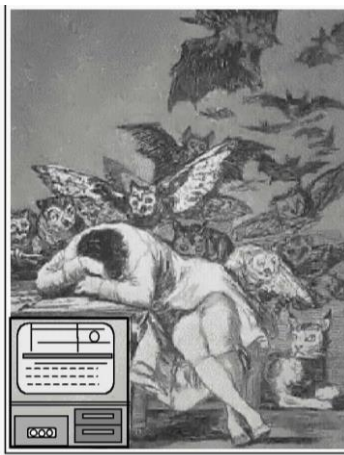


Yuri Tarnopolsky



Essays à la Montaigne



2001-2016

LAST ESSAYS
(57 to 60)

ESSAY 57. THE FEW AND THE MANY

Pattern chemistry of 2012 Elections

Essay 58. ALL RATIONAL MINDS ARE ALIKE; EACH IRRATIONAL MIND IS RATIONAL IN ITS OWN WAY

Pattern chemistry of rationality

Essay 59. THE KNOT

HUMANS, IDEAS, THINGS, AND EVOLUTION OF ECOSPHERE

Essay 60. [Art and Nexistence](#)

**Essays 1 to 56: [Essays complete.](#)
[Simplicity.](#) [Spirospero.net](#)**

ESSAY 57. THE FEW AND THE MANY

Pattern chemistry of 2012 Elections

It is the last quarter of 2012 and I am celebrating my 25 years in America. It is a quarter century, over 10% of entire USA history as independent nation, and about one third of my own life.

I am coming back to my [Essays à la Montaigne](#) five years later after my [ESSAY 56: OUT OF ONE MANY](#) (2007). But the problem of ONE, FEW, and MANY keeps haunting me. It is the last big mystery of America after my 25 years here.

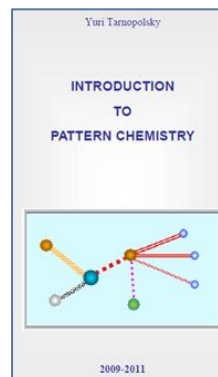
During the break, the core ideas of **Essays 51 to 56** have been developed into :

[INTRODUCTION TO PATTERN CHEMISTRY](#)

http://www.spirospero.net/INTRODUCTION_TO_PATTERN_CHEMISTRY_parts1to4.pdf
or http://www.spirospero.net/INTRODUCTION_TO_PATTERN_CHEMISTRY_parts1to4.pdf
or: <http://www.scribd.com/doc/55173251/Introduction-to-Pattern-Chemistry-Parts-1-4> (SCRIBD)

This Essay uses many ideas of the [INTRODUCTION](#) TO PATTERN CHEMISTRY, a direction of thought influenced by Pattern Theory of Ulf Grenander, which I had discovered by chance in 1980. Here I continue some threads and weave in some new ones. This time the key words are **power, politics, vital interests, inequality, and voting**. Money and patterns are default key words for “econochemistry,” as I call the patterns of the cohabitation of humans, things, money, power, and ideas on earth.

I refer the reader to the [INTRODUCTION](#) and my entire site spirospero.net for details which I omit here. I also try to limit the number of links. They die out, but Google, while morphing into something new, is still spirited enough for quick search. Companies die out, too, but so do people and nothing can be done about that.



1. PATTERN THEORY AND PATTERN CHEMISTRY

Each time I turn to patterns, I try to approach the concept from a different angle and there are at least 360 of them, most still unexplored. In a few words, my current take is as follows.

Laws of physical nature for all practical reasons are constant at least within the solar system. This is why physical equations include the equals sign “=”. Life on earth and the human condition, however, evolve. Equations do not describe history and economy and this is why physics in investment banks contributed to the Great Depression. Pattern theory substitutes similarity for equality. Pattern chemistry focuses on the processes of change and uses patterns instead of states to understand and foresee large-scale and long-run processes in social and individual evolution. Pattern chemistry is a mental instrument to deal with novelty.

We do not need pattern chemistry for anything as old as our planet, which is the subject of hard physical sciences. But the old future is contradiction in terms. The future is neither old nor new: it does not exist except in our minds and in a great variety of alternatives. And yet we have an irresistible desire to look into the time ahead although some of us would be happier not knowing it. I am going to talk about the great whatever around the corner for a particular reason: it is the best testing ground for pattern chemistry. Patience is the only tool for experiments with the future. We might wait a few years for the result.



Japan, tsunami of 2011

Since human imagination produces almost all possible and impossible at the time pictures of the future, we might never know if the right guess was accidental. Future is always a lottery.

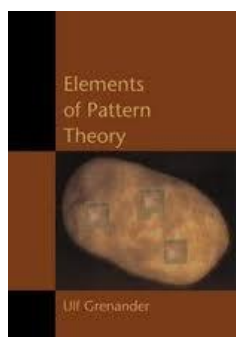
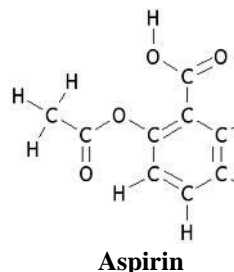
Patterns are the counterparts of physical equations for *exsystems*, a contraction of **E**volving **C**omplex **S**ystems (**ECS**ystems = *exsystems*). Like the laws of physical world, they are the invariants of change in human condition. Pattern is something we can predict more or less accurately about the future. The horizon of time is constantly receding, occasionally coming back as a tsunami wave and we have to finally learn what is the safe place to build our future.

The past of humankind was born in the process of evolution and so is the future. Most of the future—its details and particularities perceptible by senses—is dark, but part of it is illuminated by long-term patterns visible only to reason. There is also a future novelty unpredictable by definition, but born out of imagination. Our imagination gives birth to countless progeny and the problem is to assign likelihood to different outcomes. This is exactly the problem a chemist faces considering all possible rearrangements of atoms in a mixture of substances. My central

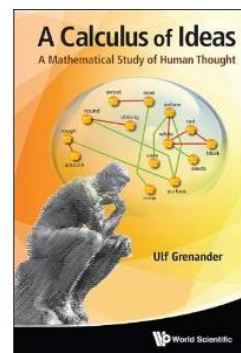
idea is that the way the chemist makes a prediction of the most probable outcome can be used not only for molecules but also for the products of imagination provided they are represented as structures of simpler entities. In terms of Pattern Theory, the structures are *configurations* of *generators*.

Mathematics includes the study of such objects into its **graphs theory**, but, unlike chemistry, it is hardly interested in the individuality of each of countless combinations of points and lines.

For example, a **mathematical** combination of points C, O, and H can look like the formula of aspirin on the right, but the **chemical** image of the same graph includes a lot of individual data about these particular white crystals, their melting point, spectra, physical properties of the bonds, including lengths, angles, and energies, what can happen to the bonds at various conditions, and even the human aspect and history of this combination of atoms. It started, by the way, at least as early as 1500 BC, long before it was isolated (1823), synthesized (1853), produced and patented (1897) and has been currently used (gladly by myself, too) almost as a panacea and an inexhaustible source of profit for the pharmaceutical industry (which I absolutely do not trust).



Pattern Theory of Ulf Grenander considers anything within human knowledge that can be represented as a combination of elementary objects (generators) and bonds between them and studies the properties of such combinations (configurations) as resulting from the properties of the generators and bonds, quite like chemistry. Moreover, it never loses the connection between the skeletal representation and the complex object of the real world.



Ulf Grenander, *General Pattern Theory: A Mathematical Study of Regular Structures*, Oxford University Press, 1994.

Ulf Grenander, *Elements of Pattern Theory*, The Johns Hopkins University Press, 1996. Ulf Grenander, *A Calculus of Ideas: A Mathematical Study of Human Thought*, World Scientific Pub Co Inc, 2012.

Numerous sites on the Web.

The chemical combinatorics arises from the idea that combinations differ not only by the “weight” of elements, but also by the way they are connected and the “strength” of bonds between them. Chemistry is complexity incarnate.

The random component and the similarity of the processes in the mind to chemistry was noticed and eloquently depicted by Douglas Hofstadter in “Jumbo” of *Metamagical Themas: Questing for the Essence of Mind and Pattern* (Basic Books, 1985) and “careenium” of *I am a Strange Loop*, but he did not pursue the idea head-on as a mathematical problem. While giving a lot of attention to “patterns” understood in the trivial sense of regularity, repetition, and order, Hofstadter seems to have missed Grenander’s Pattern Theory—as most other writers on patterns. This is the

strangest twist in the “strange loop.” Hofstadter has been rightly and forcefully promoting the idea that “analogy” is central for the work of mind, while Grenander’s “similarity” is already the central well-defined idea of Pattern Theory. Still, I would borrow from Douglas Hofstadter a phrase that serves as a great epigraph to Pattern Theory:

Where there’s pattern, there’s reason.

(Douglas Hofstadter, *I Am a Strange Loop*, Basic Books, 2007, p.117)

Chemistry is not associated with randomness in popular perception. While the pictures of a probabilistic mind and probabilistic world are becoming more conventional, replacing the determinism of classical science, it is appropriate to remind that individual acts of chemical change are entirely probabilistic. The main chemical notion of concentration is nothing than probability to find a certain molecule in a volume of substance. If chemistry looks like a hard deterministic science, it is because it deals with large numbers of molecules. Small numbers of molecules—countable on the fingers of one hand—can be as little predictable as small groups of people. Mutations and transformations of genetic material are the best example. The act of a chemical reaction that can run in two alternative directions is as random as the conception of a boy or a girl.

Chemistry can be characterized as the **study of probabilities on structures**, which is exactly how Ulf Grenander defines Pattern Theory.

I am not a mathematician. Thinking as a chemist, I am interested in the **intimate mechanism of the transition** from one configuration to another. What I want to borrow from chemistry and add to Pattern Theory is the side of chemistry less known to outsiders: kinetics, i.e., aspect of speed. In the real physical world, nothing happens in an instant. While “what can theoretically happen” is a combinatorial question, “what will indeed happen” is a kinetic question because complex systems have a lot of alternative directions of change and it is the fastest alternative that wins, if there is any.

When we write $y = x^2$, it would be meaningless to ask “what happens between $x = 2$ and $y = 4$ ” or “how soon y becomes equal 4 after x takes value 2.” An abstract mathematical operation does not involve time. The question makes sense when a calculation runs in human head, supercomputer, or something as thin as the supermodel i-Pad of the newest fashion show. The speed of a digital process in a computer is a real issue because it consists of a number of steps, none of them instant. Different algorithms can achieve the same goal at different times.



A chemist deals with the question “if **A** turns into **B**, what happens along the way from **A** to **B**” because this is the key to the question “how fast **A** turns into **B**.” If **A** can turn to **B** or to **C**, the result will be the fastest transformation. For example, if presidential candidate **A** faster persuades the electorate that he is better than candidate **B** and faster crushes the arguments of the opponent, he has much better chances to win the vote. If both candidates had more time, the opinion of the voters could change in the long run, but the election date is fixed and human minds have their own limits of speed and unlimited reservoirs of illusion.

In addition to probability, energy, and stability of configurations, I draw attention to the **speed** of transitions from one to another, using the chemical (as well as military, political, and economical) principle that the **fastest** wins. Pattern-chemical kinetics **cannot** predict the time sequence of real life events, but it could give at least some framework to compare different alternatives. Besides, I believe that it is exactly what the mind does: it offers a competitive marketplace to thoughts. We think in patterns, especially when no hard knowledge is available, as it is the case in politics and human relations in general.

This is how we can cast some light into the darkness of the future. But the past has its dark basements, too. What can we say about the most distant past in a long history of a complex system, from life on earth to global civilization? The present exists. All we need to observe the future is a comfortable chair and little patience. But what was in the beginning of everything and what will be in the beginning of everything new? Asking this kind of questions, I am looking for a science of not complexity, but simplicity. But we do not need any science to guess, in general terms, what there is in Mitt Romney's mind that he defiantly keeps under locks.

I do not believe any complexity of thinking can make the complexity of the real world understandable. This is why our elections are designed for dummies: there is simply no time for education on either side of the voter-politician divide. Besides, telling the truth in politics can be suicidal while we are in a pursuit of happiness. "For in much wisdom *is* much grief: and he that increaseth knowledge increaseth sorrow." (Ecclesiastes, 1.18).

Can we predict the outcome of the Elections 2012? I cannot. In some instances, the political analysts can do this pretty well just by counting all pros and contras for each candidate. But if the bottom lines are very close, it is hardly possible. To compare with chemical reactions, we would have approximately equal mixture of two possible products, obamene and romniol.

There is always an abstract chance to influence voting at the last minute, as it happened in Spain in 2004 after the Madrid train bombings. It is only a matter of time before some political desperados try this in America in the atmosphere of Cold Civil War, which more and more becomes religious, i.e., irrational.

2. THE DIN OF WAR

I wrote [Essay 43: The Cold Civil War in America](#) in 2006. The title says it all.

In August, 2012, I am waking up from my five year long hibernation to find that my dreamlike visions are reality. **The latest news from the front:**

“Texas Democrats are calling for the resignation of a Republican elected county judge [Tom Head] who warned this week that the nation could descend into civil war if President Barack Obama is re-elected.”

Texas Democrats: Judge who said Obama could trigger civil war should quit

By Josh Levs, CNN, August 24, 2012.

[Judge Head's interview.](#)

“One of us (David [Gergen]) has been attending conventions for some 40 years and has witnessed a distinct change in tone; listening to the hot rhetoric in both conventions in 2004, it suddenly became comprehensible how the country could have wound up in Civil War back in 1861 after another election full of ramifications for the nation's future.”

[Election a stark choice on America's future.](#) By David Gergen, CNN Senior Analyst, and Michael Zuckerman, Special to CNN, August 24, 2012.

LUDOWICI, Ga. — Four Army soldiers based in southeast Georgia killed a former comrade and his girlfriend to protect an anarchist militia group they formed that stockpiled assault weapons and plotted a range of anti-government attacks, prosecutors told a judge Monday.

[Military Terror Plot: Murder Case Uncovers Terror Plot By 'Militia' Within U.S. Military](#)

By RUSS BYNUM 08/27/12



Hot Civil War



Cold Civil War



Trench warfare

America's war with itself

America is in the state of Cold Civil War and it has enough firearms in private hands to wage a hot one.

The election of Barack Obama brought the American Cold Civil War to a stage reminding of WWI: trench warfare, poison gas, political hysteria, the cull of the brightest and bravest commanders, and opening the gates to wild opportunists.



**IT IS THE
BLUES!**

The potential mainstream national leaders are being poisoned in the womb by TV ads, Internet, perspective of swiftboating, and crawling of investigative ants in their personal life. The best and the worst of the formerly excluded off-mainstreamers steps in. We are evolving and watching the course of history at the pace of a TV serial.



**IT IS THE
REDS!**

I chronicled the previous elections in [INTRODUCTION TO PATTERN CHEMISTRY \(Part 2, DIARY OF A FERRIS WHEEL RIDER\)](#) referring to patterns going as far back in history as the siege of Masada. This pattern is still rock-solid. This time, the content of the mind of the presidential candidate Mitt Romney is an aloof fortress on top of a rock, although defending his Masada “no matter what,” the candidate can end up by political suicide. But in this Essay, I am more interested in the content of the voters mind.

I am far from extrapolating the similarity of American political life to that of Europe of the post-WWI years, but not too far. Nothing is too far in patterns—only in ossified formulas. The ferocious militancy combined with the military-like discipline of the Republican Party, paradoxically deferential to threatening figures like the grey cardinal Grover Norquist or the astounding Jacks-in-the-box of the Tea Party, do not look good in the pattern telescope focused on the twentieth century. After its first victory in 1994, the Republican Revolution looks more like a jihad than WWI.



In this atmosphere, no experienced, charismatic, energetic, ambitious, intelligent, moderate, centrist, honest, decent, progressive, rational, and mainstream person (what an improbable combination!)—neither Democrat nor Republican—can step into the airport scanner of the media with his or her life, wallet, private parts, and the skeletons in the suitcases. The minorities have their word. It was the mistrust of non-Roman generals that contributed to the fall of the Roman Empire.

The Republican militants and ideologues are nervous. They are afraid, but of what?

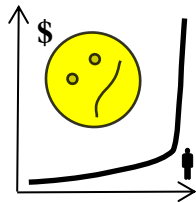
I believe they are nervous because they represent the vital interests of a minority of Americans. A party of a minority in a democracy is naturally bellicose: it feels that it has nothing to lose in war because it has a lot to lose in peace. How a minority can win a majority of votes is the greatest trick of the not so long history of democracy—the trick performed, nevertheless, quite a few times. My guess is that it is because democracy quantifies and weighs votes, but not the temperature of voters’ intentions. The mass media can operate both political ovens and fridges, not to mention distorting mirrors. Maybe democracy should protect not only minorities from aggressive majorities, but majorities from aggressive minorities, too. But without hotheads, disruptors, heretics, and fanatics, our history would freeze.

The membrane separating democracy from autocracy is the thinnest when there are only two parties comparable in strength: it could not be any thinner. **From two parties to one there is only one step.**

The gallery of patterns of history in my mind, some personally witnessed, makes me worry. They also signal caution. Neither the post-WWI Germany, nor Communist Russia had ever known anything close to successful, fruitful, and stable democracy of the American or British type. I explain the American success, now under question, by the unique diversity of American society, which compensated for the lack of organized political diversity. I explain this political minimalism by the might of the dollar, which limits the access to the political club. Money is power, and if it is in few hands, so is power.

Can a real vigorous flaming democracy burn itself out? What can save it? Business? Commerce? Religion? War? Ideology? Culture? Morals? Science? Ignorance? Pills?

Is it the economy, which today engulfs all of the above? Isn't it the economy that unites the society and puts everybody on the visually **consistent** chart? By *consistent* I mean a curve not only mathematically continuous, monotonic, and



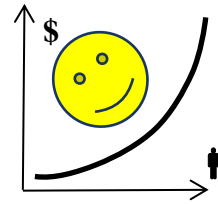
smooth, but also of little changing curvature. In other words, it is a line without clearly distinct segments and sharp local changes. Consistency would mean that we are really one

nation, from poor to rich, "out of many, one," unlike the

French society in 1789, or Syria today. But what if the consistent shape was

bent into two distinct segments and the prosperity chart looked like the spread wings or the obtuse angle of a boomerang? This happened only twice in the

last 100 years of American history: on the eve of the Great Depression and the Great Recession.¹



What is economy, anyway? Throughout history, economy meant:

An **economy** consists of the [economic systems](#) of a country or other area; the [labor](#), [capital](#), and [land resources](#); and the [manufacturing](#), production, [trade](#), [distribution](#), and [consumption](#) of [goods](#) and services of that area. ([Wikipedia](#))



IT IS THE
ECONOMY!

Since the first historical records, the political currency used to be human body, managed by a whip, crucified, hanged, burned at stake, cut short by a guillotine, pierced by bullets in wars, adorned by handcuffs, and stored not in banks but in prisons and concentration camps. Economy today, at least in America, includes politics, making laws and presidents, and regulating personal life. It uses dollars instead of bullets and knives, unlike in Syria and Afghanistan, and it manipulates human mind by TV ads, speeches, web sites, and church sermons.

Already dreading the last stage of the 2012 campaign and the hanging in the balance elections where people are going to vote for their vital interests, I am asking myself the question which has already been asked by many mystified intellectuals: ***why do people vote against their vital interests?*** How can a minority dominate the majority and recruit about a half of it?



Indeed, how can the two votes be so close? This diverse society of ours is so balanced in its political choice that in the Elections 2000 it looked like the Buridan's Ass ready to die of hunger between two exactly equal piles of fragrant Florida hay. Finally, the (numerically) odd US Supreme Court, less balanced by design, gave it a kick in the right side of the butt.

¹ Robert Reich, a tireless champion of anti-inequality, offered his own pictorial metaphors of inequality.

NOTE: It is as difficult for me to confess that in 2000 I voted for the right side of the butt as for Mitt Romney to show more than two tax returns. I am still registered independent, but I don't vote for the right side of anything anymore.

Pattern Theory is a search for simplicity in complex objects. So are chemistry and pattern chemistry. Science can be complex because it calculates complex systems in detail and is paid money to be exact. It works well because it can: the laws of physical nature in our galaxy have not changed in million years and mathematics has its own self-imposed laws, which, unlike human laws, are unbreakable for con artists.

Trying to solve the voting mystery, I leave the science of complexity to academic science. It is certainly not for most voters. I believe in the science of simplicity. But when I see simple reasons, I often can't believe my eyes.

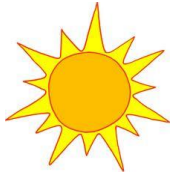
3. SIMPLICITY

Even very complex **chemical transformations** leading to very complex substances consist of simple steps and can be started from pure chemical elements. I formulate here a universal **pattern-chemical** principle of evolutionary simplicity. I put it into a frame just to show off, but in essence it amounts to the tautology: spontaneous emergence of improbable systems is improbable. The way to break the tautology is to take a close look at the emergence as a process in time and not as a rabbit from a hat.

<p>The principle of evolutionary simplicity</p> <p>A NEW COMPLEX SYSTEM SPONTANEOUSLY EMERGES AS SIMPLE SYSTEM AND EVOLVES BY REPETITION OF SIMPLE STEPS</p> <p>or, in a negative form</p> <p>SPONTANEOUS EMERGENCE OF COMPLEX SYSTEMS IS IMPOSSIBLE</p>
--

In the 1960's, physicists formulated the negative form as the greatest mystery of the origin of life because they could not reconcile it with physical principles. A chemist, however, would be completely comfortable with both forms. Chemically, the stepwise crawl of complexity from chemical elements to anything as mind-blowing as DNA and proteins is a piece of cake. A child with Lego can show how it is done.

Of course, the term “spontaneity” may need some hairsplitting. What is really **spontaneous** in the world? Does spontaneous mean **accidental**? Or **unplanned** by somebody’s mind? Even if human mind participates in the emergence and evolution, as is the case with society, science, and technology, the principle applies: emergence and evolution of complex systems of **ideas** starts in the mind with simplicity growing into complexity by simple steps. If we do not realize the beginning of reasoning, it is there, subconscious.



As for the participation of a deity, it is not my cup of tea. Strictly speaking, nothing is quite spontaneous on earth because of the creative power of the sun and the moon. The **sun monotheism**, with the moon for a company, celebrated on the Summer Solstice with low calories pancakes on the beach, looks to me as the most rational religion for humanity. BYOC (Bring Your Own Commandments).

