

Matula Thoughts May 3, 2019 Sensations

NESBIT SOCIETY

MICHIGAN UROLOGY



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2176 words



Appreciation. Leonardo da Vinci reverberates strongly even five hundred years after his death on 2 May 1519. *The Lancet* commemorated yesterday's anniversary with a cover picture of that great polymath who encompassed astonishing ideas, insights, and talents, leaving for posterity a multitude of works that amaze and delight. Anatomy, physiology, engineering, and visual art are just a few of the intellectual arenas his senses played with and his hands constructed. Walt Whitman later wrote: ***we "contain multitudes..."*** and you can fill in the words of what *multitudes in particular* might follow, such as atoms, cells, thoughts, physical creations, emotions, or other possibilities. da Vinci exemplified that human potential better than most of us, trying to make sense of the world.

One.



Spring hits our senses. We can't easily describe in words the perfumes of flowers or the pleasant rich scent of mulch, but we surely know them. Odors are important sensory inputs, although we don't usually notice them much as they are less important for us than to most other creatures. [Above: azaleas, spring 2019.]

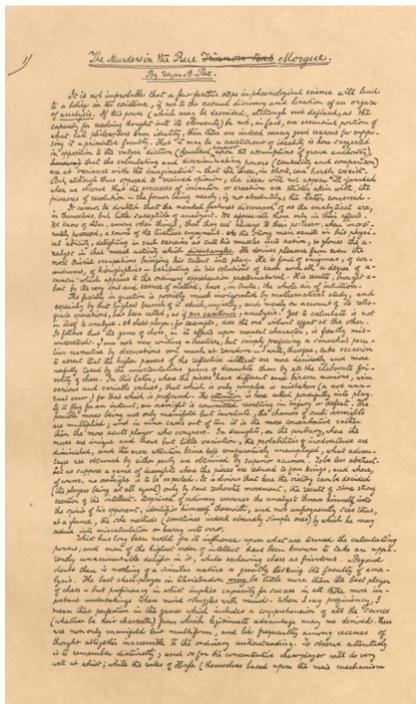
Dogs, for example, discern far more olfactory notes than we do and that is probably a good thing, since dogs sequester significant cerebral space and energy for distinctions of specific urine scents or fecal aromas to understand who is in the neighborhood, skills that have been essential to millennia of canine culture, while humans have found other ways to evaluate their fellows and territories. [Below: spring inspection.]



We surely would be confused by having to track of hundreds of scent variations. In fact, even a small amount of effluent odor from one of our neighbors is generally regarded as *too much information*. [Below: mulch delivery at Smithsonian Institution, Spring 2019.]



Smell used to be important in medical diagnosis. Uroscopy relied on smell, color, sediment, feel, and taste of urine for clues to disease and prognosis. Historically, urine was inspected by all five senses (including the taste of urine and the sound of its stream), but now patients are told to leave a sample in the privacy of a bathroom for a medical assistant to label and send to a laboratory. Doctors rarely come close to the stuff. Even so, for any good diagnostician, a necrotic wound, uremic breath, fecal odor, or hint of tobacco, are valuable bits of information not just for a specific disease, but also relevant to the life and comorbidities of a patient. These and other points of data add to the *medical gaze* that transcends visual clues and once inspired the meme of clever detectives. That gaze has now been replaced by the *digital gaze* of checklists, smart phrases, and drop-down menus.



Last month we commented on the first of the medical detectives in *The Murders in the Rue Morgue*, wherein Edgar Allan Poe in 1842 described how diagnostic senses could be marshaled in a process he called *ratiocination* to figure out crimes. The tale reflected on the odor of urine and double entendre of a name when detective Dupin explained to the narrator (Poe) how he seemed to read his mind, by making deductions from facial expressions:

“Perdidit antiquum litera sonum.

I had told you that this was in reference to Orion, formerly written Urion; and, from certain pungencies connected with this explanation, I was aware that you could not have forgotten it.”

The Latin phrase intended the loss or attrition of an old or previous meaning or sound of the word or its homonym. Orion referred to the celestial constellation (Poe called it a *nebular cosmogony*) and its similarity to *urine* became a play on words that Dupin noticed had popped into the narrator’s mind as he looked up at the constellation and smiled when the wordplay and associations came to mind. [Above: 1895 facsimile of Poe's original manuscript for “*The Murders in the Rue Morgue*.” Susan Jaffe Tane collection at Cornell University. Public domain. *Wikipedia*.]

Two.

Five classic senses taught in my childhood - smell, sight, taste, hearing, and touch - have been updated to seven for my grandchildren with the addition of vestibular sense and proprioception. Technology extends the senses further, outsourcing them and merging their inputs to provide unprecedented amounts of information of the world around us and within us. Microscopy and telescoping carry sight far beyond the unaided eye, while modern imaging with CT scans, MRI, and radioisotope labeling visualize our own living interior bodies. Sound, too, allows inspection of our interiors due to the discovery of Pierre Curie and his brother in 1880 of the piezo-electric principle in crystals that underlies ultrasonography. Extending the seven “basic” senses through technology, we see the world in new ways, although at the cost of diminished acuity of our original senses.

