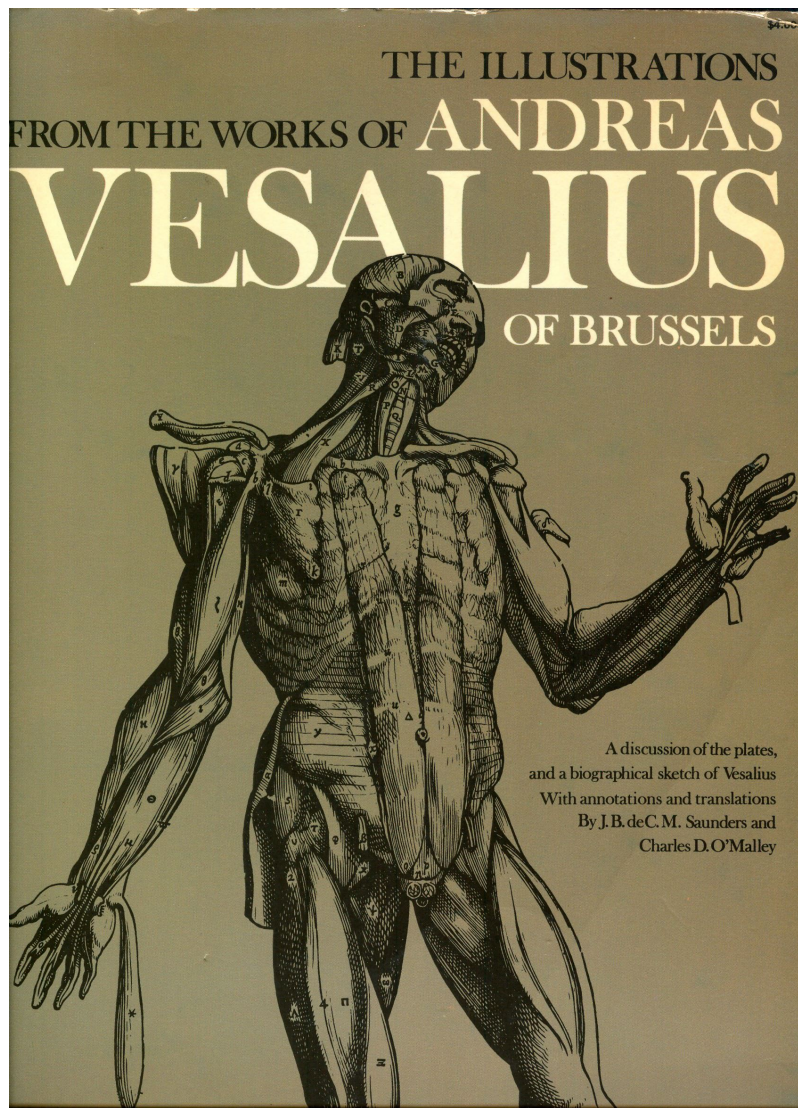
Alas, the church twice tried Galileo for publishing his theories that were considered treasonous. The Roman Inquisition of 1633 imprisoned him for two years, and then subjected him to live the last eight years of his life under house arrest.

Each of these scientists that I have so cursorily noted, and many others of the Renaissance and beyond, relied heavily and unquestionably upon visual observation at every step of coming to understand the world in which we live and the universe beyond. Without their high levels of visual acuity and sensitivity—qualities essential to visual literacy during any period in history—none of their discoveries would have been possible. While all of these geniuses inspire me, one of them in particular lit a spark that led to a body of my own work, which I will now divulge.

## Inspiration

This exposition requires that we leave the 17th century and jump to 1956. At age 18, I spotted the book, *The Illustrations from the Works of Andreas Vesalius of Brussels*[vii]—perhaps at the Cleveland Art Institute—and for some reason, was compelled to purchase it. As trivial as that may seem, I was a struggling student with limited means, working in Cleveland at my first co-op job from Antioch College (its \$4.00 price is visible in the upper right-hand corner of the cover). At the time, while fascinated with art and passionate about visiting art museums and galleries, losing myself in the works that I viewed, I had no pretense or idea that that I would ever deign to become a visual artist myself.





Due to a variety of life's unexpected circumstances, four years later I found myself in a life-drawing class—in the presence of a nude model for the first time. In Katia I saw not just her majestic form, but an exquisite metaphor for humanness and humanity itself. I immediately sensed that I would never tire of studying and depicting the human figure.