By system I mean what I call **exsystem**: evolving complex system, see above.

The term “complexity” is the vaguest. There is no consensus on what it is, except in some narrowly defined particular cases. If so, here is my definition of **simplicity** for the case of evolution: the simple is what can emerge spontaneously. Examples: snow and sand. A snowflake may look complex or simple, it emerges in a sequence of simple steps of crystal growth, but it does not evolve. The sand, on the contrary, emerges in a sequence of simple steps of crystal disintegration.

Evolution can be understood as the continuous growth of complexity in exsystems, which life on earth and human history exemplify.

If my principle is so full of circular definitions, what does it actually say? As other fundamental laws of nature, it **states what is possible or impossible**. I am too modest to call it a law, but you, a young reader, can. The circularity means that spontaneity and complexity are fundamental ideas, like energy and time in physics: they are not reducible to something more fundamental. Stability and energy are also locked in logical circle with the concept of time: **higher energy** means **lower stability**, i.e., a **change** **sometimes** later.

The laws of nature, whether pattern or not, cannot be logically proved. They can only be illustrated, tested, confirmed, and sometimes disproved.

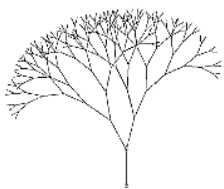
EXAMPLES. Unlike sand and snow, neither sand castles nor snow castles in **Figure 1** can emerge spontaneously. Each structure consists of the same or similar particles. They were built in a sequence of



Figure 1. Snow, sand, and life

simple steps of adding and removing sand or snow on a sand beach or a layer of snow, respectively, guided by human mind.

The polar bear on the snow did not emerge like a rabbit from a hat. Neither was it “created” like the sand castle was by a girl. Bears and girls appeared very long ago, as result of long evolution, out of something close to sand, water, and other simple substances. We believe that the original substance of life consisted of molecules of different types, while snow consists of simple H_2O and sand of simple SiO_2 molecules with some minor components. The repetition of simple steps of connecting or disconnecting two atoms is how evolution works from the point of view of a chemist. Such small acts can multiply in a branching manner, as in DNA replication or regional revolutions. Each bear, girl, smartphone, religion, and nation are links in a chain.



The repetition of simple steps of connecting and breaking bonds between some diverse entities (people, parts, bricks, semiconductors, words, ideas, spots of paint, sounds) was the mechanism of evolution of society, technology, and culture. The particular bear and girl emerged from their mothers as result of a gestation essentially similar to evolution, from small and relatively simple cells with a program of reproduction in the form of a very large molecule (DNA) similar to a long text, but, to tell the truth, rather monotonous, like the babbling of a brook.

Pattern Theory studies structural similarity of different objects of any type and origin, similarly to chemistry studying structures consisting of atoms and bonds between them.



Ideas emerge and evolve, too. Thus the idea of a deity, who created the world, evolved, too, but we do not know how because ideas leave little trace before art and writing emerge. Who can tell whether an over 20,000 year old [figurine](#) portrays goddess, woman, or a vague idea of fertility?

Yet we can explore and reconstruct the process of emergence and evolution of Roman Empire, Islam, Italy, USA, French literature, Russian Communism, General Electric, Inc., aircraft, iPad, Tea Party, Great Recession, and the obesity epidemic, although molecules have little to do with all that, except for the last subject.

Whatever scientists think about creationists and vice versa, they seem to [speak the same language](#):

"Using radiometric dating, one can observe that the Earth's oldest continents were **created** in geodynamic environments which were markedly different than current environments characterized by plate tectonics."

[Teaching creationism to children, promoted by Tea Party](#) is a troubling sign of social regression, obscurantism, and intellectual decline. Dragging a deity into politics is... but wait, this is a focus point of this Essay and I will come to it in due time.

4. THE BOOMERANG OF WEALTH

The main question about voting for vital interests splits into three parts:

- 1. WHAT ARE THE TWO ECONOMIC SPECIES?** There could be some single defining difference between voters that splits them into economic classes. What is it?
- 2. WHAT IS VITAL INTEREST?** Certainly, not the universal human needs, which are common for all, but something that is different for the two economic classes.
- 3. WHAT IS THERE IN VOTING MIND?** What makes a person to decide which way to vote is something on his or her minds. What is it? There is a perplexing book about economic mind and it is by a Nobel Prize author.

I start with the question how many really different social groups are there if we look for patterns and not details.

Humans are different in many respects, but I am looking for largest distinctions related to vital interests in connection with voting behavior in a society where money is a universal measure of wellbeing.

I select the numerical measure taken by the government on a widest possible statistical base: money in the form of [wealth and income](#), which are related, but not the same.

The data come from tax returns. The lowest and highest ends of the scale are incomplete and distorted because the non-filers of tax returns and super-rich filers can be for different reasons completely or partially invisible for the measuring procedure. Nevertheless, there is nothing more comprehensive—certainly not a telephone poll—than hard tax data.

The existence of the two classes is clearly visible from the statistics of income distribution in **Figure 2**. Its shape reminds the boomerang, but the wings are strikingly different in nature.

The graph shows the distribution of income among taxpayers or, to put it differently, the distribution of taxpayers by their income. It is a cumulative graph. The area under the curve equals the total income of the percentage of people. The graph shows that a few get a lot and many get a little.

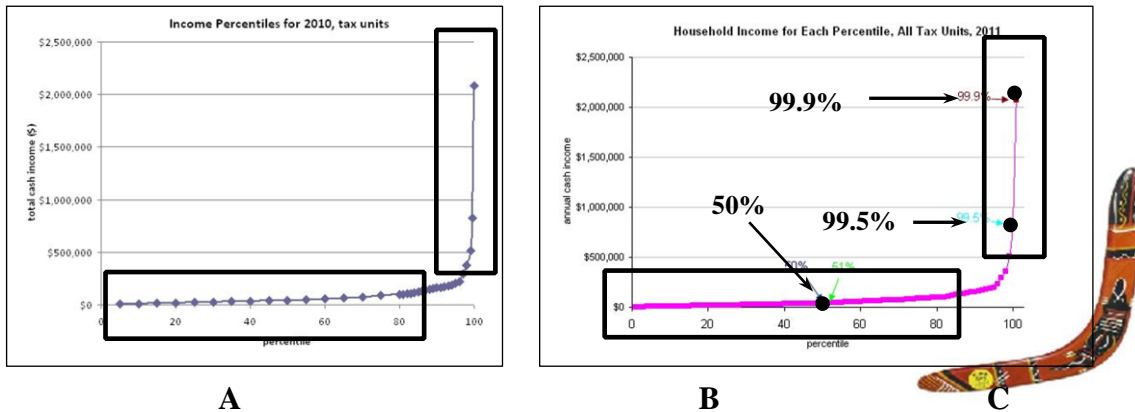
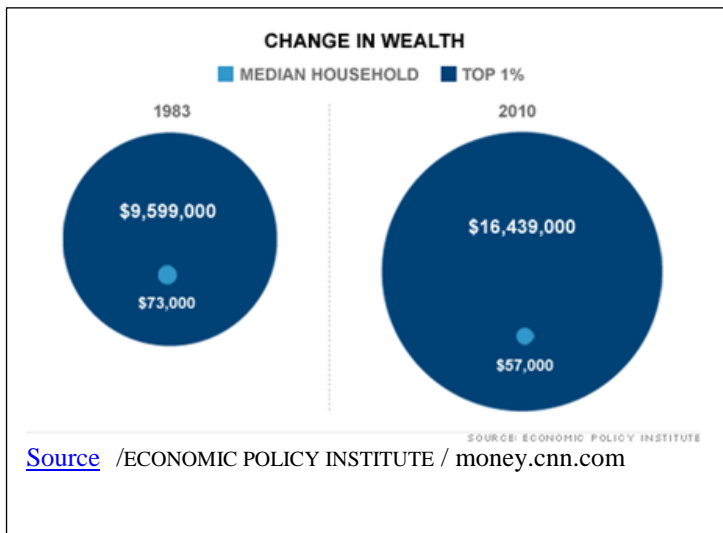


Figure 2. A: [Income percentiles](#) for 2010, tax units; B: [Household income](#) for each percentile. All Tax Units, 2011; C: Boomerang.

Wealth is not income, it is less liquid and more difficult to estimate, but the inequality of wealth is much sharper than that of income. How high is the wealth and income inequality? I [quote](#):

The Top 1 Percent Of Americans Owns 40 Percent Of The Nation's Wealth: As Nobel Laureate Joseph Stiglitz [points out](#), the richest 1 percent of Americans now own 40 percent of the nation's wealth.



The Top 1 Percent Of Americans Take Home 24 Percent Of National Income: While the richest 1 percent of Americans take home almost a quarter of national income today, in 1976 [they took home just 9 percent](#) — meaning their share of the national income pool has nearly tripled in roughly three decades.

I associate the shape of the curve (known also as [L-curve](#)) with the boomerang for a reason. A society that launches the boomerang of inequality risks to be hit by its own

missile. The previous boomerang had returned as a Great Depression.

To compare the **boomerang** distribution to the bell curve of normal distribution, we have to convert the **bell** (probability density) to its cumulative form, which is known as S-curve, **Figure 3D**.

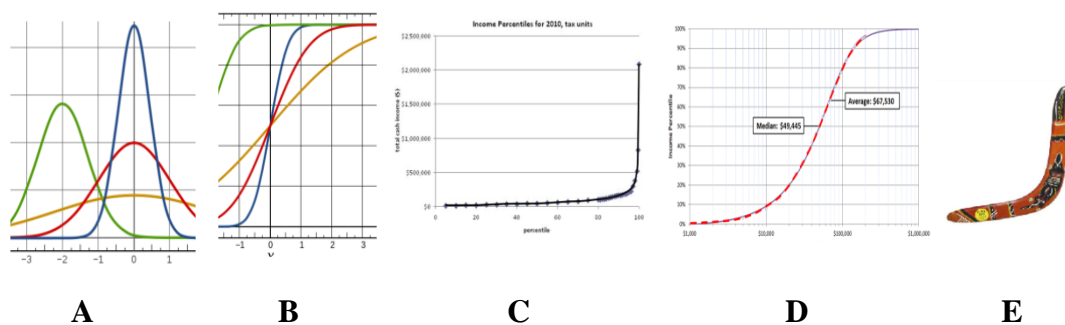


Figure 3. A: The “bell curves,” B: same in cumulative form; C: cumulative income distribution, 2010; D: same on logarithmic scale, E: boomerang

The boomerang of wealth distribution has a fascinating feature: it has no fixed upper limit, unlike any percentage. This is certainly proper for the realm of gods, not humans. Something must be wrong with the money that can endlessly grow: it is just a number, a fiction, a figment of imagination, an idea, a belief. And indeed the unlimited growth is the ultimate dogma in the religious credo of modern economy. The heretics and unbelievers—a small number—are burned at stake.

Robert Reich is among my most admired authors not just because I share or sympathize with his views, but because of the exceptional clarity of his thinking and writing. I suspect that he is a believer in simple reasons, too.

Here is how he presents the consequences of inequality in his post [Labor Day 2012 and the Election of 2012: It's Inequality, Stupid](#) of 422 words, of which I select here 188:

The 400 richest Americans now have more wealth than the bottom 150 million of us put together. In order to create jobs, businesses need customers. But the rich spend only a small fraction of what they earn. They park most of it wherever around the world they can get the highest return.

But as the middle class's share of total income continues to drop, it cannot spend as much as before. Nor can most Americans borrow as they did before the crash of 2008 — borrowing that temporarily masked their declining purchasing power. As a result, businesses are reluctant to hire.



**IT IS
INEQUALITY!**

As wealth and income rise to the top, moreover, so does political power. The rich are able to entrench themselves by lowering their taxes, gaining special tax breaks (such as the “carried interest” loophole allowing private equity and hedge fund managers to treat their incomes as capital gains), and ensuring a steady flow of corporate welfare to their businesses (special breaks for oil and gas, big agriculture, big insurance, Big Pharma, and, of course, Wall Street).

All of this squeezes public budgets, corrupts government, and undermines our democracy. ([Robert Reich](#))

Robert Reich describes inequality as what scientists in chemistry, geology, biology, physiology, etc., call “mechanism,” meaning not a piece of hardware, but a sequence of elementary cause-effect steps. It is possible to dispute this picture. There could be alternative or supplemental

mechanisms, for example, the tendency to the risky actions justified by high concentration of wealth. Losing half wealth leaves you still very wealthy and ready to grow the lost half anew. Reasonably managed wealth does not die: it regenerates, like—here you have a metaphor, not pattern—the lost tail of a lizard.

Paul Krugman focuses on a single cause-effect link in Plutocracy, Paralysis, Perplexity (*The New York Times*, May 3, 2012): “...takeover of half our political spectrum by the 0.01 percent.”



IT IS POWER!

For the past century, political polarization has closely tracked income inequality, and there's every reason to believe that the relationship is causal. Specifically, money buys power, and the increasing wealth of a tiny minority has effectively bought the allegiance of one of our two major political parties, in the process destroying any prospect for cooperation.

Joseph Stiglitz [lists](#) the multiple consequences: consumption, rent-seeking, fairness, mistrust, undermining the one-person-one-vote principle, etc. His book is a real somber encyclopedia of the recent American transformation and it spares me a lot of gloomy rumination. He said what I would not dare: “1984 is upon us.”

Here is his most important instability warning [elsewhere](#):

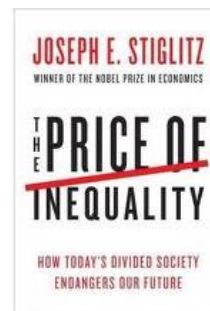


**IT IS HISTORY!
1984 IS UPON US**

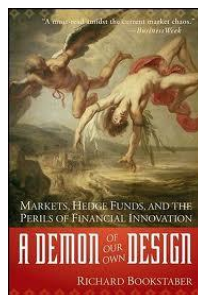
As we gaze out at the popular fervor in the streets, one question to ask ourselves is this: When will it come to America? In important ways, our own country has become like one of these distant, troubled places.

.....

The top 1 percent have the best houses, the best educations, the best doctors, and the best lifestyles, but there is one thing that money doesn't seem to have bought: an understanding that their fate is bound up with how the other 99 percent live. Throughout history, this is something that the top 1 percent eventually do learn. Too late.



There could be more mechanisms, all running in parallel, such as, for example, the blind trust in mathematical finance. The origin of catastrophic events in economy is a whole research area, all the more unreliable that they are so rare—just two in 100 years—and the conditions change dramatically from one to the other.



This is a good opportunity to explain once more the difference between pattern view of the world and—how to say it?—professional, i.e., detailed, substantiated, corroborated, and compared with alternative views. A professional view is a basis for action. We cannot build a bridge by analogy with rainbow. Pattern view is a basis for understanding a **new** phenomenon, for which there is no knowledge base. Patterns precede the professional analysis of configurations. There is little place for

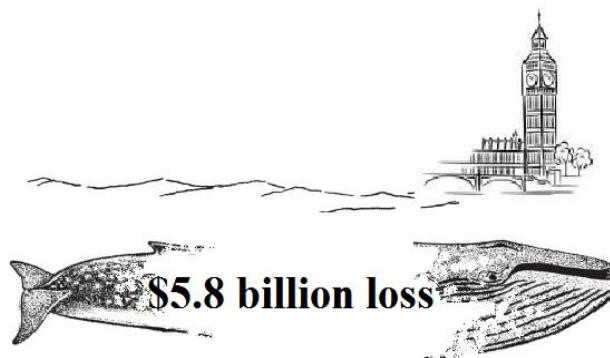
patterns in established areas, but this is how we make first steps in creating novelty and dealing with novelty imposed by evolution. We are still trying to understand what



**IT IS
FINANCIAL
INNOVATION!**

the computers—our own grand innovation—have brought to the world and how to deal with it. The term “**virus**” labels the pattern way to understanding. “**A demon of our own design**,” the title of a book by Richard Bookstaber (*A Demon of Our Own Design: Markets, Hedge Funds, and the Perils of Financial Innovation*, John Wiley, **2007**) [Before the Great White of 2008] is a pattern covering configurations from the Frankenstein’s monster to antibiotics resistance and, in this case, hedge funds and mathematical finance, yet another of concurrent mechanisms of the Great Recession.

The modern world is in a dense fog of complexity. I am motivated by the search for the ways of understanding new complex problems before the specialists solve them. My knowledge base is a map of knowledge rather than its full terrain and depth. I do not need to be an economist as I do not need to be a physicist or a mathematician. I need to know what the lines and colors on the map mean.



The instability of unequal distribution is a universal pattern: it does not depend on the nature of a system, provided the system consists of many interacting elements, whether molecules, flies, or humans, and has a sufficient degree of internal chaos.

Any inequality in distribution of energy, social energy, concentration, wealth concentration, temperature, social temperature, pressure, social pressure, political power, productivity, natural resources, etc., over space is potentially unstable.

I cannot discuss this problem in detail here. Suffice to say that this is a central idea of Pattern Theory.

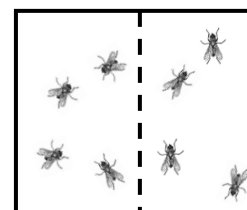
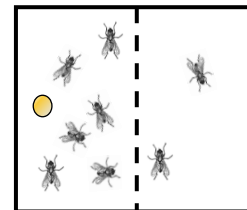
In mathematics, it is the relation between the symbols what matters, not what the symbols mean. Richard Hofstadter did not spare words to explain this in his books, especially, in *I Am a Strange Loop*. In Pattern Theory, however, it is not all: some structures, objects, relations, transformations, events, and states of the system are more probable than others, some improbable at all, and in its patter-chemical aspect, some events happen faster than others and some cannot happen at all.

I prefer illustrations to definitions. Here are some oversimplified examples of how things can be unstable and cannot stay the same for long.

1. Flies released in a room at one corner are distributed unequally over the room. With time they spread. Flies tend to distribute equally in empty space. They concentrate around a piece of fruit. When the fruit is finished, they spread.



2. The temperature in a room with a cup of hot water is distributed unequally. It equalizes with time: the coffee cools down, the room barely warms up.



3. A piece of paper in a room is surrounded by the atmospheric oxygen. It is chemically unstable and waits only for a spark to start burning, so that the distribution of energy in the room equalizes. Compare with financial crash.



4. The French society by the end of the eighteenth century is plagued by the inequality of wealth and, especially, power. It is only waiting for a spike in the price of bread to equalize the nation in a brutal manner.

5. The inequality of wealth and power in Tunisia needed only a spark to explode. And there is a spark: Mohamed Bouazizi, humiliated and impoverished, sets himself on fire. The entire region, charged with inequality, burns.



Tunisia, 2010

6. In 1917, the Russian society, mostly peasant, overheated by the WWI, destabilized by the **inequality of land ownership**, although making first steps toward democracy, explodes in a Bolshevik revolution and civil war. The Bolsheviks promise the redistribution of land, attract the majority, but soon after their victory take back all the land, together with industry and **all private wealth**. It takes 80 years before the absolute concentration of power begins to sluggishly relax and the inequality of wealth explodes in a privatization.

7. As for the Great Recession, **Figure 4** tells it all better than thousand words. It is not $E=mc^2$, it is ultimately simple: **inequality = instability**.

That **inequality is the main cause of instability** is an unpleasant, ideologically polarizing, and overall un-American idea, suppressed as anything setting a limit to a dream. Nevertheless, the parallel between the two Great Whatever has been widely discussed in print and in the Web.

See, for example, the Web page [Great Depression VS Great Recession](#) by *Brian Rogel*, from which I quote:

GD: 1921 – Top capital gains tax rate drops to 12.5% (*Revenue Act of 1921*)

GR: 2003 – Top capital gains tax rate drops to 15% (*Jobs and Growth Tax Relief Reconciliation Act of 2003*)

GD: 1921 to 1928 – Average income for the top 0.01% spiked to 892 times the average income of the bottom 90%

GR: 2003 to 2006 – Average income for the top 0.01% spiked to 976 times the average income of the bottom 90%

GD: 1928 to 1933 – U.S. home values decrease by 25.9 percent

GR: 2006 to 2010 – U.S. home values decrease by 26 percent

GD: October 1929 – Stock market crash of 1929 (*Black Tuesday*)

GR: October 2008 – Stock market crash of 2008

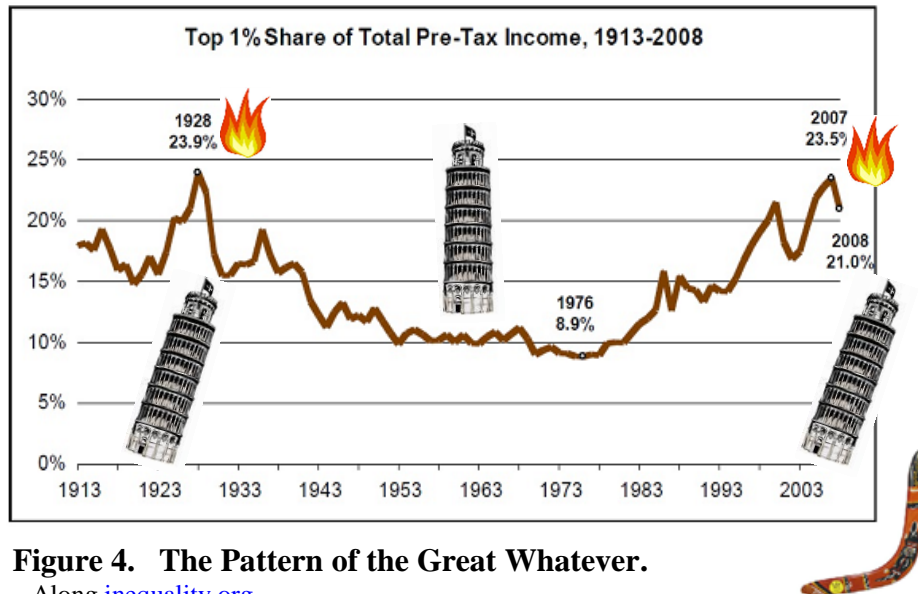


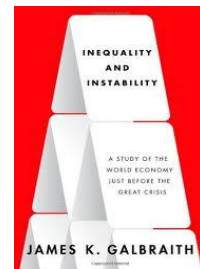
Figure 4. The Pattern of the Great Whatever.