Today’s versions of the *medical gaze* and the *detective’s ratiocination*, are powerful: the sum-total of sensory inputs (enhanced by technology) and mental heuristics of scientific thinking (perhaps enhanced by “artificial intelligence”). *Intellect* integrates the physical senses. This larger sense, *the sense of making sense* of everything, is the wisdom, judgment, and mental capacity that creates *meaning* from immediate or recalled sensory input. This may be the most

important and defining human sense, but even that is challenged by impending extension or replacement with so-called *artificial intelligence*.

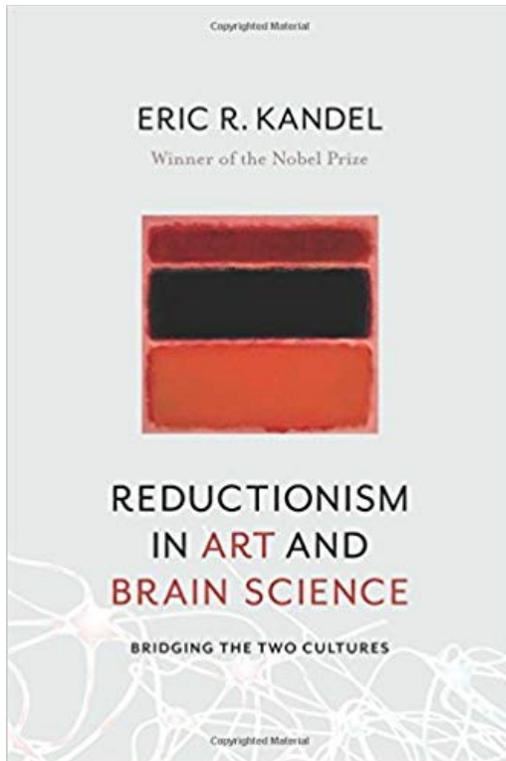
Three.



Incidental or relevant? Recently, I was asked to comment on a paper regarding incidental findings of renal cysts in children and that got me thinking how far ultrasonography has come in my career. Genitourinary imaging by ultrasonography came of age as a practical urologic tool in the 1980's. I recall those early days when, at Walter Reed Army Medical Center, we experimented with crude B-mode ultrasonography to interrogate testes for tumors or viability. Coincidentally, it was around that time, 1981 to be specific, when Gordon Sumner wrote the lyrics to a song called *Too much information* (TMI):

"Too much information running through my brain,
Too much information driving me insane..."

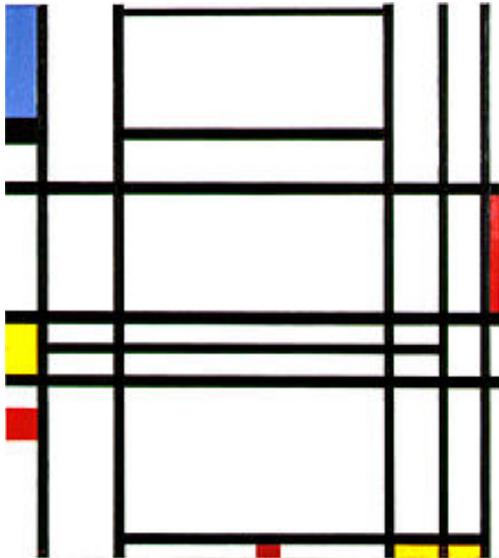
The world is even more replete with information since Sting and *The Police* recorded that song in their album *Ghost in the Machine*. Yet, one might argue that TMI is a sophomoric complaint, as if the infinite information in the cosmos should be curated for my personal capacity of the moment. The actual problem is not too much information, but too little human capacity for processing and our technologies have made this situation worse.



Perhaps this is the essence of abstract art, that Eric Kandel expressed in *Reductionism in Art and Brain Science* explaining that functional MRI shows that human brains process representational art differently and in different cerebral locations than processing abstract art (Columbia Press, 2016). Representational art gives viewers very specific images that relate to things immediately understandable. (Below: *American Gothic* by Grant Wood (1930), Chicago Institute of Art.)



“Abstract art” seems to contain less information (perhaps less *craft* - or even *no craft, at first glance*) than representational works. Kandel finds that abstractions can in fact contain far more, calling on you to search everything you know to understand the piece. Abstract artworks invite you to inspect the world to discover meaning for you, although the particular artist may not necessarily know or understand the world any better than you. The artist, however, creates a door for you to imagine the world differently than you did a moment before viewing the work. Abstract images may open up, in an informational sense, far more than a given representational scene or a moment you can readily comprehend. Abstraction is a window into far larger and stranger worlds of information, associations, and imaginations. (Below: *Composition No. 10*. 1939-1942, (Piet Mondrian. Private Collection. *Wikipedia*.)