GAA, Rembrandt; 12C map of Jerusalem. Graphite & acrylic on unprimed linen canvas.

Edge lengths in inches: 30, 32,  
48, 50.

With another time-leap of 40 years, we reach 1996. As a member of Tabula Rasa, an international collaborative exhibiting group, and inspired by Italo Calvino's *Invisible Cities*,<sup>[viii]</sup> we consensually chose to create a body of work on the theme, "Obscure Cities." Within that theme, I chose to somehow explicate through my art the adage, *Ars Longa, Vita Brevis*: Art lives long, Life is brief.



ONG, Boucher; 1890 map of Sydney.  
Graphite & acrylic on unprimed linen  
canvas. Edge lengths in inches: 22,  
24, 42, 44.

My approach to *Ars Longa* was immediate: I appropriated master figure drawings, and superimposed them with historic city maps and urban artifacts. (Incidentally, since the mid-1980s, wishing to move beyond the Renaissance "window" perspective of reality, I have given my paintings four sides of unequal lengths.

My intention is to evoke the multiple, complex realities and peculiar matings of our times: Shards of our fragmented lives.) But I was stuck on how to approach *Vita Brevis*.

## **IVLA Symposium**



The 1996 IVLA symposium was held in Deventer, Holland, and the street on which we were housed was Johannes van Calcaar Straat. I immediately recognized the name as an artist who contributed to the Vesalius book, which was somewhere in my library at home.

Eureka! I suddenly recognized possibilities for the Vita Brevis imagery.

At the symposium I presented “Digitization and Deconstruction, Can Esthetics Survive?”[ix] and also thought about possibilities— in particular, Vesalius’s torsos, rather than the more familiar skeletons. But then I wondered, what would be their context?



Plate I from *De Humani Corporis Fabrica*; artist unknown. (Hamlet contemplating the skull of Yorick.)

After the conference, I went to Bruges, Belgium—known for its 16th century architecture—to steep myself in the time of Vesalius and be open to

inspiration. Perhaps I'd draw contemporaneous cityscape backgrounds for the torsos.

But once I got to Bruges, even though it was late May, it was bitter cold and damp. Drawing cityscapes took too long, and so I settled on drawing doorways. But even as that became untenable, I resorted to taking photographs.

## Creating the Paintings

Once back home, I projected the Vesalius torsos onto unprimed pieces of linen canvases, and with ink (felt-tipped markers), copied the engravings onto them. My intention was to then paint the doorways behind each torso. But when I noticed the entrails depicted in each torso, I balked. Who would want to have them hanging on their walls? I surely didn't.



De Humani Corporis Fabrica, Book IV, Fig. 12; Fig 24; Fig 10.

So I decided to replace the entrails with the doorways, which I drew with oil pastels, and then suggest a simple earth-sea-sky background, staining the canvas with thinned acrylic paints.



Vesalius, De Humani  
Corporis Fabrica,





VITA: Dye-based  
ink, oil pastels,  
acrylic on  
unprimed linen  
canvas. Edge  
lengths, inches:  
24, 26, 48, 50.

Meanwhile, my research into the concept of *Obscure Cities* took me to a variety of city planners, and poets:

*The city brings together people who are different, it intensifies the complexity of social life, it presents people to each other as strangers...It can serve as a home for those who have accepted themselves as exiles from the Garden.*

—Richard Sennett, *Flesh and Stone: The Body and the City in Western Civilization*

*The City's voice itself is soft like Solitude's.*

—Percy Bysshe Shelley

*The city is built*

*To music, therefore never built at all,*

*And therefore built forever.*

—Alfred Lord Tennyson

And to honor my own proclivities, *I am more than an urbanite, one who lives in the city. I am an urbanist, one who lives for the city.*

## ***Ars Longa, Vita Brevis (“Art is Long, Life is Short”)***

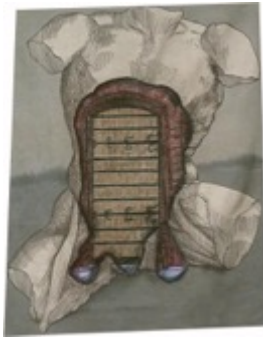
Vesalius, highly educated person that he was, had a profound knowledge and appreciation of art. Whoever he enticed to create the wood and copper plates for his *Fabric of the Human Body*, they were outstanding, educated artists who seemed to draw upon Greco-Roman treasures for inspiration.