Along inequality.org



**INEQUALITY
IS
INSTABILITY**

There are plenty of theories of the Great Depression, most of them very narrow. A large volume of work on the subject was done by James K. Galbraith, author of the recent *Inequality and Instability: A Study of the World Economy Just Before the Great Crisis* (Oxford University Press, 2012), a collection of his academic works on the causal link between one and the other. His more accessible interviews and publications are available on the Web. By linking two highly abstract terms, James Galbraith, I believe, is closer to pattern view than



anybody else.

Rather, the deeper issue with inequality of this type [‘extravagant gains by the already rich’] may be instability: that which rises like a rocket above the plain also, eventually, falls. And the problem with the trick of generating prosperity through inequality is simply that it cannot be continually repeated.

James K. Galbraith, J. Travis Hale. *The Evolution of Economic Inequality in the United States, 1969-2007. Evidence from Data on Inter-industrial Earnings and Inter-regional Incomes*. UTIP Working Paper No. 57, February 2, 2009.
http://utip.gov.utexas.edu/papers/utip_57.pdf

Instability means to me that the system is in a state **A** with energy higher than another possible state **B** of the system: **sooner or later** it will move from **A** to **B** on its own. When it will happen can be very hard or impossible to tell, as predicting earthquakes exemplify. This can serve as a definition of energy. Instability and energy are circularly defined through each other. It gets more complicated for open systems far from equilibrium. Then the behavior depends on particular details of the system and instability may have a specific mechanism. Pattern Theory offers a way to represent specific structural details in a universal language.

I believe that all economists who offer formulate reasons for two great economic catastrophes of the last hundred years are right: the reasons sing in harmony. But the last sixty years has been the period of enormous social and technological change in the world. What is the main novelty of 2008 as compared with 1928? I believe, it is the information revolution.

One of the earliest techno-prophets of the collapse was Emanuel Derman (*My Life as a Quant*, 2004), who sensed the digital tremors long before the earthquake of 2008, but first warnings were issued by Norbert Wiener.

The computers created instability of a peculiar kind: the turbulence of a fast moving stream, like a tsunami, or Katrina hurricane, wind tunnel, or just water in the garden hose nozzle. In short, they tend to amplify (as in above examples) or conceal fluctuations, to which the world of finance was not prepared and did not care because of enormous concentration of money and resulting risk tolerance. Computers do not have facial expression and body language, which could tell humans what the flickering symbols cannot.

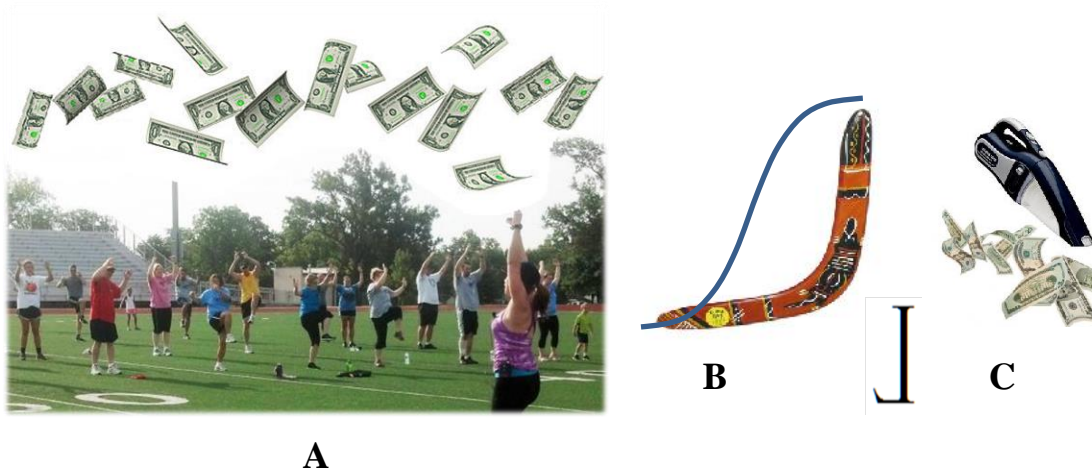


Figure 5 . Kinetic origin of wealth inequality.

Figure 5 presents my pattern vision of the technological origin of the wealth inequality.

Imagine that money is falling in dollar bills from the skies on a field with people catching and picking them up without cheating and fighting (**A**). The resulting cumulative wealth distribution would look as the blue S-curve (**B**), corresponding to normal “bell” distribution. But in reality it is the boomerang: and L-curve with the vertical “I” reaching the skies.

Imagine that **a few** people, armed with some gadget, like a vacuum cleaner (**C**), or just a broom, a butterfly net, were gathering the bills faster than **the rest**. This is what I call kinetic origin of inequality. With the amassed money the new rich could further buy more powerful vacuum cleaners. No cheating, no fight, no theft. Ultimately, they would pay (to a hedge fund) for high tech vacuum cleaners like the behemoth of **high frequency trading** facility. What the hell is it? Here is a testimony:

Vasant Dhar: So it's like a cash machine with very little risk. That's what's really appealing about it. You just make money every day. ([High-speed trading goes off the Street](#), by Jill Barshay, [Transcript](#). *Marketplace*, August 26, 2009)

Money-Making Machines (MMM), Figure 5, are a branch of technology emerged around 1970.

They are as diverse and vertically ranked as any kind of technology and they range from a MMM-bicycle to MMM-Lamborghini. Only the rich can afford MMMs of high productivity, such as hedge funds, private equity, high frequency trading, even the Berkshire Hathaway, originally designed for people who were not supposed to need money at all (Class A shares, \$129942.00 per share). Therefore, the pool of available money generated by economy is being pumped out at incomparable speeds by the middle class and the rich. This is how the middle class was left high and dry along the shores of the money pond.



Moreover, the competition propels to the skies a very small group of super-rich. Moreover, I spitefully claim (without any facts) that it is not the super-rich who arm to the teeth the Republican revolutionaries in their onslaught on the middle class, but the simply rich who dream about the entry in the club of the super-rich. The vertical world is quite different from the planes of the middle class. There are boomerangs, L-curves, and pinnacles of its own. What we call greed is, probably, 50% envy.

Note that in this metabolism of money nobody appropriates or steals other people's money or other property. The flow of money is not even redistributed: it is simply distributed like the water in public water supply systems, where water flows only in one direction to the consumer, but the pressure and pipe diameter can vary. Or, it is like the distribution of scarce water between neighboring states and nations, which leads to [water wars](#), whether in California or Central Asia or [Bolivia](#).

Now we are moving from a metaphor to pattern. The parallel between money and planet's water is, probably, a true pattern and not just a superficial and single-use metaphor, but I have not yet explored it. The depths are for the professionals, not pattern chemists.

NOTE: In fact, the picture is more complex and less ill-intended because of private mutual funds and public money taken from private pockets. As I understand the idea of the tea-drunk Republicans, there must be only the single irrigation system supplying private water to swimming pools, fountains, and kitchen taps in palaces and shacks. A diluted class war is guaranteed. It would bring us to the happy times before 1929.



The “pools” of money for **the rich** and the rest are as different as the world ocean and the pond. **The rest** operate mostly within national borders while the rich dip their hands in the entire world economy. The national economy, even the largest in the world, depends on the world ocean of money **as much** as a pond in Kansas

depends on the mercy of El Niño. **It is only a sea connected to the ocean in a tricky way.** The market wisecrackers have invented a term “(n)eurosis” for the morbid dependence of US stock market on the events in Europe.

The technology of expensive and productive MMMs is one of the noticed but least bemoaned reasons for the apocalyptic inequality. Not accidentally, the beginning of the steady inequality rise coincides with the spread of computers since 1970 and the switch from the Gold Standard to digital money—a pure fiction until it is exchanged for something tangible and not another, larger, exorbitant fiction. Economy is the antithesis of democracy and it cannot be otherwise, unless under totalitarian socialism. One way or another, it must be regulated and this is the

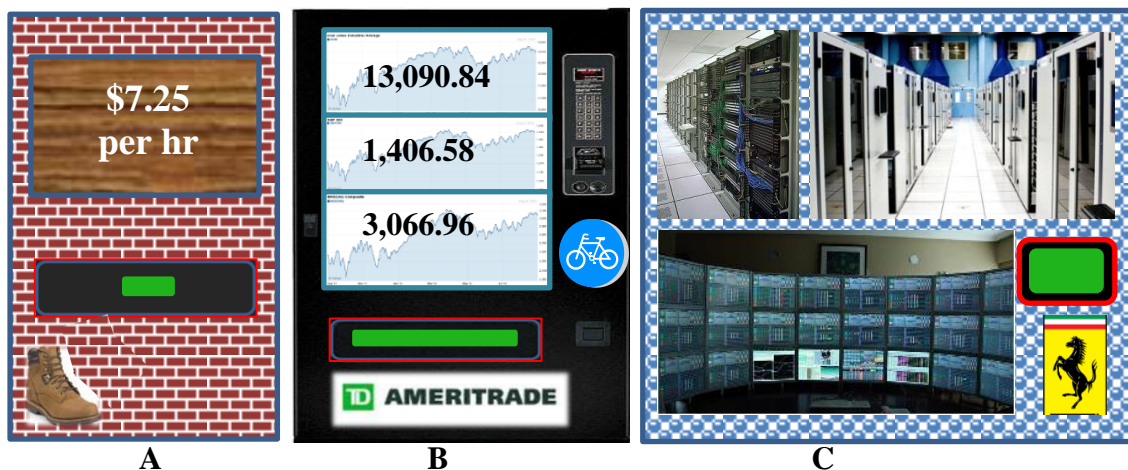


Figure 5. Money-Making Machines

essence of the Cold Civil War: it is a water war.

American Family Financial Statistics (statisticbrain.com) Date Verified: 7.26.2012		Data
Average American family savings account balance		\$3,800
Percent of working Americans who are not saving for retirement		40 %
Percent of American families who have no savings at all		25 %
Average American household debt		\$117,951

Average American household annual income	\$43,000
Average credit card debt	\$2,200
Percent of American adults who do not have a bank account	7.7 %
Percent of American adults who have an emergency fund to fall back on	38 %

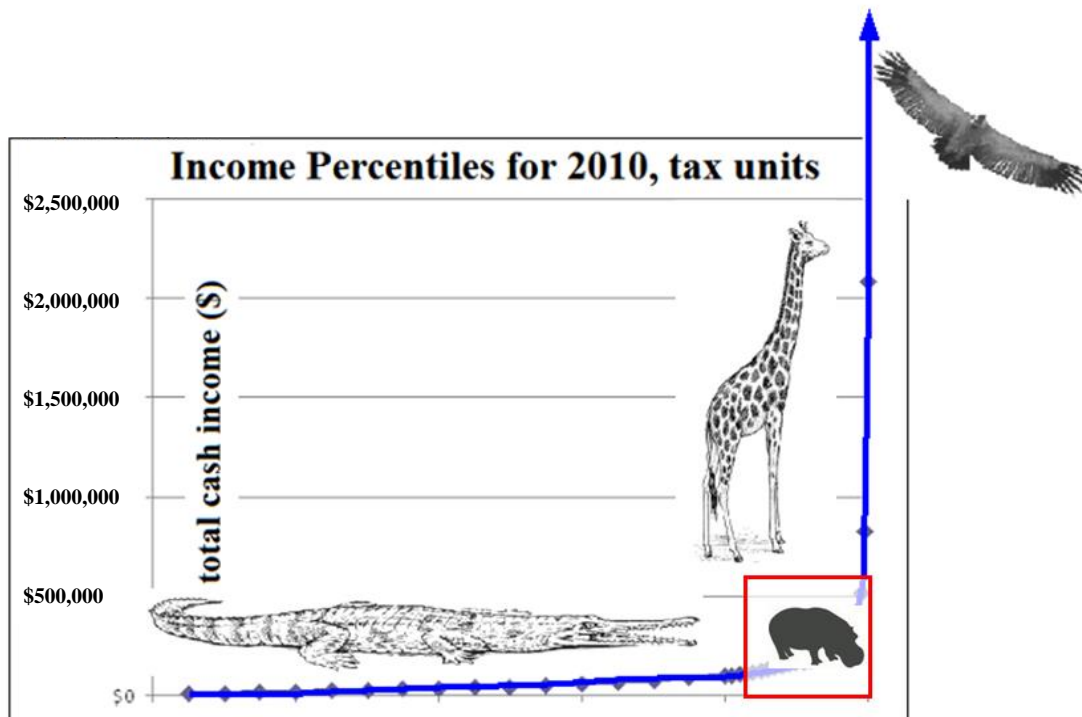


Figure 6. The bestiary of inequality

What is waiting there behind the November 2012 corner? The Robespierres of the Tea Party with the guillotine as the cure for a liberal headache? Or the specter of Karl Marx, which had never left Europe and showed up incognito, with a guitar, his bushy beard trimmed, in the American “Occupy” (instead of “expropriate”) movement? Or the monstrous national debt—another instability—as an aspirin for the brain cancer of unlimited growth?



TOLD YOU SO

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There is one kind of wealth that is given away equally to all people: the

wealth of statistical data on wealth. It is available on the Web. The difference between the rich minority and the rest is so striking, that the two groups look like different socio-biological not even species, but classes, like reptilians and mammalians. **Figure 6** symbolizes the contrast. It does not show, however, how overwhelming the contrast is. Thus, one of the top personal possessions, around \$50 billion, is 100,000 times larger than \$500,000, the lowest “giraffe height” income. Let us take half a million figure as moderate wealth. If **Figure 6** was 1” tall, the connecting line between the lowest “giraffe” and “condor” top would be 1.5 mile long. How realistic is half a million? Half of American households had not more than \$109,500 in 2007 and \$96,000 in 2009. The average wealth was \$506,500 and \$390,005, respectively ([source1](#), [source2](#), somewhat incoherent).

There are not too numerous books about sociobiology of crocodiles and giraffes. Reading some of them was a painful experience for me. I was left with questions with no hope to find answers.

Charles Murray. *Coming Apart: The State of White America, 1960-2010*, Crown Forum, 2012

Richard J. Herrnstein, Charles Murray. *Bell Curve: Intelligence and Class Structure in American Life*, Free Press 1994

Robert Frank, *Richistan: A Journey Through the American Wealth Boom and the Lives of the New Rich*, Three Rivers Press, 2008

Robert Frank. *The High-Beta Rich: How the Manic Wealthy Will Take Us to the Next Boom, Bubble, and Bust*, Crown Business, 2011

Robert H. Frank, Philip J. Cook. *The Winner-Take-All Society: Why the Few at the Top Get So Much More Than the Rest of Us*, Free Press, 1995

Robert H. Frank. *Falling Behind: How Rising Inequality Harms the Middle Class*, University of California Press, 2007

Barbara Ehrenreich, *Nickel and Dimed: On (Not) Getting By in America* Picador, 2011

David Brooks. *Bobos In Paradise: The New Upper Class and How They Got There*, Simon & Schuster, 2001

Thomas Frank. *What's the Matter with Kansas?: How Conservatives Won the Heart of America*, Holt Paperbacks; 2005

Chrystia Freeland. *Plutocrats: The Rise of the New Global Super Rich and the Fall of everyone Else*. Penguin, 2012

Coming Apart: The State of White America (2012), by Charles Murray, is as controversial as Richard Herrnstein's and his *Bell Curve* (1994). Regardless of interpretations and controversy, *Coming Apart* is, probably, the most comprehensive opus in comparative sociobiology of crocodiles and giraffes with hippos. David Brooks' *Bobos In Paradise* takes under the social microscope a narrow segment of the hippos and lower giraffes. The brave Barbara Ehrenreich runs an experiment on herself in order to crack the mystery of survival of lower crocodiles in *Nickel and Dimed*.

Note that the hippos come not exclusively from the crocodiles but also from the baby giraffes—to get elite education and have good chance of squeezing into the giraffe elevator.

Unlike the normal distribution, given by nature and blind chance, the boomerang distribution is typical for the most significant results of human initiative and purposeful activity. It is suggestively called the **power** law distribution, or, “the more you have, the more you will have.” In a straightforward form it [is known](#) as the Matthew effect (or accumulated advantage) “[the rich get richer and the poor get poorer](#).” In its extreme form it sounds like “the winner takes all.” American spirit, however, does not approve of monopoly and the stars and kings of all kind rise and fall easily.

MONEY IS NOT WATER! Money is not water, even though it can run as fast through the fingers. A gram or a ton of water, H_2O , whatever happens to it, does not lose an atom! Money, however, especially, if digital, is not conserved. Most remarkably, it can be created, like the world by God, out of nothing by “*fiat*,” which means “let it be.” I am not a mathematician, however, and I cannot clarify this problem. I can only formulate it: if money constantly changes in an unpredictable manner, what kind of physics can describe it? Can the equality signs in the math of money be reliable? Money seems to exist in time which is not Newtonian, but tangled, torn, knotted, and twisted by human factor. The truth has the same pliability.

5. A TRIBUTE TO THE RICH

Equality is not my ideal. If I had had any illusions, my life in Soviet Russia had not spared them. True real-world equality—even the equality of opportunities—is impossible. Genuine real-world equality—and even the equality before the law—is unattainable. Money warps every playing field. Genes add wings to ankles or chains to wrists. Inequality is as natural as rain and shine. Inequality is the bright palette of life. Inequality means exciting, and stimulating diversity. Equality is for the gray army of robots good for destruction, not creation. But even the army needs generals.

Enforced equality of wealth means, paradoxically, not democracy but monopoly of power, stagnation, and decline. Evolution means selective advantage and advantage is the synonym of inequality. In exsystems—evolving complex systems consuming energy—there is a range of inequality which means stability. The physical reasons for that were discovered only around the middle of the nineteenth century and they are not so simple. Paradoxically, they follow from the physical counterpart of equal opportunities: some opportunities are lost, others amplified. Fluctuation is the physical name for “opportunity.” Chemical structures that can be generated from a given set by recombination of atoms are “opportunities” in chemistry. Various thoughts in a particular mind at a given moment are “opportunities” in Pattern Theory. One of the most fundamental properties of the world is that only a small part of all “opportunities” has good chances of realization. Pattern chemistry adds to this a rider: the least obstructed opportunities are more probable. The obstruction is the irregularity of a transition state.

I am not an egalitarian. I have no moral opposition to wealth. American spirit encourages success, wealth, personal progress, and stardom, however temporary. It is the American spirit that created prosperous middle class between the Great Depression and Great Recession and remains a powerful attraction for the poor, oppressed, and mistreated, as well as for talented and ambitious. An immigrant from a despotic system, since my first day in America, I could physically feel what it meant to breathe free. I enjoy freedom, my basic needs are met, and I do not fret over missing wealth. To take what is free, to use the opportunity, to get an advantage—to condemn that is like to condemn a cat that chases a mouse.

In one way or another, willingly or under pressure, the rich contribute to all lasting things. Freedom, art, music, poetry, science, culture, philosophy, justice, information are as important to me as food and water. Throughout history it was the rich benefactors, extravagant kings, and greedy predators that left palaces, temples, and monuments for the next generations, patronized greatest artists and scientists, funded colleges, hospitals, libraries, and charities.

The rich are the keepers of freedom, diversity, independence, originality, and innovation on a very large scale because they will not give a damn for anybody's opinion. They can resist pressure. They are free to experiment and to set new patterns to the rest. The rich are the strongest potential opponents of repressive regimes. The poor can only adapt to the system or revolt. The Russian Communists were able to exterminate freedom of thought only by abolishing not just wealth inequality, but the wealth itself.



It was the support and generosity of the well-to-do and rich American Jews that made possible the exodus of the Soviet Jews from Russia. It was a wave that picked me up from a desperate situation in the middle of the Eurasia and landed on the shores of Lake



Michigan.

The super-rich are often the super-generous. It is Warren Buffett who [pledges](#): “More than 99% of my wealth will go to philanthropy during my lifetime or at death.”

Or: [Warren Buffett](#) and Bill and Melinda Gates’ [initiative to get billionaires to pledge](#) at least half their wealth to charity signed on 11 new families who support causes from science museums to access to marijuana.

Nevertheless, on average, the rich are not like most of us. There is an impenetrable barrier between the psychologies of the average **rich** and the average **average**. Sometimes I was jarred by a strange psychological dissonance in the mentality of the rich: they expect all people to behave as rich. I can understand that. People cannot imagine what they have never experienced. But many among the rich in America, if not the majority, are of humble or painful origin and they have enough imagination.

In any case, the rich should not have either legal or moral obligations to the rest of society. But the double entendre of the word *tribute* is intended. There is a tribute that “the rest” are paying to the rich. It is the threat of economic and political instability. The excessive inequality is a

blessing without disguise, but sooner or later, historically, the boomerang comes back as a disaster. The problem with exsystems, like life, society, economy, and religion, is that they are stable within a certain range of parameters. A large deviation from the optimum ends up in extinct species, revolution, crash, and either reformation or theocracy.

Anyway, after this tribute, I swear not use the word “rich” in this Essay anymore. I do not want any ideological connotations. I prefer **the Few**. The division into the Few and the Many—the *oligoi* and *polloi*—is part of life and a law of history. It is natural. It is necessary. It happens because wealth is a life form: it multiplies like rats in a large, expanding, but still limited space. It feeds on abundant, but still limited food. In order to multiply wealth to the “condor” level, you need not only enough money left after your daily expenses, not only a passionate love of money, but also a modern rat farm, computerized, served by MIT graduates, and upgraded by a notch each year like the Apple’s iPad. You need an MMM: Money Making Machine. Moreover, you need to protect your MMM with the power of the government and the courts and you are tempted to put them inside your MMM.

There are few of **the Few** because they make money faster than **the Many**. It is like a marathon or a bike race which stretches from a few leaders to the tight core and a long tail of the weak. The money road narrows with each million.



Inequality is beyond ethics because it is a fundamental pattern of life on earth, based on multiplication and competition for limited resources, from microbes to political parties and from money to fame. It is the competition in which there are always winners and losers

in an always shifting order—through centuries, decades, or overnight.

No traditional Abrahamic religion either extolled wealth or saw any moral symmetry between wealth and poverty. All three commanded giving and support of the poor, as did all traditional religions and Confucianism, as far as I know. All religions assumed, however, that the commandments held only within a strictly delineated tribe, nation, religious community, denomination, or caste—and many still see it that way. Only the few last centuries shaped the liberal view of the world without borders. Yet the word “liberal” is still derogatory in parts of America. Without Middle Ages in its history, the USA as a whole is not in a hurry to embrace Enlightenment and Deism of the founding fathers. In the absence of astrophysics, Deism was a very practical substitute and still is a good metaphor and God is always a good shortcut to the reason of all mysterious things.