[Above: UM Silver Club members attend *Meet Me at UMMA* program at the University of Michigan Museum of Art. Image courtesy of UM Silver Club. The untitled painting is by Mark Bradford, 2005.]

Four.

The Shannon number, named for UM graduate Claude Shannon (1916-2001), represents a lower bound of the game-tree complexity of chess, 10^{120} . This is an enormous number, unimaginably large, given that the number of atoms in the observable universe is estimated at 10^{80} . The point here is that human imagination (and in this instance, for only one human game), in a measurable sense, is far larger than the real world. Walt Whitman (1819-1892) may not have known the celestial math, but he wasn't exaggerating when he wrote *Song of Myself*.

“Do I contradict myself?

Very well then I contradict myself,

(I am large, I contain multitudes.)”

[Whitman W. *Song of Myself*. Section 51, 1892 version.]

Whitman imagined that he and each of us is unimaginably large. This is sensory overload at its best. It is ironically, *unimaginable*, far beyond TMI.

Five.

An article and a book expand these considerations of gaze, ratiocination, and information. Roger Kneebone, in *The Lancet*, offered perspectives on “Looking and Seeing,” comparing a physician’s observational skills to those of an experienced entomologist, Erica McAlister at the Natural History Museum in London. The article begins with these resonating sentences, quoted with his permission:

“Medicine depends upon observation. Yet we are changing the way we look and that alters what we see. As a medical student, I was schooled according to a rigid mantra. Inspection, palpation, percussion, auscultation – always in that order ... The aim, I think, was to ensure that we directed our attention to the person in front of us, that we didn’t jump to conclusions before assembling all the information we needed. That fell by the wayside as we turned into junior doctors. Nobody seemed interested in what we had seen or how we described it. Instead, it was all about blood tests, x-rays, scans – all about results.” [Kneebone R. “Looking and seeing.” *The Lancet*. 393:1091, 2019.]

Kneebone says it beautifully. The last word in his phrase could easily be *data* as well as *results*. *The results* becomes a proxy for *the patient*. The physicians of the next generation have learned excellent key-board skills, data collection, acronyms du jour, and navigation of electronic health records with drop-down menus, check-lists, and cut-and-paste artistry. The artful skills taught to me and Kneebone - inspection, palpation, percussion, and auscultation – seem rendered obsolete by data. One worries if the talents to navigate technology and its data come at the expense of the medical gaze, the medical sniff, and the ratiocination Edgar Allen Poe and Arthur Conan Doyle brought forth in their detectives. The model of the astute clinician is giving way to Watson, not Conan Doyle’s Watson, but IBM’s Watson.

Information or *data*, if you prefer, is a false deity. We must use data but should not worship it. Too many leaders say “show me the data,” believing that data will perfectly direct essential actions. Data should inform key decisions, of course, but data needs human wisdom for good decisions – using, tweaking, discarding, or reformulating data for human needs not for the "needs" of data or algorithms.

Self-learning algorithms can accomplish much, but cannot replace human wisdom.

The book of relevance is *Deep Medicine: How Artificial Intelligence Can Make Healthcare Human Again*, by Eric Topol, reviewed by Indra Joshi in *The Lancet* and I look forward to seeing if it convinces me in its promise. [Joshi I. "Waiting for Deep Medicine." *The Lancet*. 393:1193-1194, 2019.] The concern with "artificial intelligence" is its easy confusion with human wisdom, the wisdom of crowds that tends to bend toward truth and overarching human values. Self-learning algorithms that constitute AI are ultimately constructed by individuals with their own values, biases, and agendas. Furthermore, they are susceptible to intrusion and perversion. Finlayson et al warned of this recently: *Adversarial attacks on medical machine learning, emerging vulnerabilities demand new conversations*. [Finlayson SG, et al. *Science*. 363:1287–1289, 2019.]

Short story.

Truth is often stranger than fiction. Poe's story in 1841 revealed the perpetrator of *The Murders in the Rue Morgue* was an orangutan smuggled to Paris by a sailor. The actual murders were unintentional, the escaped animal was frightened and responding as millions of years of environmental selection of its genes had prescribed. Most readers probably found that part of the story a bit outrageous, it didn't quite make sense that a sailor could or would smuggle such an animal. But truth is often as strange or stranger than fiction: a recent report from the Associated Press of Russian tourist Andrei Zhestkov, discovered on the Indonesian resort island of Bali trying to smuggle a 2-year old drugged orangutan in a rattan basket to Russia on March 22. The smuggler also had seven live lizards in a suitcase. [Mike Ives. *New York Times*, March 25, 2019.]

Man Arrested After Drugged Orangutan Is Found in Indonesian Airport



Andrei Zhestkov, right, is accused of smuggling an orangutan, held at a news conference in Bali, Indonesia, on Monday by Denpasar's police chief, Ruddi Setiawanholds. Firdia Lisnawati/Associated Press

By Mike Ives

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Thanks for reading *Matula Thoughts*.

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