Belvedere Torso,  
Vatican Museum



Vesalius, *De Humani  
Corporis Fabrica*, Book IV,  
Fig. 22



TABR: 32, 34, 40, 42.

And so to complete my versions of the Vesalius torsos as appropriated to participate in several exhibits of *Obscure Cities*, I titled them with four-letter permutations of the phrase, *VITA BREVIS*. All are dye-based ink, oil pastels, and acrylic on unprimed linen canvas; edge lengths are given in inches. Note how your eye shifts when it goes from a door to figure to background, and back, even though they all are on the same plane. This illustrates one of my greatest joys in both viewing and creating paintings.



ITAB: 26, 28, 44, 46.



ABRE: 30, 32, 48, 50.



BREV: 26, 28, 44, 46.



EVIS: 24, 26, 48, 50.



VISV: 24, 26, 44, 46.

The first exhibit of the paintings (1997) took place at Philadelphia's long-abandoned Eastern State Penitentiary for one of its first creative re-uses in what is now an ongoing museum and cultural center. The individual cells are extremely small, every one for solitary confinement. I clipped one of the *VITA BREVIS* paintings to the metal-frame cots in the center of the cell, and suspended an *ARS LONGA* painting on the wall. In order to view them in this context, one must wear a hardhat, and bow down to enter a five-foot-



high, narrow door through a thick concrete wall. A skylight —in many cases broken at the time of this exhibit— was the sole source of light.



SLO & VISV viewed  
from cell corner.



ABRE viewed from  
doorway.

I continued to be enamored with the Vesalius torsos, and subsequently created three sets of print/drawings in which I replicated the compositions on gray cover- stock paper. When I visited various locations along the eastern shore of the US, I drew in backgrounds, completing them in 2008.

After having been exhibited in a variety of venues as loose, banner-like canvases, in 2015, for the first time, I stretched and wired four of the paintings (VITA, TABR, REVI, and SVIT) for hanging.

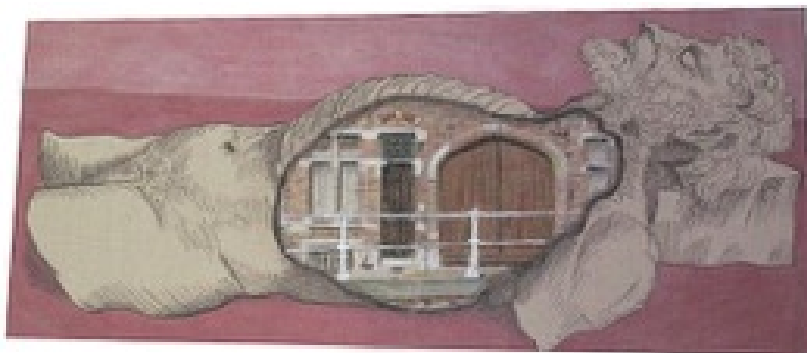


REVI: 28, 30, 48, 50.

At this writing, all are now on exhibit in my studio and artists' co-op where I live and work, grouped together with their respective print/drawings.

Thus my journey continues, as my hungry mind draws inspiration from visionaries and visual literates. Whether they be astronomers, dancers, ethicists, musicians, neuroscientists, or whatever, I revel in and treasure the myriad possibilities that life offers.

Now my task is to find permanent homes for these works, perhaps in medical schools, where I hope they will, at last, rest in peace.



SVIT: 20, 22, 48, 50.

## Endnotes

[i] Kusukawa, p.5.

[ii] *ibid.*, p. 229

- [iii] Dobrzycki & Hajdukiewicz, p. 11
- [iv] Born December 31, 1514, Vesalius's quincentennial is being celebrated throughout 2015.
- [v] Kusukawa, S., (2015)
- [vi] Simmons et al.
- [vii] Saunders & O'Malley
- [viii] Calvino, I.: imagines that Genghis Kahn and Marco Polo meet on their travels and spend their evenings conjuring fantastic cities for one another's entertainment.
- [ix] Curtiss, D. (1996). I suggested that the generally accepted canon of aesthetics propounded in western culture since the Greeks, would erode and become both more individualistic and multiplistic, which has occurred.

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Wikipedia: Leonardo, Copernicus, Vesalius, Tycho Brahe, Galileo.

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