Religion is a complicated divisive subject and I should leave it untouched until the very end of this Essay.

Where can we see **the Many** brotherly mingling with **the Few**? Certainly not in Wal-Mart. Not on public beaches. In the polling place of the one-person-one-vote elections? It will not make any difference for the giraffes.

6. VITAL INTERESTS

I distinguish between **universal human needs** (food, shelter, security, leisure, freedom, etc.) and **vital interests** that are different for different social groups. Vital interests can clash, which is more or less the essence of history.

Placing poverty and wealth onto the same continuous scale in **Figure 6** conceals the extent of the split of the society into two biosocial classes as different as “crocodiles” and “giraffes”. The Many and the Few simply have different pattern physiologies—more distinct than the difference

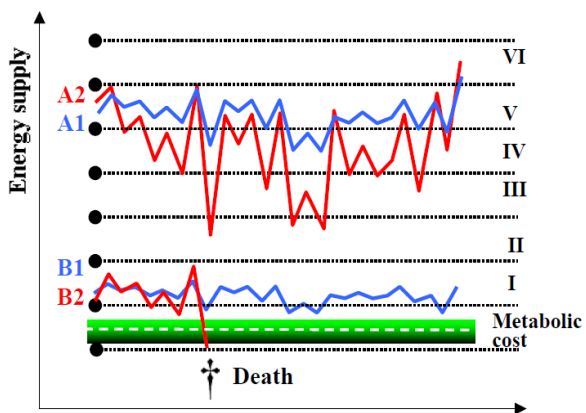


Figure 3.6.2. Prosperity (A) and poverty (B) at low (blue) and high (red) range of economic fluctuations (temperature).

Figure 7. Metabolic cost.

From [Introduction to Pattern Chemistry](#), p. 101

between reptiles and mammals. The striking difference seems to be of the magnitude of the contrast between plants and animals. It manifests in the way the taxonomic class reacts to economic events: the animal can escape or fight, but the plant can only accept its fate and halt its metabolism during the drought or winter. The problem is that the next step down from “metabolic cost,” i.e., the minimal level of life, is death, biological for plants and animals, social (physical in many parts of the world) for humans.

Figure 7 reproduces *Figure 3.6.2* from [Introduction to Pattern Chemistry](#) illustrating the idea of metabolic cost.

In this Essay, I present a different visualization of the problem of two classes, inspired by the metaphor of water.

There is no Economy ocean on the map. We can imagine it, see **Figure 8**. A five-story residential beach-front property is subject to the dangers of storm surge or even tsunami from the Economy ocean.

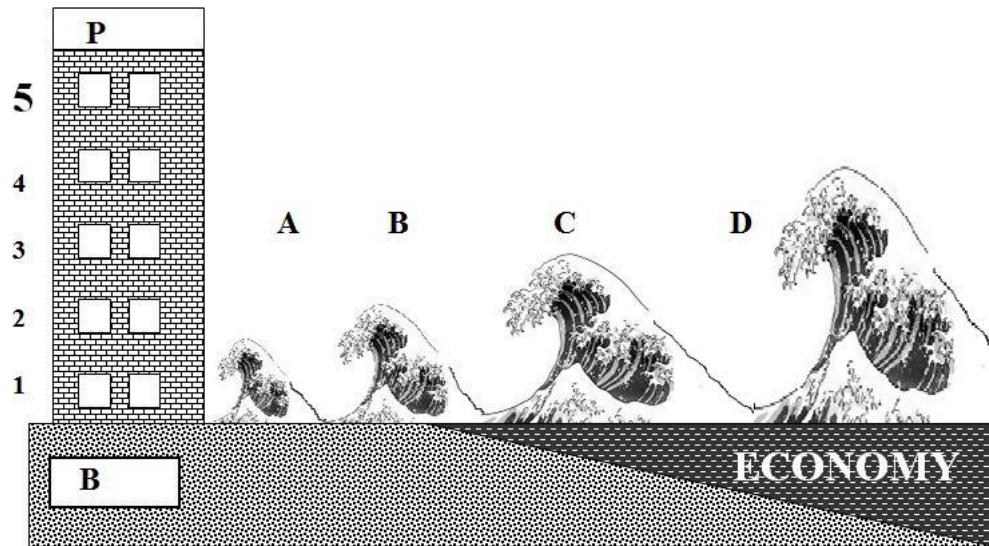


Figure 8. Inequality of loss

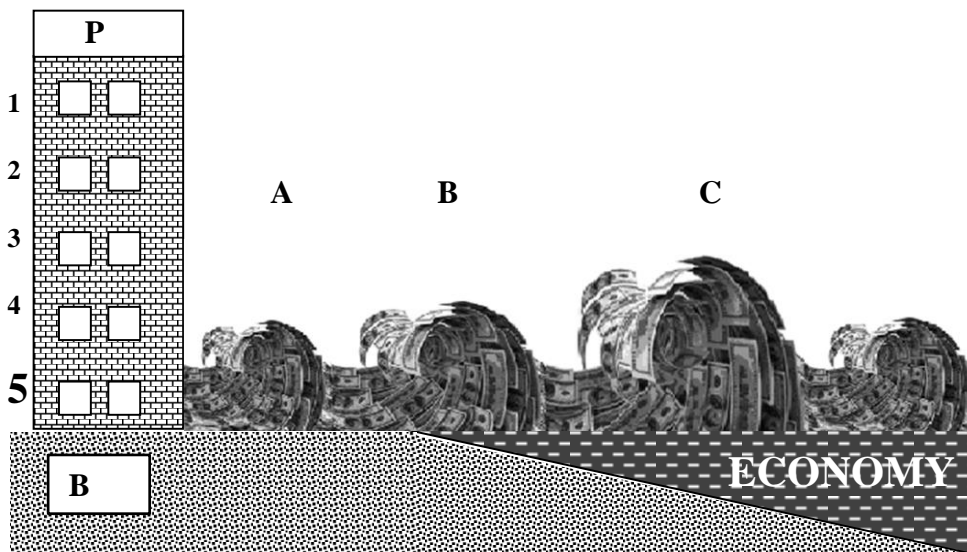


Figure 9. Inequality of gain

The irregular but limited in range tide of Economy—which the economists call “equilibrium”—does not reach the house. From time to time a storm comes and waves hit the house and bring misery and material damage to the occupants. People on the first floor are most vulnerable. People at the top may never lose anything to flood during their lifetime. This inequality of loss is matched by the inequality of gain in **Figure 9**. Both gain and loss have the same origin. The loss is just the opposite end of the scale of gain. In the long run, Economy is beneficial and

productive. It brings overall gain, although there is no law of nature guaranteeing “unlimited growth” in a very long run, just the opposite. The effect of the social structure built on the shores of Economy is such that it splits the tenants into two (not four and not three) classes. One class lives **under the threat** of moving into the basement **during lifetime**, the other class is **certain** that the basement and even the first floor are out of question **during lifetime**.

There is a limited movement in both directions simply because the number of the Few can be only, well, small. I am not sure that it is only the magnetism of multi-digit numbers that motivates some of the Many and all of the Few to elbow their way upstairs, as I do not believe that it is the loss of .07" of thickness or a 0.5 " gain of screen that makes fans to swoon over the new iPhone 5. I doubt that all Americans are motivated only by money. I believe it is just the typically human diversity of talent, initiative, character, and genetic endowment, as well as the play of chance in circumstances that shapes the human fate. I do not believe in human irrationality: I believe in the diversity of reasons. But this area is still very dark even with the candles lit there by David Kahneman and other psychologists of human behavior.

Anyway, the vital interests of the Many and the Few are different: the Many want not to be flooded, while the Few want not to be the Many. As a consequence of the inequality of loss, the stakes are much higher for the Many and stability is their vital interest. But as the consequence of the inequality of gain, the Few profit not from stability, but from the storms and tsunamis of Economy. One should be rather surprised if the party of the Few called themselves conservative. One should not be surprised if the party of the Many called themselves liberal.

As for the reason for the storms and tsunami, it could be tempting to blame the Few for angering the Poseidon of Economy. I cannot blame them. It is just the inherent property of the exsystem shaped by the Industrial and Digital revolutions. In this system both classes are not really two antagonistic forces, but two complementary hyper-sexes.

To summarize, there are two biosocial classes—**the Many**, open to high life-shaking loss, and **the Few**, open to high life-stabilizing absolute gain—and this is why they are represented by two political institutions. The number of parties is minimal because political Darwinism is the most ruthless of all when politics becomes a branch of economy. The parties clash not at the polling places during the elections, where everything is quiet and decent, but in the vast diverse ecosystems of human minds.

7. THE VOTER'S MIND

New ideas do not arrive to an empty mind. There is already a community of ideas, some of them friendly, some hostile, and most indifferent. The newcomer either fits in, or has to fight, or melts into shadows.



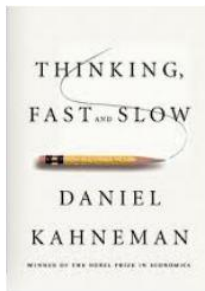
The sleep of reason produces monsters
(Goya)

What is there in a voter's mind? This is the to-be-or-not-to-be question for a candidate. But how can we know that? Even some presidential candidates, in bright limelight, who are expected to open their hearts, minds, and tax returns to the voters, can be more secretive than their future secret service, while others do that to their peril.

Human mind is a curtained voting booth. There is no mystery, just a secret.



Ross Carl "Rocky" Anderson, a former two-term mayor of Salt Lake City, is a fascinating but little known person (Google him). I learned about him just a few days before writing these lines, while listening to the radio. He worked with Mitt Romney on 2002 Winter Olympics in the city. In his [interview to Public Radio](#), when asked about the presidential contender, he said that “nobody can say who Mitt Romney really is” or what he will do if elected President, so diametrically opposite his previous (moderate, pro-choice, pro-gay, pro-stem cells) and current views are.



Truly, human mind is a well-protected mystery. Nevertheless, the best minds since Plato and Aristotle to modern psychologists have been trying to crack the defenses of their own extraordinary organs.

Daniel Kahneman's *Thinking, Fast and Slow* (2011), is about the sleep of reason or, in author's terms, irrationality. I was reading it with a feeling of protest—an uncomfortable sentiment when the author is a Nobel Laureate and an excellent writer on a captivating subject of general interest. I hope to come back to this book later elsewhere [look for Essay 58]. Here I give the best known single [example](#) from a paper by Amos Tversky and Daniel Kahneman (1982).

This experiment was repeated with different people many times and the great majority (85% in the original experiment) chose answer 2, although a female bank teller is a more common occurrence than a female bank teller who is also an active feminist.

LINDA

A group of students was asked the following question:

Linda is 31 years old, single, outspoken, and very bright. She majored in philosophy. As a student, she was deeply concerned with issues of discrimination and social justice, and also participated in anti-nuclear demonstrations.

Which is more probable?

1. Linda is a bank teller.
2. Linda is a bank teller and is active in the feminist movement.

The experiment and the interpretation of the statistically dominant answer as irrationality or fallacy have been criticized, sometimes in very strong words, by a part of psychologists. Psychologists remain split quite like our political parties. I am not going into details here. In essence, as I discovered going back to the history of the problem and original publications of experiments (a large, fascinating, somewhat eerie domain!), our mind, in my interpretation, works the following way.

If there are two possible answers to choose,

(the preamble and choices in an experiment often are intentionally deceptive, suggestive, or ambiguous),

the entire content of our mind—conscious and subconscious—

(it can be anything: education background, money troubles, expectation of a date with an intimate friend, weather, recent news, personality of the experimenter <yes!>, etc.)

at the time of choice divides into three parts,

(either supporting or contradicting or irrelevant, regarding each of the choices)

and it votes for either answer 1, or answer 2, or abstains in the election of the answer and votes arbitrarily.

There is much more to it in Kahneman's book and the corresponding field of psychology, for example, the division of thinking into fast and slow. I regard it controversial because what is slow or fast and rational or irrational depends on the background and education, i.e. the content of the mind. What is slow for a student is fast for the professor.

Psychological experiment in this field consists typically of filling out a questionnaire or performing an action, for example, choosing a chair from a row to sit down. As an experimental scientist used to experiments with chemicals and hardware, I was struck by a peculiar situation in psychology: the result of an experiment with the purpose to investigate the mind content of a

subject reflects also the intent, background, imagination, and **mind content** of the experimenter. This can be quite a tangle, like in a comedy of errors.

Just one more example. People, it was found, tend to exaggerate risks. Thus, it is known that the risk of a fatal accident with an airplane is extremely low, but some people are still irrationally afraid of air travel. But is it irrational? I believe that it is generally natural to value your own life more than lives of strangers: the statistics that applies to others does not apply to you. Yet nobody dealing with statistics of personal risk seems to notice the cardinal difference between “my life, my health, my money” and “your life, your health, your money.”

Although the significance of the entire rationality research is undisputable, I do not consider interpretation of most experimental results as quite rational. This important and troubling book made me turn to original experimental works of Daniel Kahneman and Amos Tversky, as well as some of their opponents. I tried to look deeper and wider at the whole large area of behavioral psychology, which turned out not so behavioral, if playing make-believe games does not count as behavior, and not so scientific, if science means logical rigor. What it certainly is, although not on purpose, can be summarized as the theory and practice of mind manipulation. Countless and rather depressing examples can be all summarized as the principle: what you do is what is in your mind, which is a cocktail of a few ingredients, some of them secret, stored in the subconscious, and closed to yourself and the manipulator. Therefore, the manipulator uses his own mind as a template for humanity and frequently, but not always, succeeds. It is the relative concentration (i.e., intensity) of the ingredients (fears and desires) that decides the outcome. Strong fear or desire overcomes the weak fear or desire, but if there are no fears and desires to compete, there is no choice and the outcome is straightforward.

The main unanswered question is: what is rational? It seems to me that because two different minds take part in a psychological experiment (or a political confrontation), what is rational for one mind can be irrational for the other. It is irrational for a college freshman to give any serious thought to an artificial and utterly irrelevant question with no personal consequences for the answer. It is irrational for a scientist to expect the same answer to an artificial question about money from a son of a billionaire and a coal miner's daughter.

It has already been noted by some reviewers, that Daniel Kahneman's encyclopedia of irrationalities omits the most conspicuous item of all: religion. It is mentioned twice in passing, without judgment.

But why is religion irrational as a matter of fact, not in a derogatory sense? Because for every belief there is another belief which considers the other one a fallacy. Beliefs have no consensus and ask for no proof. The purpose of religion is personal moral guidance and responsibilities, spiritual comfort, sense of community, historical roots, meaning of life, attitude to adversity, and, in some fundamentalist cases, everyday behavior and customs. It is what science based on facts and logic cannot give and does not intend to. Religion and ideology is about personal choice. But what is good for the goose is not good for the gander.

Anyway, I am coming to the core of this Essay. The voters with two different vital interests form two groups of unequal size. How can their minds be statistically equilibrated regarding the binary election choice?

Let us put the blue Democratic and the red Republican minds on a balance scale, **Figure 10**, and load the pans with items of mind content relevant for the choice.

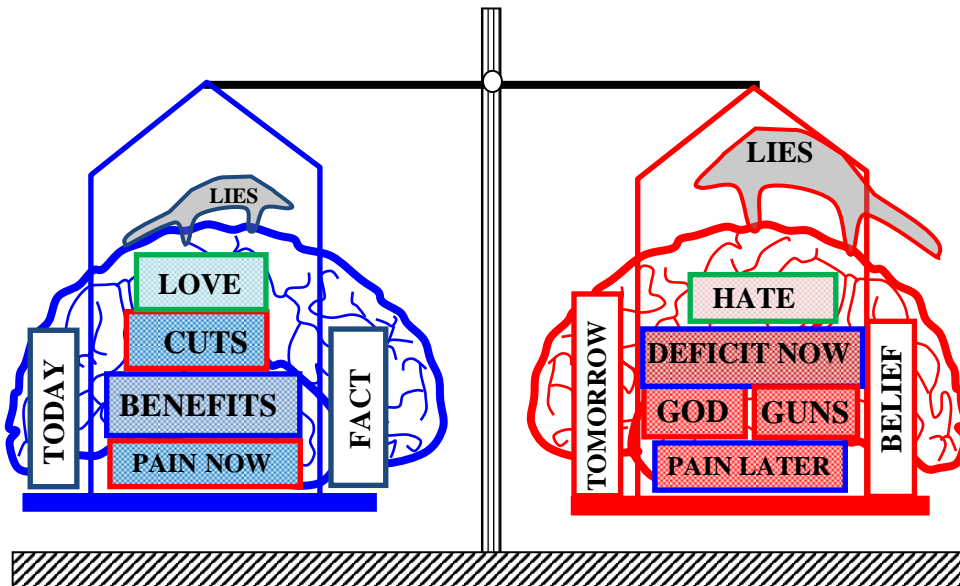


Figure 10. The choice for the Many: Blue or Red?

BENEFITS	Democrats promise and keep alive social security (literally, not just as the name of the package of programs) to the Many. I label its box as BENEFITS . I frame the items coming from Democrats blue and from Republicans red. The	TODAY
CUTS	Republicans promise CUTS , which also add weight to the blue choice of the	
LOVE	Many. Suppose, the person is inclined to follow the liberal and Christian idea of love of the neighbor regardless what is on the neighbor's mind, skin, or	
PAIN NOW	memory. Let us put LOVE on the scale. Since the choice depends on the state of the economy, I add PAIN NOW of unemployment, poverty, or uncertainty TODAY . If the	FACTS
	person makes decisions basing not on beliefs and dogmas, but on FACTS , I mark it so.	

Let us take a different mindset of one of the Many. **HATE** is an exaggeration, but it is certainly not **LOVE** or equal rights. It means prejudice and negative feelings to some neighbors. **DEFICIT** is a perfect reason to worry, although not for **TODAY**, but for **TOMORROW**. It is **PAIN LATER** for a concerned person who has little worries about **TODAY**. Of course, **PAIN LATER** is just an idea, but it can be painful **NOW**.

It is only my assumption that the load on the right pan can hardly outweigh the load on the left pan. The stress of the situation does not come from facts only. The right mindset is susceptible to **BELIEFS** and **TOMORROW**, i.e., the imaginary future and apocalyptic visions is a weighty

factor in the right mindset. Still, it seems to me that it needs something else to catch up with the left pan. **GOD** and **GUNS** come to join politics of **BELIEF** and **TOMORROW**. The **GUNS** hysteria reflects the expectation that **TOMORROW** the government of the leftists will come to the doors to take people's freedoms. To **GOD** and **GUNS** I would also add the worship of **GREED** relabeled as **SUCCESS**, but it weighs upon both pans, although heavier on the right. I include it in **LIES**

The choice is ultimately between **BENEFITS** and **DEFICIT**, both **TODAY** and **TOMORROW**. My personal position, which is, by my observations, the opinion of a vast majority of voters, is that both are equally dangerous because they are two ways to name the same thing. They should be settled by a compromise in the national interests of highest priority. The party politics create national schizophrenia aggravated by money.

The choice is simple and automatic for one-issue voters. Others weigh the offers on their minds scales rigged by personal background and current problems.

Social psychiatry is not my cup of tea. I leave it here with the last note: the Few do not need **BENEFITS**, do not feel much **PAIN**, rely not on **GOD** but on money, can hire all the **GUNS** in the world, and have no reason to be much concerned about **TOMORROW**: in these hard for the Many times the MMM of the stock market is in high gear.

The Red package, therefore, is designed for the Many along the vital interests of the Few. It is like a piece of bread made of the mixture of flour and sawdust—in times of war, siege, and blockade, this is how it was often made.

And yet the Few **vote** Blue, too. I do not mean large donors. I wonder why. I have no data to substantiate my explanation, but I suspect that common sense, belief in the US Constitution, and liberal ideals are among reasons. I hope the Blue Few understand that theocracy, bigotry, limits to personal choice, depletion of reward for honest work, and exploding inequality are the guaranteed ways to destroy the USA. I believe that the Blue Few make a rational choice.

Naturally, many other compositions from the same or other blocks can be put on the balance and compared, although not so easily in numbers. Some blocks are connected, like lack of education and religious zeal, cultural isolation and guns. Professions, incomes, beliefs, and tolerances form heavy clusters, mental “molecules,” which weigh more than just the sum of the isolated components.

Figure 10 is a product of my imagination. It is a configuration of a pattern of manipulated rationality. Whether it is the question which Linda is more probable (ridiculous and intentionally misleading test) or which candidate you vote for (even one with a tightly closed mind), or even whom to marry (Charles Darwin, actually, compared all pros and contras for his marriage), it is the choice between **combinations of components of different composition and weight; in other words, pure chemistry.**

I consider any religious arguments in politics irrational anywhere in the world and regarding any religion, whether in America, Israel, or Egypt. It is not irrational, however, as the last resort of

the minority—or even majority—within the democratic society, to promise a bright future instead of facts and logic. I know no major religion (or ideology, or even a TV ad for health and fitness) that would not promise something—paradise, nirvana, communism, wisdom, weight loss, or happiness the person is desperate to find.

A TRIBUTE TO IRRATIONALITY. We are taught to be rational along a universal set of rules. Rationality limits our fantasies. We are free to be irrational. Irrationality is a wealth in itself and we do not need to toil for it. It is the source of individuality and antidote to tribal boredom. Irrationality makes life a fun to live. It adds intensity, variety, entertainment, surprise, colors, taste, and humor to daily routine. It adds purpose other than money, breaks up boredom and monotony, intensifies search for gain and provides comfort at loss. Life is a theatrical play about human nature, where reason and belief, logic and passion are engaged in love, jealousy, deceit, and competition.



**IT IS
IRRATIONALITY!**

My **Essay 57** is just a mental experiment, a game, played to illustrate the pattern view of the world and the search for similarity between the pattern-chemical composition of a new product, social structure, political situation, human mind, and stages of history.

Nevertheless, I, a registered Independent, have my own firm political convictions and I know who I am going to vote for.

Although both extremes of liberalism and clericalism are reckless and irrational in their own way and the profession of a politician does not leave anybody clean and spotless, I do not find any symmetry between Democrats the spenders and Republicans the cutters. For Democrats, Republicans are political enemies, but Republicans see Democrats as blood enemies.

It is not only the nastiness, bigotry, obscurantism, and hatefulness of the Reds that tilt my balance heavily toward the Blue. Those four attributes could be a result of my own irrationality. What important is the internal logical contradictions of the Republicans. It is the self-contradiction between the two Mitt Romneys within a short span of only ten years, from 2002 to 2012. It is the self-contradiction of two Paul Ryans: one a devout follower of the aggressively atheistic Ayn Rand and the other a devout Catholic and Tea Party hero with a gun. It is the contradiction between the Christian ideals of mercy, forgiveness, and compassion on the one hand and the social Darwinism and harsh invasive theocratic legalism in the current Republican ideology on the other hand. Moreover, it is the screeching friction between legalism and anarchism.

The most absurd idea coming from somebody whose profession is based on knowledge of history and Aristotelian logic is that we can penetrate the minds of the Founding Fathers 225 years later with a mind rejecting science, evolution, and lessons of history. How can we do that? By talking to their spirits with Ouija board? By interpreting the US Constitution as a religious text?

Of course, there is also something personal sitting very deep in my mind that makes me cringe at the Republican propaganda.

It is the same pattern of **internal contradictions** which first made me doubt the Communist ideology I was brought up in. The Soviet canon had many essential features of a religion, including sacred texts, prescribed rituals, and standards of ideological purity. It also promised a sort of paradise: the future triumph of Communism on the planet free of exploitation, inequality, and even money itself. To its credit, the Soviet system promoted education and even the universities were free. But capitalism and Western philosophy were as much an anathema as Darwin to the Christian fundamentalists.

Early in my youth I asked myself a question. The elections in the Soviet Russia were extolled by propaganda as the most free and democratic in the world. Right so. People were encouraged or even nagged to come to the polls, nobody was discriminated, there were curtained voting cabins, one person one vote, but why was there only one candidate on the ballot? That act of rational thinking was a beginning of my transformation until the open conflict much later.

The irreconcilable contradictions between Red and Blue world views mean that the USA is in an unstable transition state. The patterns of history do not promise a return to the happy days. The only thing they promise is novelty and surprise, slowly relaxing into habit. What is new for America, however, could be old for a different place on earth.

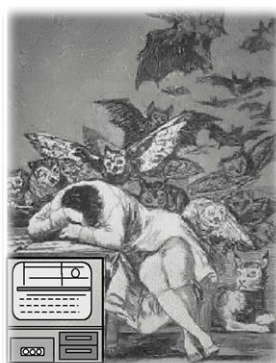
2012



Yuri Tarnopolsky



Essays à la Montaigne



2001-2015

**Essay 58. ALL RATIONAL MINDS
ARE ALIKE; EACH IRRATIONAL
MIND IS RATIONAL IN ITS OWN
WAY**

Pattern chemistry of rationality

Essays 1 to 56 (2001-2009) were previously published at:

<http://spirospero.net/simplicity.html> (contents and links to single Essays)

<http://spirospero.net/essays-complete.pdf> (Essays 1 to 56)

<http://www.scribd.com/doc/11607864/Essays-Part-1> (Essays 1 to 20)

<http://www.scribd.com/doc/12273800/Essays-Part-2> (Essays 21 to 40)

<http://www.scribd.com/doc/12529842/Essays-Part-3> (Essays 41 to 56)

<http://www.scribd.com/doc/17164855/Essays-a-la-Montaigne-complete>
(pdf, Essays 1 to 56)

[Essay 57. THE FEW AND THE MANY](#) , html (pdf)

MAIN SOURCES FOR PATTERN THEORY

Ulf Grenander, *General Pattern Theory: A Mathematical Study of Regular Structures*, Oxford University Press, 1994.

Ulf Grenander, *Elements of Pattern Theory*, The Johns Hopkins University Press, 1996.

Ulf Grenander, *A Calculus of Ideas: A Mathematical Study of Human Thought*, World Scientific Pub Co Inc , 2012.

Numerous sites on the Web.

PATTERN THEORY AND PATTERN CHEMISTRY:

Yuri Tarnopolsky, COMPLEXITY, <http://spirospero.net/complexity.html>

ESSAY 58. All Rational Minds are Alike; Each Irrational Mind is Rational in its Own Way

Pattern chemistry of rationality

PART ONE



While I am coming to the end of my Essays, the difference between light and heavy matter disappears. Two different sections of my website spirospero.net begin to partly converge. Starting with **Essay 57**, I place links to some new Essays into both [complexity](#) and [simplicity](#) and use pdf format.

The difference between complexity and simplicity is a matter of size. All possible states of small systems can be listed and counted within reasonable time. To list all possible states of a complex system is practically impossible because of the combinatorial explosion. For evolving complex systems (exsystems) it is impractical even if possible: the list will be out of date before completion. Besides, most of the complex system does participate in an act of change. Nowhere else is this as clear as in economics: economy is the largest evolving systems on earth, gradually encroaching on life, climate, landscape, and solar system. Nowhere else was it as successfully used for creating a theory as in chemistry. Pattern chemistry generalizes chemical ideas over other areas of complexity.

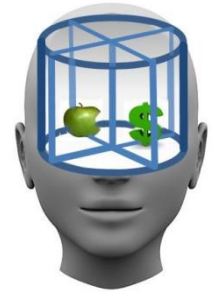
Pattern Theory of Ulf Grenander, the original author of the pattern approach to human mind, inspired most of my website spirospero.net, even some poetry. Grenander's recent book is *A Calculus of Ideas*.

Patterns reduce complexity of *exsystems*, (**e**volving **C**omplex **s**ystems) to the level of simple systems. Patterns are counterparts of physical equations for objects of non-physical nature, like ideas and social structures. We can make some abstract predictions about such systems because

patterns are limited in number and have larger life spans than details. Besides, all exsystems start as simple systems and increase their complexity by simple steps. Therefore, it could be possible to explore universal patterns of change.

Chemistry is the science of structural transformation and its experience with atoms and molecules may have universal significance. After thirty years of observing, reading, and thinking, I have now much more confidence in pattern chemistry as a mode of understanding complex novelty arising daily in human evolution.

I promised in [Essay 57, *The Few and the Many*](#), (also [html](#)) to take a close look at the peculiar area of psychology that overlaps with economy and has been presented to wide audience by one of his creators, Daniel Kahneman, in *Thinking Fast and Slow*, (Farrar, Straus and Giroux, NY, 2011). It is not odd at all that its author, a psychologist, was awarded Nobel Prize in economics (2002): today everything is economy—climate change, next iPhone, God, and Presidential Elections. Psychology and economics of rationality are just two sides of the dollar bill. The product of economy enters your life and money leaves your account through the revolving door in your mind.



The dominant part of an experiment in psychology of rationality consists of communication between the **experimenter** (sometimes, a team) and a number of participants (**subjects**), one on one or with a group. [Neuroeconomics](#) is a different related area of research that uses brain scanning during the communication.²

The communication consists of speech, writing, and simple acts of behavior, like finding a chair to sit down. The verbal part can be preceded or accompanied by various visual images. For example, the subject can be “primed” to money by floating banknotes in a computer screensaver.

The fact that the psychological experiment is an interaction of two human minds seems to me of cardinal importance.



Verbal communication is uniquely human: it is the coarse backing of human life on which fate weaves its European tapestries and oriental carpets. A right person with the right words at the right time can change a human life. The peculiarity of the experiments based on verbal communication is that spoken and written phrases can be misunderstood



² On the surface, it looks no different than any experimental science, but the whole situation is typically make-believe, even if the money reward is real. See, for example, K. Luan Phana, Chandra Sekhar Sripadaa, Mike Angstadta, and Kevin McCabec, [Reputation for reciprocity engages the brain reward center](#), (2010).

by both subject and experimenter. Moreover, they can be false, confusing, intentionally misleading, and emotionally suggestive.

A king or dictator does not expect a response to a decree, but their spies are watching how population reacts. A criminal interrogator needs to hear confession. A military or state security interrogator cares not so much about the words as about the hidden thoughts. Psychotherapy promises a deep mind cleanup. Social media know what is on our mind better and faster than ourselves. Language conveys and hides thought. In the digital era, our thoughts are the equivalent of gold and precious stones of the old empires and of the coal and iron ore of the Industrial Revolution. A whole industry, with Google as its flagship, is busy with mining our minds and trading the stuff, good, bad, and trashy, delivered to the surface. Our thoughts, intentions, and decisions are turned into money and we are left with viruses, scams, and disposable short-living junk, happy with ourselves, our acquisitions, and our democracy. Silicon chips mediate human communication and impose on our imagination the incontestable, commanding language of menus.

As far as personal thoughts are concerned, there are hard direct methods. Torture is the oldest, but not always reliable. Reading the mind by behavior and things under the clothes is already an accomplished technology. With no access to the mind, the airport scanner is looking for hard matter to recognize ill intent. There are a few remaining steps, if any at all, to the use of brain scan against terrorism and crime, as well as against freedom.

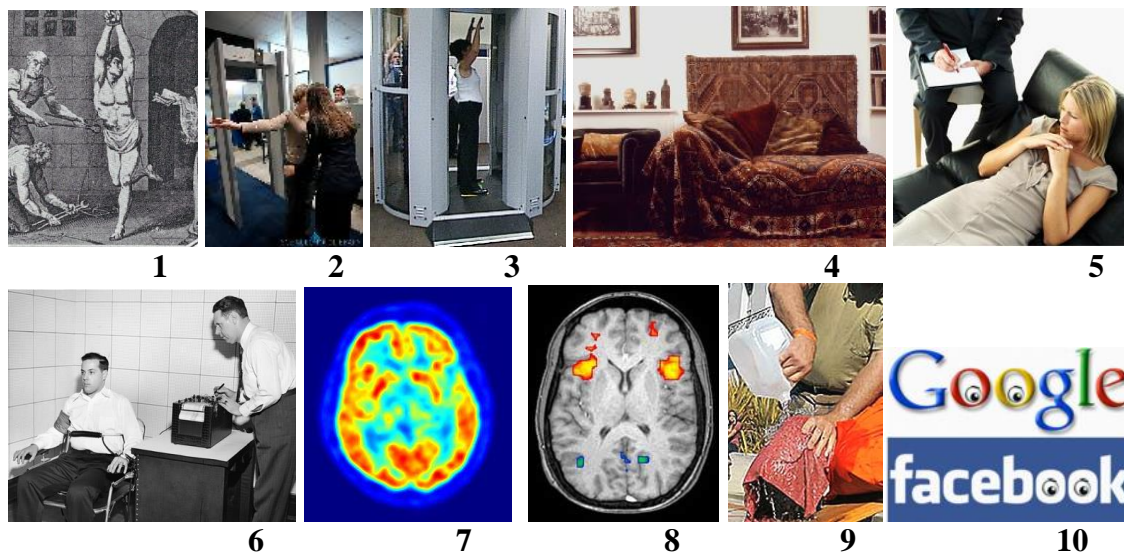


Figure 1. What's on your mind?

1. Inquisition. 2, 3. Body search. 4, 5. Sigmund Freud's original couch and modern psychoanalysis. 6. Lie detector. 7, 8. Brain imaging (PET and MRI scans). 9. Waterboarding. 10. Personal data collection.

Figure 1 illustrates some methods of crude mind reading, none of them—thank God—fully reliable or universally applicable.

Our conscious mind is a tiny part of the murky world below the surface. Mathematicians³ describe a full lack of awareness during a major discovery. The current content of my consciousness is in the same relation to my subconscious as this computer window to the rest of the Web or my desk to the rest of the globe.

The big dark subconscious mind does not have either vocabulary or grammar of its conscious complement but it can express itself by twisting and tweaking the words already on the tip of the tongue. Keen observers, from Sigmund Freud to Douglas Hofstadter, have assembled a rich collection of accidental surface splashes of the deep-water mental fish.

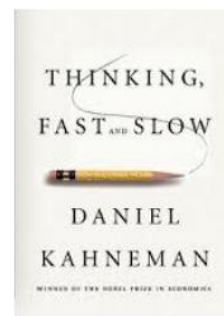
Politics is the greatest aquarium to observe the depth of the mind. In the 2012 season, for example, we could enjoy watching the minds of Michelle Bachman and Rick Santorum. The two presidential candidates were transparent to the bottom because they were consistent in ideas as well as emotions and body language. But who can penetrate the mind of Mitt Romney saying mutually contradicting things over time—anything that will make you vote for him—with no expression whatsoever, except for a half-smile?

I am neither an economist, nor psychologist, nor linguist. I am lucky to be a chemist. Chemistry gives me a habit to see the world in terms of changing structure, build an inventory of combinatorial possibilities, distinguish probable from improbable, and do without numbers and equations, thinking instead in terms of MORE and LESS. In general, I cannot judge anything single on its own: I can only compare two instances. My world exists in time and space of Leibnitz. Time there does not move unless something changes and the minimal change is the unit of space.

My knowledge of the literature on other subjects is very selective and fragmentary. Thinking in patterns is my way to extract, borrow, steal, and appropriate patterns from knowledge as a whole, without borders and partitions, and in this way to compensate for the complexity of the past, urgency of the present, and the opacity of the future. I believe, together with Douglas Hofstadter, that we all think in patterns, although strikingly different ones.



Thinking, Fast and Slow by Daniel Kahneman is a captivating and engaging book. It is a rich and very artfully written accessible introduction into a vast, relatively new (although with old roots), less known (and all the more surprising) area of research of dramatic relevance for our lives and, even more, for the direction of human history. It is a book **about** how the mind works, how to manipulate it, and it is a product of human mind writing



³ Jacques Hadamard, *"The Mathematician's Mind,"* Henri Poincaré, *"Mathematical discovery."*

about (go to the previous **about**). A “strange loop” (Douglas Hofstadter) indeed.

A major part of Daniel Kahneman work was done together with Amos Tversky, who died in 1996. I will further refer to them both as K&T or Kahneman alone as the author of the recent book.

I was reading *Thinking, Fast and Slow* with feelings ranging from skepticism to disbelief to protest. It was for the first time that a long expected and highly praised book of an eminent scientist and Nobel Laureate clearly irritated me, although it fully confirmed my own pattern-chemical ideas on the subject.

For example, I could not accept the author’s assessment of human mind as typically irrational in “fast” decision making and problem solving. Even the very division into fast and slow thinking looked shaky to me. Slow thinking, i.e., the thinking of an informed, motivated, educated, and professionally skilled person can be slower than a casual guess simply because it consists of a larger number of steps. On the other hand, the professional can give a correct answer to a complex question in an instant simply because of his professional background. Which atom is heavier: magnesium or manganese? A chemist will answer in an instant, not even remembering the exact densities. But a top professional, thinking day and night about a problem, can be dead wrong as well.

Kahneman’s book had a catch: it analyzed the mind in terms of LESS and MORE, but judged it in terms of RIGHT and WRONG. Can we say that the leopard is RIGHT to have its spots but the panther—the same leopard under the skin—is WRONG to be all black? In human matters, the words RIGHT and WRONG are inflammatory enough, but IRRATIONAL sounds truly offensive. What pops up in my Russian mind is the Soviet treatment of dissidents in psychiatric clinics. Isn’t the entire American history of civil rights, now in its war-on-women stage, the record of the shifting frontier of rationality?



If we are prone to fallacies, illusions, biases, and all kind of mental defects, then who can put the U.S.D.A. “PRIME” stamp on the mind of a psychologist of rationality?

This is all irrelevant for the purpose of this Essay, however. I use psychology of rationality as a source of factual material and it is “PRIME” enough for pattern chemistry unconcerned with details.

Daniel Kahneman’s book is intended for people like me and I can understand selected original scientific papers in the area of psychology. From time to time, I will vent my emotions by the right of not only the reader but also a lab rat. Sorry, the rationality research makes me bubble quite often.



My first pattern-chemical ideas about thinking go back to 1980. Since 2003, some results can be found in [complexity](#)⁴ and among the Essays. I do not repeat here all the basics of Pattern Theory and pattern chemistry. For major sources, see p.2.

I approach the problem of thinking from scratch, beginning with an experiment on myself. I am encouraged in this undertaking by the fact that I have all I need in my head to think about thinking because I do it every day, like anybody else.

Before starting this Essay, I decided, on a whim, to run my own introspective experiment. Since I have never been apt with mental calculations in general, I can consider myself general public for a psychological test with numbers. In this experiment, I am both the observer and the subject, so that misunderstanding is unlikely. I further describe it in stages as I remember it after a few days. I can guarantee only the overall logic.

EXPERIMENT

1. I ask myself: What is larger, 345×254 or 354×245 ? I cannot give any reason why I asked this question, but I am sure there had been something about numbers in my mind.

My choice of numbers has an explanation. I quickly select 345 as the smallest three consecutive integers over somewhat atypical 1 and 2. Then I stumble. It is not so simple to find a second **not obvious** pair. " 345×254 or 545×524 " is obvious.

2. The selection of the second pair requires some work. I use the first pair as a template and invert the last two digits in both factors, intuitively expecting that their influence will be minor as compared with the change in the first digit (**first guess**).

3. In less than a second, an uneducated thought goes through my mind that if we multiply a larger and a smaller numbers, the larger factor (354) will have more influence on the product (**second guess**). My fast answer is: $354 \times 245 > 345 \times 254$.

⁴ For example: (1) Molecules and Thoughts: Pattern Complexity and Evolution in Chemical Systems and the Mind; (2) The Chemistry of Semantics; (3) Pattern Chemistry of Thought and Speech and their Hypothetical Ancestor; (4) Tikki Tikki Tembo: The Chemistry of Protolanguage. See [complexity](#) for links.

4. My calculator tells me that I am wrong:

$345 \times 254 = 87630$; $354 \times 245 = 86730$; $354 > 345$ but $86730 > 87630$. The first pair of factors gives a larger product.

5. Having discovered my mistake, I realize, with no reason, that the smaller number has more influence because its variation is multiplied by large increments of the larger number (**third guess**).

6. I have no idea where I was right or wrong. I do not know which principles a mathematician would apply, but I suspect that he would give a very fast correct answer.

My experiment leads me to initial understanding of some aspects and conditions of thinking.

OBSERVATIONS AND COMMENTS

(1) Quick thinking needs some stimulus on hand to start. It is not the **heuristic** needed for finding an answer without an explicit inference. It is **activation**, the very beginning of thinking, like the turn of the key, a coin drop into the vending machine, a military order, or the change of the traffic lights at the intersection. It can be just a question. For example, activation consists of the act of presenting a task to the cooperating subject. Normally, activation brings the mental cogwheels into motion in a very individual manner. Initiation could be a better term, but it has more connotations.

(2) Even if I used the calculator right away, it would take more time than the intuitive guess. If I was **strongly motivated**, I would do exactly that. But I was not. Nobody offered me \$5 for my answer. My life did not depend on the experiment.

(3) Not only a motivated but also an **educated** subject would have better chances to give a correct answer. In the experiment, the **trial** provokes an **error**, but not a chance to learn from it, which is the most unnatural thing about *economic psychology* (one of many names of rationality research).

(4) An objective and provable criterion of success must exist in the cognitive experiment. The assumption that the **correct answer exists** is yet another knowledge-dependent component of correct fast thinking. As a problem can have more than one solution, the subject could find a solution of which the experimenter is unaware but should be. I characterize this condition as **completeness**.

(5) If the topic is **new** for the subject of experiment, the expectations of “rationality” should be lowered. Since the word *education* is overused, I will use the term **novelty** instead of “lack of

education.” Indeed, the purpose of education is to **convey new things**. To convey known things is propaganda. The virgin experiments with novelty cannot be repeated twice with the same person, even if they are not subsequently explained.

(6) To err is not only human, it is rational. Often vague “gut feelings” and instinctive hesitation let the subject know that something is wrong with the intuitive answer and it can be quickly re-examined and reconsidered.⁵ This is not the “trial and error” process because the right answer remains unknown. It looks like a signal from the subconscious, probably, of the same nature as the Freudian neurosis, i.e., unconscious conflict. It means that there is a hidden contradiction in the mind. In pattern terms, it is the instability caused by a negative bond (see further). Normally, hesitation returns the state of mind back to the beginning of the process. In chemical language, it is a reversible reaction.

(7) Since I asked myself the experimental question, there was **no misunderstanding or misarticulation of either question or answer**—an aggravation always possible between two minds, especially, because of ambiguity of language.

(8) The question of **intent, manipulation, and deceit** does not arise here, but is, in principle, possible even within one mind (cognitive dissonance, self-perception, denial).

(9) The state of mind can be MORE or LESS stable. Clarity, absence of emotional, economic, career or status-related pressure, and, ultimately, sufficient **concentration** (cognitive effort) are needed for successful solution of the problem—if the solution itself is really needed.

(10) The **background, lifestyle, and experience** of a subject are crucial. Questions about money can have drastically different pathways to the answer for a spoiled son of a ... billionaire and for a coal miner’s daughter. Men and women can have very different ideas of feminism.

(11) The subject brings to experiment not only his since long settled background, i.e., biography, but also the current **context**: his or her immediate problems, impressions, and most recent events, i.e., current state of flowing mind.

The problem with all experiments with verbal outcomes is that we know only what the person says but not what he thinks. Sometimes we ourselves do not know what to think or what we really want. I don’t think that I am capable of reading—or speaking—my own mind during moments of stress, indecision, and passion. It is also a hard work to articulate my thoughts in these Essays and this is why I so often use pictures, quite like a caveman, and childishly prefer color.

⁵ The “error detector” in the brain was first suggested by Natalia Bechtereva (or Bekhtereva) in 1968. (Bechtereva, N.P., Shemyakina, N.V., Starchenko, M.G., Danko, S.G., Medvedev, S.V., 2005. Error detection mechanisms of the brain: background and prospects. *Int. J. Psychophysiol.* 58, 226–234). In my scheme of things, negative bonds in the subconscious can be the source of the “error feeling.” Neurosis might be the extreme case of the same phenomenon.

Motivation, the important component of an action, is always in doubt for psychological experiments. “It is a game... It is only a game.”

Therefore, the following components should be taken to consideration in psychological experiments based on interaction of two minds.⁶

COMPONENTS OF EXPERIMENT	
1. ACTIVATION	6. CONCENTRATION
2. INTENT	7. ERROR HANDLING
3. UNDERSTANDING	8. KNOWLEDGE
4. COMPLETENESS	9. BACKGROUND
5. MOTIVATION	10. CONTEXT

Obviously, if a group of subjects is recruited for research, the simple percentage of “failed” subjects leaves unexplored the most precious material about individual differences of the subjects (and the experimenter!) that could **elucidate the mental mechanisms**, the much prized ultimate goal of psychology. This could be done by testing larger diverse groups of subjects and subsequent covariance analysis. It may be too invasive and difficult, but this is none of my business, anyway. No wonder, artificial intelligence is far ahead of the artificial one: we understand what we can make.

Rationality is not only defined differently for different areas of knowledge, but there is no consensus regarding what rationality means within the areas like psychology and philosophy dealing with thinking and behavior. What seems common for all known to me definitions is the need of the external arbiter of rationality. In other words, rationality is a normative notion. It is quite natural when we evaluate the rationality of a rat in a maze (is that the origin of the term or a human trying to find an existing solution, high hanging fruit. The human can surprise by inventing something never seen.



RATionality

of a rat in a **rationality?**) like reaching a you, however,

to illustrate pattern-between two and invisible

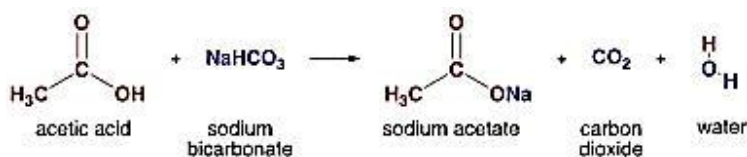
Interaction of two minds is an excellent object pattern-chemical ideas because it is *similar* (in theoretical sense) to a chemical interaction molecules. The process includes observable configurations:

1. OBSERVABLES: There is the base state before the interaction (**A**), the moment of presenting the question or problem (**B**), and the final state of response (**C**). **2. INVISIBLES:** There is a transition state (**TS**) between **B** and **C** which is, actually, a short fleeting process with its own

⁶ The notion of [bounded rationality](#) recognizes that up to a point.

mechanism. It happens entirely in the mind, although some changes in facial expression, posture, and, physiological parameters are possible.

If the states can be represented as **structures** with elementary ideas and bonds between them, this is all we need in pattern chemistry. And this is what I want to deal with. The strategy borrowed from chemistry consists of representing physically invisible⁷ to humans **processes** in a visible symbolic language.



Indeed, a similarity is undeniable: we see bubbles and fumes in the flask, ask ourselves what they mean, what is there that we cannot see, and give an answer in letters

connected with lines: a chemical equation. “Wait a minute! There are no letters in the flask!” “Right, this is what symbol means: whatever there is.”

The chemist deals with inanimate matter that neither listens nor talks back. The actions of the chemist and the reactions of the **object in the flask** are measurable, recordable, and reproducible. The conditions of experiment can be varied along a continuous scale. There is no right or wrong response.

For somebody with a background in hard science, the experimental technique, typical for the rationality research, looks alien. The visible behavior is the only fogged up window into what probably happens underneath, but there is no language for describing the invisible mental process—no counterparts of atom, molecule, and bond or spring, gear, and ratchet. In short, there is **no theory**, but there is a firm distinction between right and wrong. Well, who experiments on whom? I bet I can experiment on my experimenter, driving him crazy.

When an act of behavior of a **known in advance kind**, instead of verbal reaction, is observed and registered, the subject is usually verbally **primed**, i.e. induced to think in a certain direction by injecting some ideas in his mind. In rationality research, priming can be done by various means. Pictures of money or carefully crafted semi-literary surrogates of sad or joyful confessions are supposed to tune the subject up to the topic.

Regarding priming, there is a diminutive short story *A Horsey Name* (Лошадина фамилия) by Anton Chekhov. Ivan forgets the name of an urgently needed person. The only thing he remembers is that it is related to horses. People around are suggesting dozens of horsey names, but nothing matches. Finally, when it is too late, Ivan hears the word “oats” and remembers: Oats! (Овсов). Ivan’s helpers were definitely “over-primed.” See [A Horsey Name](#), a good old literary English translation by Marian Fell.

I have nothing to wonder about in the natural contact of two minds on the street, in a bar, or at a business office, where each mind has clear goals. As an experimental scientist, however, I am struck by the difference between the “hard” experiment with two reagents in the flask and the “soft” contact between two human minds in a psychology lab where the psychologist is a human

⁷ Atoms and molecules were physically invisible when the foundations of chemistry have been developing.

being who asks a question and issues a verdict about another human being who neither hears it nor care a bit. What is happening in the minds of both people who form a joint system for a short time?

Only a third party can decide on the rationality (if its definition exists) of both the subject and the experimenter. Obviously, this is an irrational way to evaluate rationality because a fourth arbiter would be needed to oversee the third, and so on. None of them would have an access to the mind content of the observed persons, their true goals, motivation, intent, concentration, and background. There is no universally accepted symbolic language to describe all that. There are, probably, dozens of systems of logic, each with its own notation, but logic is a totally different matter: it is detached from the content of thought and is concerned with its form. Money, love, life, success, failure, and death—it is content, not form.

Today, it seems, there is no such thing as pure psychology: it is always social in more than one sense. Here are three: (1) it takes a single mind to notice molecules and stars, while a mind needs another mind to be noticed; (2) social and educational background of both sides of an experiment do matter, see **Comments 10** and **11**, p.11, and the conclusion of this Essay; (3) like anything else, scientific community is part of economy where competition is in conflict with the drive to consensus.

In scientific practice, differences are reconciled simply by scientific community and arriving at some consensus in a mature area of research. Normative rationality, however, caused a real conflict, a Great Debate (Keith Stanovich *et al.*), a “fight” (between K&T and Gerd Gigerenzer), and even a war, as a psychologist (Helmut Jungermann) hinted by quoting the Greek philosopher: “As Heraclit[es] said, war is the father of all and the king of all.” Apparently, human mind is inherently divisive both as subject and object.

While I am writing these lines, another war for human mind is raging, see [Essay 57, The Few and the Many](#). One can see a full display of psychological trickery in the ads and debates and the fully fanned out peacock tail of human fallacies in the reaction of the public.

The scientific community remains split on rationality instead of ditching it. I am curious whether Daniel Kahneman and his opponent Gerd Gigerenzer would find this rational. I would, cynically. If something is good, it could be sold. If something is bad, a remedy can be sold.

The best way to deal with the controversy it is to ignore the term “rationality,” until it is clear what we all mean by that. Indeed, as I found out, this point of view was expressed by psychologists very early in the initial period of rationality research. Moreover, the human limitations of psychologists had been noticed even earlier.



Psychology is one of the youngest major sciences with one of the longest pedigrees. Its practice by far preceded its theory. It broke out of an egg laid by physiology only by the end of the nineteenth century, curiously, influenced by chemical analogies that Wilhelm Wundt borrowed from John Stewart Mill.⁸

Am I rational? What would Daniel Kahneman say? He is merciless. Just on four pages, 161 to 164, of his book we find the following invectives:

“Error”—“violation of logic”—“fallacy”—“misrepresentation of probability”—“absurdity”—“blatant violation of the logic of probability”—“flagrant violation of the conjunction rule” (Chapter 15, *LINDA: LESS IS MORE*, pp. 156-165).

The entire book is generously peppered by such or similar remarks because it is about our alleged errors and fallacies of judgment while thinking fast, although thinking slow can be no less fallacious. Besides, the entire direction of research, based on psychological experiments with groups of subjects, seems to have a major method flaw: the problems that subjects of psychological experiment had to tackle are in the absolute majority of cases totally irrelevant for the lives of the subjects and if occasionally rewards are paid, there are symbolic or just for participation. The typical experiment is a make-believe situation to which the participant had to react by telling how he or she *would* react.

Next, I am going to illustrate the reaction of the opposition.

The critique of K&T by [Gerd Gigerenzer](#) is best known, can be easily googled, and I omit it here. I need to say that I was very impressed by Gigerenzer’s position and logic, as well as by his practical efforts against deceitful medical advertisement. His books are widely available.

I want to mention here two other authors.

In his classical often quoted paper, [Helmut Jungerman](#) describes “the two camps on rationality.” He notes “Rationality is not a genuine term of scientific psychology but rather a concept of philosophy and economics.” It requires an established norm, for example, formal logic, which has a limited area of application in psychology. I quote:

In a somewhat exaggerated manner, I will distinguish two camps in this debate, one that points to the deficiency and one that argues for the efficiency of human judgment and decision. The

⁸ The chemical influence was disputed, somewhat self-contradictory. “Further, he [Wundt] stressed that these elements [of psychological process] were to be taken as hypothetical constructs. Such elemental processes would never actually be observed, he thought, in pure isolation but would always be aspects or features of larger images or **configurations**. Here Wundt used the German word *Gebilde* [structure, **pattern**].” (Arthur L. *Blumenthal*, [A Reappraisal of Wilhelm Wundt](#), *American Psychologist*, Nov. 1975, p. 1083).

pessimists, as I will call the members of the first camp, claim that judgment and decision making under uncertainty often show systematic and serious errors, due to in-built characteristics of the human cognitive system. Violations of rationality, particularly of the SEU model [Subjective Expected Utility], are interpreted as true deficits of the decision maker. The *optimists* of the other camp claim that judgment and decision are highly efficient and functional even in complex situations. Observed violations of rationality axioms are interpreted as unjustified evaluations based on inappropriate theoretical assumptions or empirical approaches on the part of the researcher.⁹

Helmut Jungermann presented a detailed summary, very much in agreement with the conclusions of my introspective experiment, provided I place myself in the camp of optimists, which I do, somewhat surprised. Here are his “optimistic” points of criticism, in short: (1) most experimental situations are unrealistic, (2) there is a lack of real life context, (3) no account of cognitive effort, (4) no account of misunderstanding by subjects, and (4) no definition of what error is. He sees the arguments of the pessimists as “defensive.” He does not mention the factor of the experimenter’s bias, background, and intent, however.

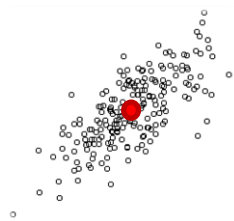
[Keith Stanovich](#) following Helmut Jungermann’s analysis, labeled “optimists” as Panglossians [happy with everything as it is in the best of the worlds] and “pessimists” as Meliorists, i.e. believers in the improvement of humanity [who can sell you a good tip, I cynically comment]. The title of his large and detailed paper, with Richard West, “[Individual differences in reasoning: Implications for the rationality debate](#)?” (Behavioral and Brain Sciences, 2000, **23**, 645–726), reveals the direction of his thought, which I fully accept. Although not the differences I expected, they are completely to the point. The authors note:

The so-called Great Debate about human rationality is a “high stakes controversy” because it involves nothing less than the models of human nature that underlie economics, moral philosophy, and the personal theories (folk theories) we use to understand the behavior of other humans.

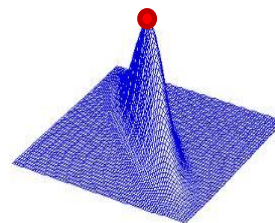
With high stakes, nobody wants to be on the wrong side in the economy of science.

The numerous ramifications of the “individual differences,” however, filled me with doubt. My first impression: maybe there is a norm, but if so, we all deviate from it in various ways. My “fast thinking” solution: the norm is as normal, i.e., fictional, as the “norm” in normal multivariate distribution. The problem is, therefore, what to consider normal: an abstraction or reality. There is nothing to reconcile: one does not contradict the other. But because psychology is social, what it notices, to what it pays attention, and what it finds important changes with time and, most importantly, with economy.

⁹ Jungermann, H. (1983). The two camps on rationality. In R.W. Scholz (Ed.), Decision making under uncertainty, (pp. 63-86). Amsterdam: Elsevier. Reprinted in: *Judgment and Decision Making: An Interdisciplinary Reader*, Second Edition, Cambridge University Press, 2000. [A poor and incomplete copy is available](#). See also [Google Books](#).



Figures on the left and right present bivariate distribution. The red dot of “norm” is just a mathematical point (the *mean*) in the space of our abilities, not our failures. I am not sure that our abilities have independent normal distributions, however.



Niels Bohr suggested that if a truth is profound, the opposite idea is also profound. As he could probably say to the two camps in cognitive science, “A Nobel on both your houses.”



With the above introduction, I leave psychology—not without regret. Its exciting and challenging landscape is still hot in the process of emergence, like the islands of Hawaii. I return to the solitary confinement of pattern chemistry.

In this Essay, I quote some selected experiments in the field, neither having the knowledge of the entire area nor using them not for the purpose of criticism. I attempt to interpret borrowed facts from the position of pattern chemistry, which currently exists only in my head. Yet I am inclined to believe that in the “talking” psychology of Freudian kind, nobody in possession of such a treasure as his or her mind is a complete outsider. Interrogative psychology is under the mild curse of the “strange loop” of Douglas Hofstadter and it is even stranger: it is a double loop.



PART TWO



PATTERN CHEMISTRY FRAMEWORK

I start with the question coming from [Douglas Hofstadter and David Moser](#) (*To Err is Human; to Study error-Making is Cognitive Science*, *Michigan Quarterly Review* Vol. XXVIII, No. 2, Spring 1989, p.191)

What do cows drink?

The authors predict that “almost everybody finds that the answer “milk” jumps to mind virtually instantaneously, even though it is clearly wrong.”

For anyone in our culture, the concepts “cow” and “drink” are both neighbors of the concept “milk”, and since each of them has been activated by the question itself, some activation from each spreads to the concept “milk.” (Hofstadter and Moser)

Here is my introspective report, stage by stage, about how I reacted to the “cow” question.

1. INITIAL STATE. The moment I saw it (almost half a year ago), the question triggered the **initial state** of a process in my mind. No doubt, the idea or image of milk popped up in my mind in an instant, without thinking. I was ready to answer “milk”, but hesitated half way.

2. TRANSITION STATE. **Transition state** was short, ephemeral, and impossible to either clearly keep in mind, or describe, or repeat. The **transition state** barrier from the initial state to the **final state**, i.e., answer MILK, is very low. The elementary ideas COW and DRINK bring up MILK from the composite idea DRINK—COWS—MILK.

3. INTERMEDIATE STATE. My **final state** “milk” **was not stable** enough and I hesitated: something was wrong with it. It took some short time, but longer than the way to almost saying “milk” in the beginning. I have reached an **intermediate state**—of doubt, hesitation, and

instability—which was more **stable** than the **transition state** but not stable enough to be the **final one**. Note that I am doing without numbers, satisfied with MORE and LESS.

4. SECOND TRANSITION STATE. Through the **second transition state**, on the way to “water,” another word/idea popped up: GRASS. With hindsight, I can hypothesize why “grass” was part of the transition state. When we see a cow, it is more often with grass, not water. Again, whatever I had in my mind was unstable. Subjectively, the instability of a mental transition state is often accompanied with a slight discomfort and feeling that something is wrong: a micro-neurosis, I would say.¹⁰

5. FINAL STATE. I reach the **final stable state** “water.” I feel relief.

While finishing the above report almost half a year after running the “cow” experiment on myself, I suddenly realized that cows, indeed, drink milk: as calves. This is an example of the **incompleteness** of the experiment, which I noted in **OBSERVATIONS AND COMMENTS**: there is more than one solution. What is peculiar about this minor flaw, both the experimenter and the subject can defend with equal strength their positions of unequal imagination. I believe this is one of the key “individual differences” issue of the Meliorist-Panglossian divide: both sides in an experiment are humans with naturally different capacity of imagination, as well as all other abilities, in line with Keith Stanovich’ ideas. I am inclined to view imagination as the ability to analyze the situation, split it into components (generators), and find all their relevant, i.e., most probable combinations (configurations) and similarity relations between them.

Groups of similarity transformations define patterns. This is the essence of the method in Pattern Theory. Interestingly, analysis and synthesis in Pattern Theory need the participation of **individual** human mind. It cannot be fully algorithmic. This is why I see Pattern Theory of Ulf Grenander as the theory of human or artificial mind and not of the world around, which is the subject of specific sciences.

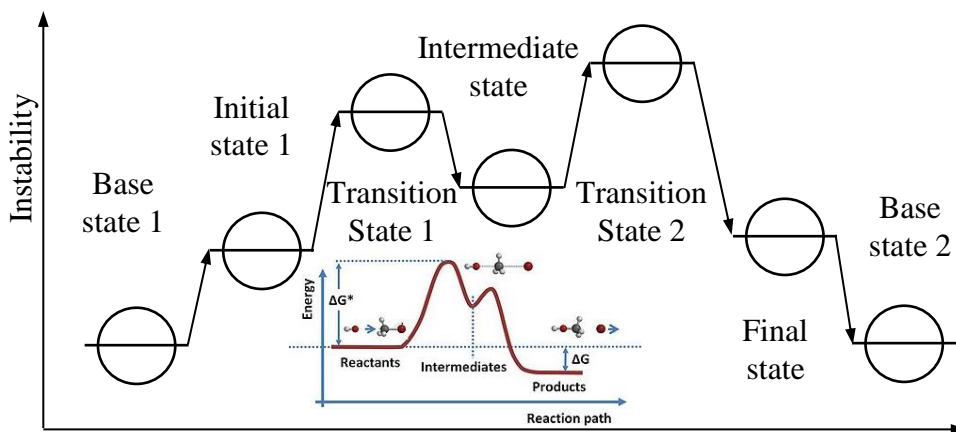


Figure 2. Stability change in a cognitive act with intermediate state. Inset: same for a chemical reaction.

¹⁰ While writing this Essay, I felt full of respect for Freud.

As we cannot perceive transition states **in either chemistry or cognition**, we have to imagine them and then select a few most stable ones. Moreover, we have to imagine the most stable final states. Since all configurations are combinations, this process can be algorithmic, at least partially. Imagination is the core of intellectual power, although it alone does not guarantee the power of achievement. The latter consists in increasing the stability of transition states leading to the goal and decreasing the stability of those leading away from it. Ultimately, it amounts to imagination, too. In daily life we speak about foresight, leaving imagination to fiction writers and poets. I am not familiar with IQ tests, but I wonder if they test imagination.

From state **1** to state **5**, the content of the cow problem sits in my mind sticking its head into the conscious with most of the body in the subconscious mire. Before the initial activation¹¹ and after the relief of the final state, the mind is in the **base state** concerning the cow, which means that it is out of my conscious mind and a new cognitive event can begin.

Figure 2 illustrates the change of instability along the pathway of a cognitive event. I inserted there a small illustration from a chemical text. The exact appearance of the connecting line, as well as the time line, in both cases is unknown. Transition states, by definition, cannot be isolated.



Figure 3. Elementary and composite ideas related to COW.

In order to complete the pattern-chemical picture, we need to reveal the structure behind the states: the generators.

Figure 3 represents some simple and composite ideas pictorially, verbally, and pattern-chemically. In terms of Pattern Theory, elementary ideas are **generators**, some of which are connected, producing **configurations**, i.e., **composite ideas**. This looks like atoms connected by bonds into molecules. The latter are material objects that can be observed through a special microscope.

The cardinal novelty of Pattern Theory is the formalization of the long known representation of thoughts as skeletal structures consisting of points and lines. It consists of attribution of probability to both generators and connecting bonds.

¹¹ I use the word “activation” not in the sense of spreading neurophysiological excitation, but closer to its meaning in chemistry: activation, for example, by collision or radiation, brings the system into state ready to a possible transformation. Transition state is a process and activation is its very beginning, like an accidental meeting that initiates a relationship. With molecules, it is not just sufficient energy, but also a particular position.

There could be some issues with the meaning of probability for mental constructs and convertibility of probability to **energy** or its doppelganger **instability**. Nevertheless, this approach offers us a firm pattern-chemical ground, all the more attractive that we do not need to know any neurophysiological details and lose any ground for fight about inherently non-consensual matters¹².

Generators and bonds are just words of the language in which we can describe what we see going on between two minds as if it were happening between two magnets, or two mice in a cage, or two protagonists in a silent movie. For as long as the language helps understand a mystery, does not create a new one, and causes defection of the opponents, we can trust it. The bond has the following meaning: the stability of two generators connected with a positive bond is higher (or energy is lower) than the stability of isolated generators. Negative bonds mean that two generators require energy to be connected because they repel each other and are more stable apart. The negative chemical bonds ([antibonding](#)) are as real as positive bonds. Just almost nobody is interested in them because of their instability. But, as I believe, they are absolutely crucial in a cognitive act because they signal that something is wrong, creating a vague mental discomfort. Compare with chemistry:

Another particular feature of antibonding is that the *antibonding orbital is more antibonding than the bonding orbital is bonding*. ([source](#))

The previous paragraphs omit significant and sometimes unresolved issues with this picture, but I cannot repeat all that here. Instead, I refer the curious to [Introduction to Pattern Chemistry](#) and the rest of [complexity](#), where much more can be found about pattern chemistry of thinking and its verbal expression.

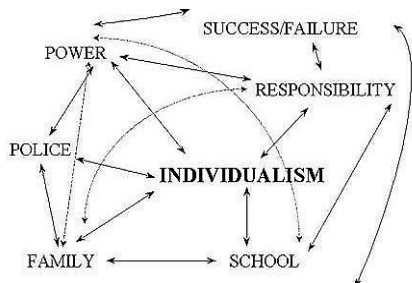
Next, let us take our cow by the horns. **Figure 3** shows what can happen when the mind is activated by cow-related pictures. In order not to get mired in terminology, definitions, and formalism, I will discuss **Figure 3** free-style.

The top row of **Figure 3** contains generators (elementary ideas) COW, MILK, WATER and DRINK. Each of the ideas has one of many possible pictorial presentations. A picture or words under it activate other bonded pictures or ideas—one or more, simple or composite. The pictures in the bottom row are selected configurations. They are relatively stable small “molecules” of thought that pop up from the mind content and disperse after the cognitive event ends.

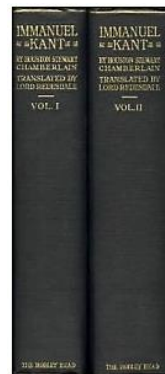
Mind is a pattern-chemical flask with content disturbed and agitated by external events and internal spontaneous fermentation.

¹² Why is it possible to reach consensus in physics or physiology, but chronically impossible in economics, psychology, politics, and other human matters? (1) Scholars in human matters are humans; (2) they study humans; (3) humans are combative because life is competition; (4) competition means taking sides in a contest in order to win and get an advantage. Competition without a rival is meaningless and if there is no rival, it should be invented. In terms of **Essay 57**, for a crocodile to set foot among giraffes requires trampling some crocodiles.

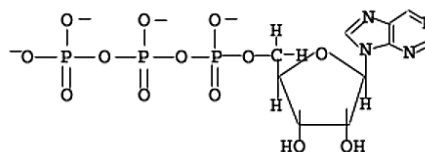
The relation between mind and reality has been subject of countless heavy volumes and we will get lost in just these two terms set side by side. Mind is real and reality is in the mind and it is better not to start another rationality war. Most of what I am going to say in this segment has been known for a long time and in many versions.



Everybody can invent a new way to express one of the oldest psychological concepts: associations, the crisscross links between components of mind and reality. All of them will have topology of graphs: points connected with lines, quite like molecules.



Chemists had been performing transformations with molecules before atom became a household name and molecules could be observed. In 1905, Albert Einstein was motivated by desire to prove reality of atoms in his work on Brownian motion. We still do not know what a thought, idea, and mind content *really* are, not to mention what “really” means



but we can understand how they behave. Jumping from molecules to words, it is the same way we understand the meaning of a word defined through other words in a dictionary.¹³ But the notion of “individualism,” for example, will be divisive in one way or another because notions are individually grown in our minds on the soil of our life experience and are as diverse as American winter squash.

As an exercise, one can try to list all associations with any picture in **Figure 3** in the bottom row within half a minute, play the [Word Association](#) game, or travel in a time machine 100 years back and listen to the lectures of Carl Jung on his [association method](#). I also recommend the movie *A Dangerous Method* (David Croneberg, 2011), which seems to confirm the disrationality concept of Keith Stanovich.

Next, consider what can happen in the mind activated by “what” in the question “What do the cows drink?” DRINK can activate WATER and MILK, as well as TEA, COFFEE, WINE, BEER, MEDICINE, POISON, etc. What in fact will be activated, as I suspect, is the most probable/stable generators in the Jungian personal subconscious.

More probable generator is more stable in the sense that it is more probable to be in the conscious sphere, continuously or flickering, i.e., it has higher time frequency.

I can think about coffee in the morning, my medicine after meal, a glass of wine at dinner, and, probably, poison, if I am plotting murder, before falling asleep. In conjunction with COW, only

¹³ **EXAMPLES** (from [Merriam-Webster](#)): **hasband**: an ex-husband; **derecho**: a large and long-lasting wind storm that is associated with a band of rapidly moving thunderstorms; **webster**: a person who frequently uses the World Wide Web; **bankster**: a member of the banking or financial industry who engages in reckless or predatory financial practices.

WATER seems most probable. COW is an animal, and animals DRINK WATER. Other liquids, from TEA to COFFEE, would make the thought very unstable because of the negative bond, not just a lack of bond, with COW. They do not behoove there. COW, however, is *usually* associated with MILK, not in all contexts, but at least for somebody unrelated to farming. MILK behooves the COW.

Why do I use here the rarely used verb “behoove” for the first time in my life? Ten days ago I was watching Saudi Prince Turki al-Faisal using this word on his interview with Charlie Rose. I knew its meaning but it seemed so unusual that the word stuck in my mind. BEHOOVE has nothing to do with hooves.

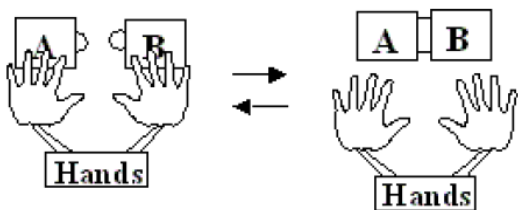


HOOVES

BEHOOVE BEHOOVEs the **COW** because of its **HOOVES**. Two positive bonds between three generators, of which BEHOOVE is just a sound, makes the triad stable enough in the current context because BEHOOVE is still “fresh in my memory,” as we say. FRESH has strong links to STABLE, pulling MILK into the triangle. Writing the beginning of this sentence I almost heard the HOOVES of a HORSE coming out its STABLE. In my mind, COW transmuted into HORSE.

What I think right now depends on the most stable (probable) part of the current content of my mind. It is a layered cake: upper crust changes by the minute and lower levels renew day by day.

Triplet **A—C—B** takes a special place in chemistry and pattern chemistry. The enormously important in chemistry and biochemistry catalysis has a general mechanism $A + C + B \rightarrow A—C—B \rightarrow A—B + C$, where C is catalyst. It is not incorporated into any stable structure in this transformation. Formally, nothing happens to C regarding the initial and final states. It can repeatedly perform its catalytic function. All it does is to make the transformation of **A + B** into **A—B** more probable in time, i.e., faster. In chemistry, it makes both direct $A + B \rightarrow A—B$ and reversed $A—B \rightarrow A + B$ transformations faster.



There is a lot of popular stuff on catalysis on the Web. From pattern-chemical perspective, see [The Visible Hands: Homo Faber and the Chemistry of History](#) in [complexity](#). I reproduce its representative picture here.

In a linear triplet **A—C—B** both **A** and **B** are in the topological neighborhood of **C**, which increases the probability of bond between **A** and **B**.



Similarly¹⁴, in **Figure 3**, MILK bonded with DRINK and COW (blue lines), increases the bond strength between DRINK and COW. I show the “second-rate” bond with amber line. Conversely, DRINK and COW, if activated close in time, activate MILK, if there is nothing to compete with this course of cognitive event.



¹⁴ Similarity is the magic word of Pattern Theory. Analogy has a bad reputation: there are good, bad, and false analogies, but similarity, unlike analogy, is well defined. It is the only alternative to reductionism way to see the world as a whole.

I expect, however, that the same question asked close in time or space with the picture of a COW near WATER, would leave very little stability to MILK. Similarly, not just the calf drinking milk, **Figure 3**, but also the picture of a cow and calf near water should increase the probability of MILK as answer. In rationality research, the priming by text, speech, and image is typical. Anyway, those are my predictions. Such experiments cannot be run introspectively and I have to wait until somebody experimentally recombines an individual human mind with the brighter aspects of cow's life and see what happens.

The magic properties of a triangle have been noted in psychology and social psychology of small groups. This is a big topic, with which I am only superficially familiar. It straddles graph theory, topology, sociology, and cognitive psychology.

In graph theory and image recognition, full graph is a graph in which all nodes (points) are connected with each other. Single bond and triangle are the smallest full graphs. Four-node

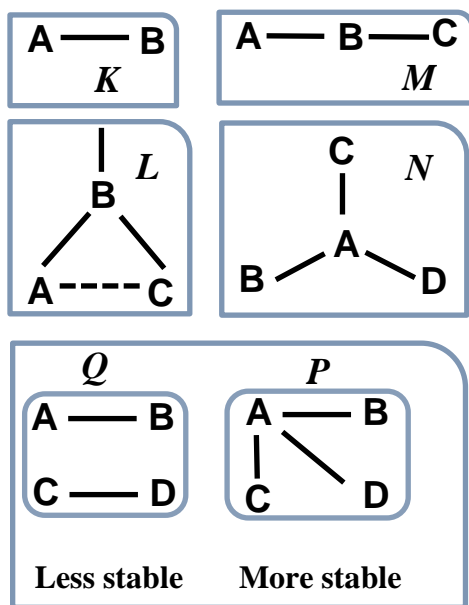


Figure 4. Configurations of simple thoughts

graphs can have some possible bonds missing. In a triangle, to use the language of topology, all points are in the neighborhood of each other. What I call triplet, however, is different: B—A—C is a linear configuration, in which B and C are not connected.

I suggested (see [Pattern Chemistry of Thought and Speech and their Hypothetical Ancestor](#) or [this](#)) that the difference between thought and language is that former is non-linear, containing such fragments of the network of ideas as triangles and forks (reducible to triangles), speech is always linear, consisting of doublets and triplets. Therefore, a thought on its way to speech must undergo linearization. This is possible in more than one way, causing the divergence of languages at the earliest stage of their evolutions.

Figure 4 shows some of the simplest possible thoughts. Configurations **M** to **P** are superpositions of bonds of **A—B** type (**K**) between just two generators.

In triplet **M** and configuration **L**, the central **B** has the peripheral **A** and **C** in its topological neighborhood. This makes them, so to speak, “neighbors of the second degree.” If **B** is activated, both **A** and **C** are activated, too, which makes them similar to the doublet **K**, although the strength of the bond **A—C** depends on the properties of the bonds **B—A** and **B—C**. This **triangle** configuration is unique in the sense that its three generators are always in the neighborhood of each other, although the probability distribution of the three bonds can vary. This is what catalysis means in chemistry, but it also naturally applies to pattern chemistry of the mind and its branched network of associations.

The concept of triangle found a place in social psychology long ago.

The theory of balance in social psychology is just another embodiment of the concept of pattern-chemical stability.

Georg Simmel had powerful encyclopedic imagination, which generated numerous and still underappreciated ideas in philosophy, economics, psychology, and humanities in general. I was greatly impressed by his [*The Philosophy of Money*](#) (1907), which also included psychological aspects.

I quote here an overview of an early idea with a pattern-chemical spirit.

[Georg] Simmel, writing at the very start of the 20th century, had a different view of the role of relationships in social settings. He began by noting that the dyad, the fundamental unit of analysis for anyone studying relationships, including social networkers, was not the best focus for understanding social behavior. Indeed, he argued that before making any predictions about how two people in a relationship might behave, it is important to understand their context. The context, Simmel continues, is determined by the set of third others who also engage in various relationships with the two focal parties. In other words, Simmel argued that the triad, not the dyad, is the fundamental social unit that needs to be studied.

David Krackhardt and Mark S. Handcock, [Heider vs. Simmel: Emergent Features in Dynamic Structures](#).

In sociology, a third member added to the diad destabilizes the group. In pattern chemistry, the third generator increases stability.

As for context in relation to “irrationality”, Richards Heuer brings Panglossians and Meliorists together, in a curious way, separated only by a one way mirror:

To see the options faced by foreign leaders as these leaders see them, one must understand their values and assumptions and even their misperceptions and misunderstandings. Without such insight, interpreting foreign leaders’ decisions or forecasting future decisions is often nothing more than partially informed speculation. Too frequently, foreign behavior appears “irrational” or “not in their own best interest.” Such conclusions often indicate analysts have projected American values and conceptual frameworks onto the foreign leaders and societies, rather than understanding the logic of the situation as it appears to them.

Richards J. Heuer, Jr, [Psychology of Intelligence Analysis](#), CIA, 1999

In other words, Panglossians can, actually, improve the world, while Meliorists—at least in foreign affairs—can destabilize it. I believe this is what is happening in Iraq, Afghanistan, and Middle East in general.

The Panglossians here are, actually, in the role of Meliorists. The deep roots of the Meliorist mindset were uncovered long ago:

The **psychologist's fallacy** is a [fallacy](#) that occurs when an observer presupposes the objectivity of their own perspective when analyzing a behavioral event. The fallacy was named by William James in the 19th century. It is a specific form of the "similar to me" stereotype: what is unknown about another person is assumed, for simplicity, using things the observer knows about themselves. ([Source](#))

This means that the Meliorists are, actually, Panglossians: optimists who think about the world and themselves better than both deserve. They believe that world can be improved and only they know how.

What makes any mindset unstable, indefensible, and ultimately militant is internal contradictions, logical as well as factual (see the end of [Essay 57](#)). They are destabilized by negative bonds between ideas that repel each other.¹⁵ Political and religious beliefs easily implant themselves in minds sparsely populated with ideas where nothing opposes them.

Speaking about psychologist's fallacies, more than one might apply:

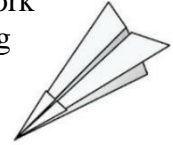
- [Curse of knowledge](#) – when knowledge of a topic diminishes one's ability to think about it from a less-informed perspective.
- [Bias blind spot](#) – the tendency to see oneself as less biased than other people, or to be able to identify more cognitive biases in others than in oneself.
- [Confirmation bias](#) – the tendency to search for or interpret information in a way that confirms one's preconceptions.
- [Congruence bias](#) – the tendency to test hypotheses exclusively through direct testing, in contrast to tests of possible alternative hypotheses.
- [Denomination effect](#) – the tendency to spend more money when it is denominated in small amounts (e.g. coins) rather than large amounts (e.g. bills).
- [Experimenter's or Expectation bias](#) – the tendency for experimenters to believe, certify, and publish data that agree with their expectations for the outcome of an experiment, and to disbelieve, discard, or downgrade the corresponding weightings for data that appear to conflict with those expectations.
- [Ludic fallacy](#) - the misuse of games to model real-life situations.
- [Negativity bias](#) – the tendency to pay more attention and give more weight to negative than positive experiences or other kinds of information.
- [Projection bias](#) – the tendency to unconsciously assume that others (or one's future selves) share one's current emotional states, thoughts and values. (from Wikipedia)

¹⁵ How can bonds be still called bonds if they mean repulsion? Because the generators in the mind are bound to remain close. They have no freedom of movement for the lack of Euclidean space.



LINDA

LINDA is the classical case from the very large body of early experimental work started by K&T. Having stirred up a lot of criticism, it remains the largest stumbling block of rationed rationalism. I am not going to throw another pebble at LINDA. She is already 40 years. I am not a psychologist. It is too late. Consider it a paper plane.



I am interested in pattern-chemical mechanisms, i.e., the sequences of elementary steps, in the mind of the first people to whom LINDA was first introduced.

In a series of psychological experiments the authors asked “a group of 88 undergraduates at UBC [University of British Columbia]” to rank the following statements by, I quote, “the degree to which Bill¹⁶ (Linda) resembles the typical member of this class:”

Linda is a teacher in elementary school.

Linda works in a bookstore and takes yoga classes.

Linda is active in the feminist movement. (F)

Linda is a psychiatric social worker.

Linda is a member of the League of Women Voters.

Linda is a bank teller. (T)

Linda is an insurance salesperson.

**Linda is a bank teller and is active in
the feminist movement. (T&F)**

Most of the participants (87%) of ranked **F > T&F > T** (“This finding is neither surprising nor objectionable,” comments Kahneman. “The description of Linda was construed to be representative of an active feminist (F) and unrepresentative of a bank teller (T).”

K&T found it “more surprising and less acceptable that the great majority of subjects also rank the conjunctions” (T&F) as more *probable* than their “less representative” answer (T).

Next, a group of 142 undergraduates at UBC were asked the following question:

¹⁶ Bill was another imaginary person in a similar experiment, but in the annals of behavioral psychology Linda became famous, while Bill is almost forgotten.

Which is more probable?

1. Linda is a bank **teller** (T).
2. Linda is a bank **teller and** is active in the feminist movement(T&F).

This is a clear version of LINDA, in which the information junk intended to confuse the undergraduates has been filtered off.

Still, subjects with richer imagination and wider knowledge base will remain perplexed. What does “Linda is a bank **teller**” mean in the **context** of the test? The second part of the question brings the logical operator AND into the flask. She is a teller AND not active outside the bank? She is teller AND nothing else?

The stages of problem understanding, noise filtration, orientation, retrieving relevant information, are part of any mechanism of reasoning. Obviously, the muddled initial information requires more cognitive effort than the filtered one. At a low motivation, the subject could choose a random answer in a multiple choice.

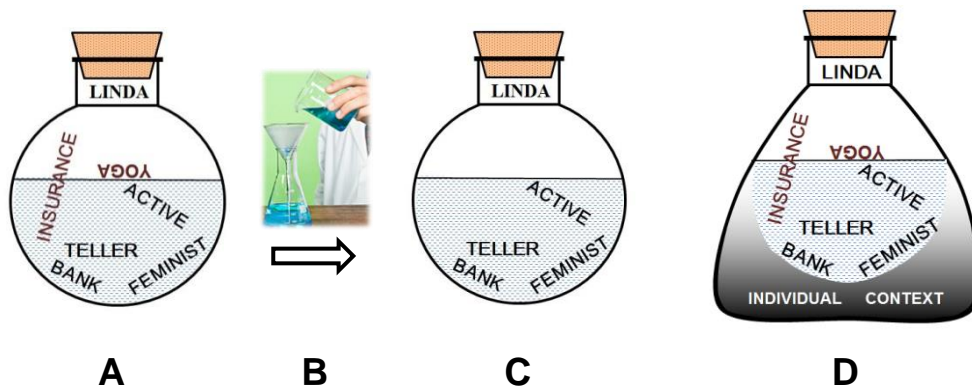


Figure 5. Mind content in LINDA.

A, B, C: Irrelevant matter is filtered off; D: Dark matter of individual context

“In a flagrant violation of the conjunction rule,” (K&T) 85% of them found (T&F) more probable than (T).

The pattern-chemical approach means the following. In order to explain what happens, possible transition and final states should be constructed in terms of generators and bonds. Their stabilities should be compared. The more stable the transition state, the more likely the corresponding outcome.

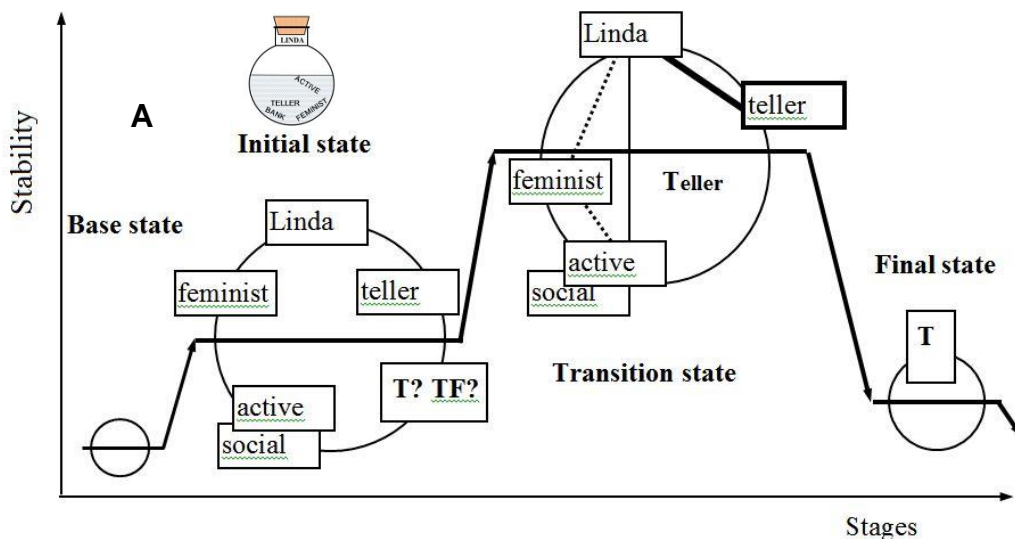


Figure 6A. Transition state of LINDA leads to T[ELLER]

At least two mechanisms of reasoning are possible. Mechanism A, **Figure 6**, takes into account that the idea TELLER occurs 2 times in the initial state. It is the main factor of stabilization.

In the initial state, the mind (circle) is filled with relevant ideas and activated.

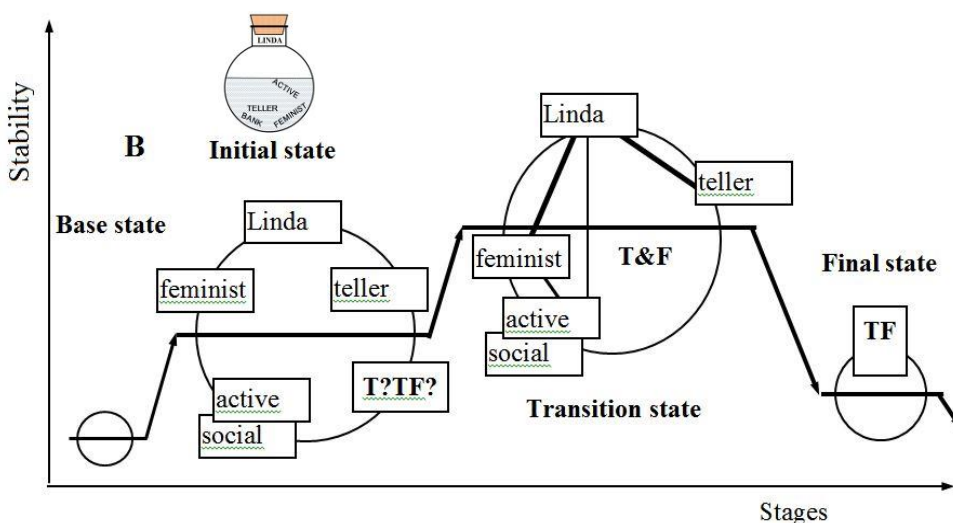


Figure 6B. Transition state of LINDA leads to T[ELLER]&F[EMINIST]

In mechanism **B**, the stabilization by the three bonds in the triangle LINDA-FEMINIST-ACTIVE plus the bond with TELLER cries out for TELLER & FEMINIST.

But this is not all, because the subject's mind contains a lot of personal information that can bond with the generators introduced by the question. "Individual differences" means not just parameters, constraints, and enhancements of intellectual abilities—the classical stuff of psychology—but also individual non-measurable and non-quantitative data, like some familiarity with probability or logic and Venn diagrams, being a female, feminist, or teller or having a boyfriend working in a bank, etc.

Figure 7 shows how **individual context**—background information, brought by the subject to the test in his head—interacts with the **current content**, i.e., information brought by the experimenter. This pattern-chemical reaction is what happens in any human mind initiated by a new situation.

The individual context of the subject's mind can be anything that he or she was preoccupied before the test, especially if the experimenter's content can have some associations with it.

A few out of an indefinite number of possible relevant associations:

1. BANK – MONEY – I-NEED
2. BANK – MONEY – COUNT – MATH
3. MATH – PROBABILITY
4. TELLER – MY-GIRLFRIEND
5. FEMINIST – ARTICLE – SEEN-YESTERDAY
6. MY-GIRLFRIEND – FEMINISM
7. MY-BOYFRIEND – ACTIVE
8. PROBABILITY – NUMBERS - TELLER

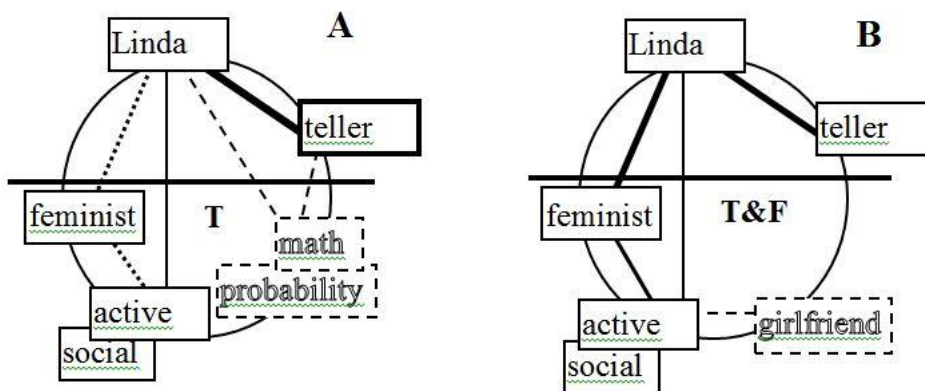
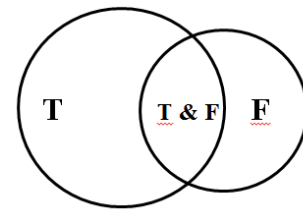


Figure 7. Individual context in the transition state.

I also wonder who the 15% of the rational guys were: half of the 30% who gave the answer at random or the 15 % who remembered logic and elements of set theory. Probability theory is not

needed here because there is no event space for statistics. The stern rationalists were pestered for applying probability to one-time events. A mental image of a Venn diagram will do, even the subject never heard the term.

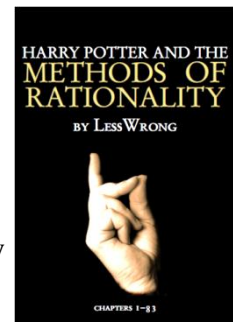


The famous LINDA and JIM experiments and their uncountable children that have populated the earth are pattern-chemically incomplete: they do not give enough space to imagination which is necessary for designing possible mechanisms. I cannot blame the authors. In molecular chemistry, all possible generators are listed in the Periodic Table. There is something more or less like Periodic Table for psychological properties of humans. But personal background is a realm of not just sociology, but the sociology of the current moment. Moreover, retrieving this background requires at least some good old talking association techniques and can be unjustifiably invasive.

I repeat that I am not qualified to judge professional academic psychology as an insider. I am, at best, a reader of Daniel Kahneman's book and maybe a dozen publications out of many hundreds or thousands. But I wonder why other than Meliorist possibilities have been so little explored in 30 years after LINDA. As an exception, I can mention Gerd Gigerenzer, who, instead of branding the college undergraduates with red hot iron, began to fight, successfully, those who manipulate the minds of patients with probabilistic junk in medical advertisement. The world still can be improved.

The answer is, of course: the economy. Meliorism sells. It is the major driving force of economy: our product is the best, it will change your life overnight.

It happens not because of somebody's ill intent and dishonesty—those are just moral tags. It happens because more money means better life. It increases individual stability and what increases stability happens indeed, until inequality begins eroding stability. Life since the 1970's has been under a heavy and visible hand of economy which is heavier than ever before and pushes only in one stressful direction instead of dispensing blessings of equilibrium and stability.



GOOD NEWS! YOU HAVE \$1000!



I take this problem from **Investopedia** because the original work of K&T¹⁷ uses the term *probability*, which has a well-defined meaning, especially in the market context. Investopedia uses the vague word *chance*.

What is “chance?” Is it an outcome decided by tossing a coin once, with money on the table? Or is it the reality of a businessman who does it every day many times, for years, so that the probability makes sense? But then what kind of sense can such statistic mean if market rarely if ever has any regularity in a long run? In his book, however, Kahneman uses the word “chance,” the vaguest of all and full of mystique.

QUESTION 1. You have \$1,000 and you must pick one of the following choices:
Choice A: You have a 50% chance of gaining \$1,000, and a 50% chance of gaining \$0.
Choice B: You have a 100% chance of gaining \$500.

QUESTION 2. You have \$2,000 and you must pick one of the following choices:
Choice A: You have a 50% chance of losing \$1,000, and 50% of losing \$0.
Choice B: You have a 100% chance of losing \$500.
If the subjects had answered logically, they would pick either “A” or “B” in both situations.

However, the results of this study showed that an overwhelming majority of people chose “B” for question 1 and “A” for question 2.

My answer for a one-time event: If I am rich, I take choice A for Question 1 and Choice A for Question 2. I can afford to gamble.

If I am financially constrained, I take choice B for Question 1 and refuse to take any chances for Question 2. What can you do, shoot me? Then I will toss a coin to choose between A and B. Still, in a real situation, my individual context could probably break the ties. Each irrational mind, therefore, is rational in its own way, depending on the individual context.

¹⁷ Daniel Kahneman and Amos Tversky, [Prospect Theory: An Analysis of Decision under Risk](#), *Econometrica* ; March 1979; **47** (2) , 263, March 1979.

Interestingly, behavioral psychologists recognize that the rich and the poor have naturally different measures of money. In fact, the psychologists consider the discovery of this difference (known at least since Jesus Christ) one of their major accomplishment. Yet they keep designing experiments around the idea of money in the same normative framework as if everybody were already in a moneyless paradise, using the token money for playing Monopoly.

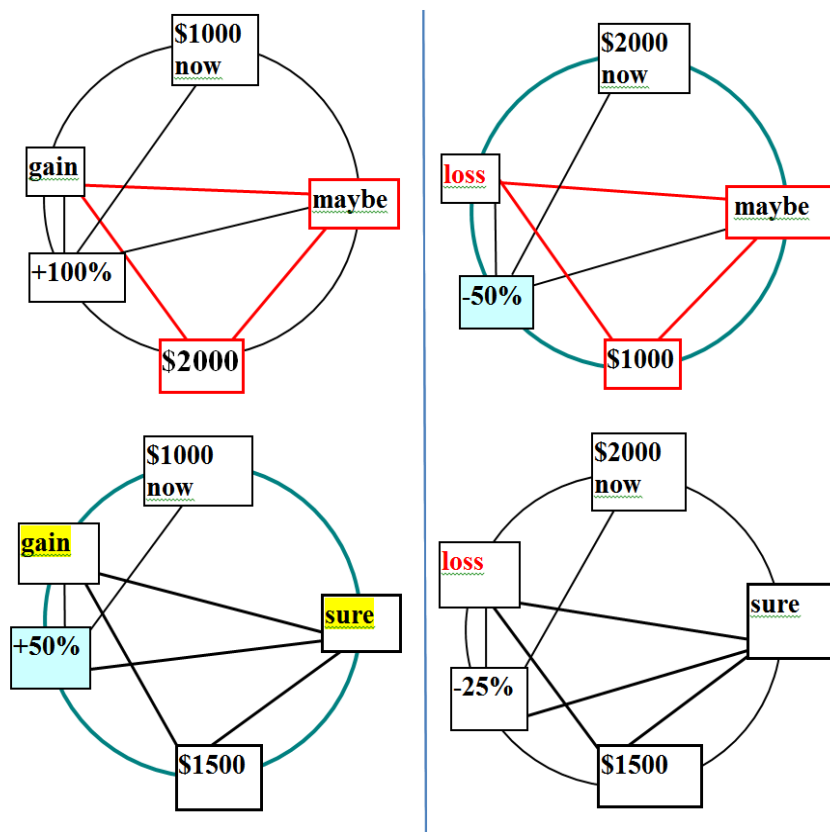


Figure 8. Mind configurations for Question 1 (left) and Question 2 (right)

As an outsider, I can afford a poisoned barb. The behavioral economics has an air of a make-believe Harry-Potter-esque fairy tale: it is funny and it sells.¹⁸

Figure 8 compares the basic elements of mind content for Questions 1 and 2. As I see it, the major qualitative difference is between MAYBE and SURE. What are they, anyway? MAYBE is appropriate only for a one-time choice. SURE is the limit to which MAYBE approaches when making up one's mind in such situations becomes the subject's profession and the law of large numbers kicks in. For the profession of a trader, nothing ever remains the same in a long run, however, from the market hysteresis to the vagaries of personal fortune. Unlike fairy tales, real

¹⁸ The early original works of K&T, in my opinion, really made both psychological and economic contributions because they were put forward in the context of the existing utility theories, with obvious difference between both. In turn, they may not be the last word. The economics of academic science can be as cruel and scoffing as the economics of Great Depressions.

world does not guarantee a happy end. Moreover, philosophically, it guarantees an ultimate unhappiness in the longest possible run.

I will abuse my outsider position once again. Where should behavioral psychology go next? Zurück, zu Freud and Jung: vorwärts! Back, to Freud and Jung: forward, to individual context.



LOVE AND MONEY

There has been a big discussion about the “endowment effect,” or valuing something we own more than the same thing we want to buy. Note that the two things are never exactly comparable because we cannot have and have not the same thing and the content of our mind will be different before and after possession. Besides, the change in personal situation can change the personal rules of the trade. Nevertheless, here is, reportedly, not a make-believe but a modified real life story:

A wine-loving economist we know purchased some nice Bordeaux wines years ago at low prices. The wines have greatly appreciated in value, so that a bottle that cost only \$10 when purchased would now fetch \$200 at auction. This economist now drinks some of this wine occasionally, but would neither be willing to sell the wine at the auction price nor buy an additional bottle at that price. ([D. Kahneman, J. Knetsch, and R. Thaler](#). Anomalies: The Endowment Effect, Loss Aversion, and Status Quo Bias, *The Journal of Economic Perspectives*, Vol. 5, No. 1. (Winter, 1991), pp. 193-206. Daniel Kahneman gives a longer and different version in his book.)

I am not going to immerse into the professional discussion. I only note that a single real life story cannot be either generalized or put in the same basket with typical undergraduate experiments. I have my own pattern representation of what happens with the wine-loving economist whom I will call Eco.

Love is a bond between two persons, two things, or a person or a thing. Attraction means that the bonded state is more stable than the separated one. Regarding a human and a thing, the difference can be measured in money and, according to the assumed laws of the market, the willingness to pay for a bottle to add to a stock or to sell a bottle from the stock should be the same. In Eco’s case the willingness is very low, but not zero. The problem is that the wine collector, unlike the wine trader, does not want make money on his old purchase.

Figure 9 illustrates the difference between wine collecting and wine trading.

It is easy to imagine various internal and external circumstances that can be bonded, positively or negatively, to the transition state, changing the outcome. This, however does not matter because

the transaction is in both cases reversible, at least in the mind of the wine collector or the trader. Transition state is the same in both directions.

Neither adding a bottle to the existing stock nor subtracting from it will change the affection of the wine lover. Only a gain but not a loss of a part of monthly income will satisfy the affection of the trader.

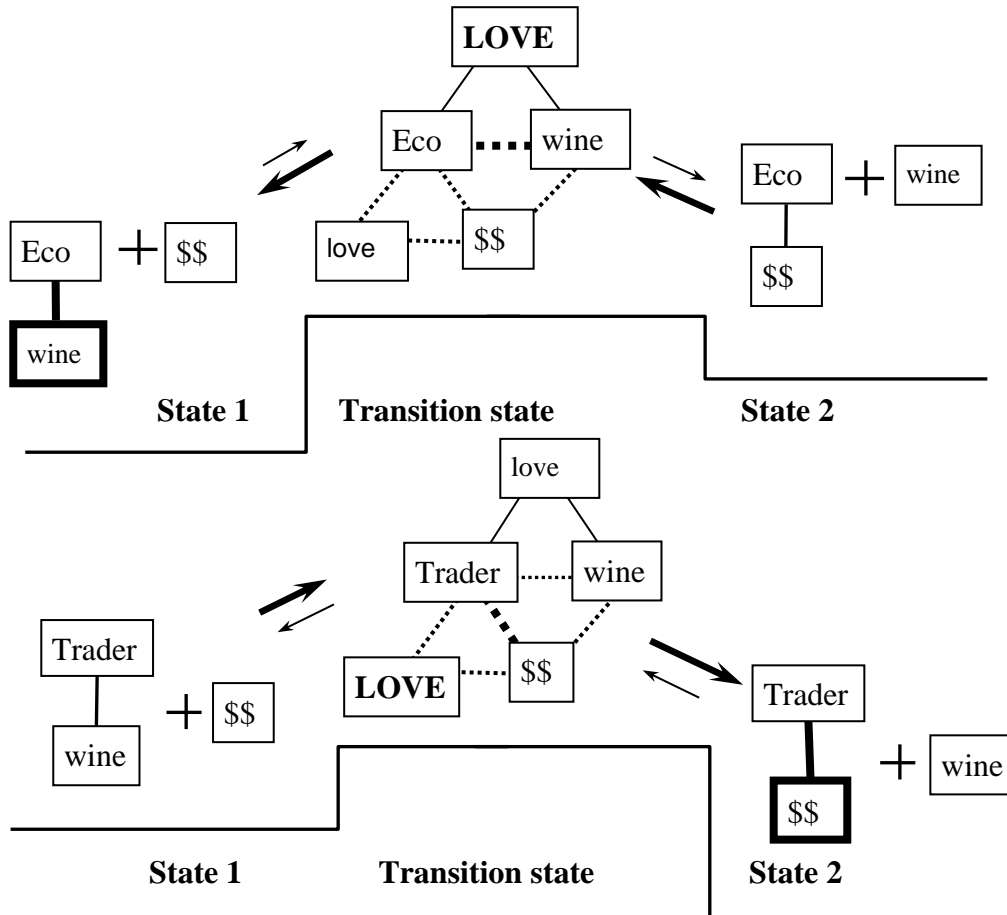


Figure 9. The case of a case of Bordeaux: states in equilibrium

Chemical reactions are mostly (in principle, all) reversible. They reach equilibrium at a position depending not on the transition state but on the relative stability of both stable states.

For the wine collector, preoccupied, as most collectors with the object of his passion, wine is more prominent (probable) in the mind content. For the trader, it is money. Therefore, the equilibrium is **shifted**, as chemists say, to more stable configuration of the two. Yet this regularity is statistical. **Figure 9** also applies to cognitive dissonance.

This example might suggest a simple explanation why economic reality and realities of human behavior are not quite similar: the difference is between the statistically baseless world of one-time events and the swarming relentless unstoppable global economy with its statistical base.

The enormous concentration of wealth in society after 1970's and the monstrous inequality of market players is, probably, the best explanation of clinical **irrationality** of American economic and consequently, political organisms. *Ergo*, the Great Deprecession. We are becoming the property of a small family.

My prediction is that everybody involved in systematic reversible transactions with unequal attraction to object of exchange will from time to time deviate from any entrenched habit. This is a good illustration of the possibility of individual statistical regularities along the time line—a far cry of psychological experiments which are always virgin.

No wonder, the endowment effect is one of the most disputed “fallacies” of behavioral psychoeconomics. It is so simple that it will not pass for science without bells and whistles.

My purpose was to illustrate pattern chemistry with results borrowed from a single domain of research in psychology. To toss barbs is just part of my gain in the form of fun—one of very few valuables not measurable in dollars.

I must remind again (for the third time) that my judgment, background, and knowledge base are not professional and I am definitely not familiar with many important works in the field. I am outside the professional research area. I am interested only in Pattern Theory, where my credentials are also not too high, and pattern chemistry, where I am in solitary confinement. But I have a truly irrational hope that the latter may change.



RATIONALITY GAP

This is my first and last Essay driven by my skepticism regarding a big and thriving area of experimental research. However often (many times in this Essay) I emphasize that I am an outsider and my only qualification is being a reader of a recent popular book addressed to people like myself, I cannot hide my surprise at the uncomfortably low level of imagination, logic, and experimental rigor in this area, at least from the point of view of traditional hard experimental science like chemistry. This is a mess, and a few pearls in the mud do not make it shine.

The term “individual differences” of Keith Stanovich had deceived me. It turned out to be reclassified individual abilities, which can, naturally, give birth to new possible fallacies and shortcomings of human mind.

Something prevents psychologists from fully including into the picture the most important natural factor of human thinking: the individual content, created by entire previous life of the subject, of which only a small part shows on the surface of consciousness, like the top of the

iceberg. The economic psychology for 99%-ers and 1%-ers should be two different sciences, not one. The Kansas Board of Education rationality and MIT rationality look like they come from the opposite wings of our Galaxy.



The most striking illustration of the rationality gap (don't ask whose rationality) is the question "Would you prefer \$3,400 this month or \$3,800 next month?" used by Shane Frederick in his analysis of "Cognitive Reflection Test (CRT)"¹⁹ results. In the low CRT group, 35% preferred next month, while in the high CRT group 60% showed more "patience," as it was interpreted by the author. Note that high CRT group included well poised students of MIT, Princeton, and Harvard, while the group of the edgy ones attended Bowling Green, Michigan State (Dearborn), and University of Toledo.

In his [presentation on CRT](#), Shane Frederick denied the role of the wealth gap between the higher and lower grade GATTACA groups, in my view, unconvincingly.

Here is the comment of Daniel Kahneman in *Thinking Fast and Slow*:

Only 37% of those who solved all three puzzles [on which CRT is based] correctly have the same **shortsighted** preference for receiving a smaller amount immediately. (p.48)

What were the tree fateful questions, quite like in a fairy tale?²⁰

- (1) A bat and a ball cost \$1.10 in total. The bat costs \$1.00 more than the ball. How much does the ball cost? _____ cents
- (2) If it takes 5 machines 5 minutes to make 5 widgets, how long would it take 100 machines to make 100 widgets? _____ minutes
- (3) In a lake, there is a patch of lily pads. Every day, the patch doubles in size. If it takes 48 days for the patch to cover the entire lake, how long would it take for the patch to cover half of the lake? _____ days

I greatly sympathize with the millennium generation who will be tried at human resources by rationality tests, urine analysis, and saliva swab in their 40's and 50's.



I begin to think that breaking up with Freud and Jung was a misstep for psychology because it lost sight of what makes us individual as nations, artists, scientists, leaders, lovers, and spouses: our roots, genes, upbringing, biographies, and bedroom secrets. Like economics, psychology comprises all human matters. Although it is much more conservative and narrow-minded (sorry),

¹⁹ Shane Frederick, [Cognitive Reflection and Decision Making](#), *Journal of Economic Perspectives—Volume 19, Number 4—Fall 2005—Pages 25–42*

²⁰ "The boy is confronted with three questions on his journey, as he travels between two towns and across the river." ([The Devil with the Three Golden Hairs](#))

it surpasses economy by primogeniture. Human nature is the oldest and most stable factor in the evolution of economy—more stable than even the climate and local geography. Whether human nature is good for economy (it is definitely good for politics) or its modification or even substitution will be even better is a separate big issue. I hope to touch upon it in the next Essay 59.

It is my impression, after a short reconnaissance, that behavioral economics, in spite of its enormous experimental material and numerical interpretations, is full of contradictions. Here are a few examples from Kahneman's book.

(1) The example “\$3,400 now or \$3,800 later” obviously (maybe only to me) contradicts the central point of the prospect theory: the evaluation of gain or loss is rational not in absolute numbers, but relative to the reference point. If so, the position of the subject on the wealth ladder defines which decision is rational and which is not. Without personal data, the question does not make sense.

(2) “The science of availability” (p.129) tells you that it is irrational to rely on your recent experience and, generally, on what is currently most active in your mind. That may be true regarding weather in the Windy City. But by the same logic, it must be irrational to rely on your current monetary reference point: it can change by next morning. Maybe it has already changed and you don't know about it. Or never knew. Exaggeration of your assets is another “fallacy.”

(3) If you want to rely on statistics of diseases, accidents, crime, and other rare unpleasant things, you will be rebuked for exaggerating your own risks. Statistics, however, is based on data about large numbers of people who are complete strangers to you. What matters is where and how you live **your** life. In order to develop your own realistic statistics, you need to analyze your own lifetime behavior (time series). Using Daniel Kahneman's example, you can die in a Jerusalem bus only once (p.333). By the time you are finished analyzing, you will be finished indeed. This is why Plato warned not judge a man's life happy until he dies.



PLATO'S WARNING

In his book *What Intelligence Tests Miss: The Psychology of Rational Thought* (Yale U.P., 2009), Keith Stanovich refers to two life stories. Two very intelligent people, professor of mathematics John Allen Paulos and David Denby, a writer and film critic (whose reviews I greatly enjoy and trust) lost a lot of money in stock market, as they acknowledged, because of irrational trading. They wrote books about that. I have read only *American Sucker* by David Denby.

The stories have a beginning and an end and are **diachronic** experiments run by nature, like any life story and any chemical transformation in the flask. Both people failed in achieving their accessory goals, but not of their primary ones. I am sure their stories can be counterbalanced by two others: of people who bought a single, at the time obscure stock, and made their fortunes without moving a finger. The names of the lucky ones are much better remembered than the names of the losers. In my opinion, the behavior of the two intellectuals was irrational only from the point of view of the rules of the trade, some of them as contradicting as any folk wisdom. But if the idiotic behavior of the majority of stockholders was **the norm** during the dotcom bubble, it cannot be generalized as irrationality.

I suspect that by a careful Freudian analysis on a couch, the behavior could be either explained by some personal circumstances (clear in the case of David Denby) or shown as a **pattern** repeating several times throughout life in different configurations.

In this Essay à la Montaigne, I easily acknowledge that I used to make mostly the same mistakes all my sufficiently long life. I had learned from some of them, but not all, by the time the lessons became useless.

I also suspect that both people, clearly of very sharp intelligence, simply did not love money enough to get a good market **education** and were unable to fully commit themselves to making money. I believe, their professional occupations were the biggest distractions from their stock market exploits. Like the wine collector Eco, they probably loved mathematics, movies, and writing—and maybe just intensity of life—more than playing lottery.

Unlike **diachronic** tests, psychological rationality tests, however, are incomplete **synchronic** (one-time) experiments that neither allow for statistical generalization nor take to account the entire mind content, nor pay attention to the powerful factor of education.



ECONOMY OF ECONOMICS

In natural sciences, you are successful if you make everybody agree with your ideas and results. In humanities, you can make a career by opposing somebody's ideas. In economics... well, it is different.

When I ask myself about possible reasons for the “strangeness” of the situation as I see it, the answer is immediate: behavioral **economics** is morphing into **economy** of right behavior, joining the economies of well-being, good health, seductive beauty, and true religion. Its message seems to be: “Your behavior is wrong, your mind is full of fallacies, we can cure you and make your mind **less wrong**®, and you will prosper even more.”

Compare with “Your body is ugly, you are fat, your face is full of wrinkles, we can cure you and make you look less wrong, and you will shine.”

The [list of fallacies or biases](#) is long, growing, and growling at us. There are currently 92 “Decision-making, belief, and behavioral biases,” 24 “Social biases,” and 52 “Memory errors and biases,” the total of 168. The list, by the way, does not leave any doubt that fundamentalist, literalist, and politicized religion is the worst clump of fallacies, although it is not even mentioned²¹.

Has anybody attempted to encompass the “biases,” which is a milder term for “fallacy,” within a single conceptual framework? I do not see any offer of a single theory, however tentative, and, according to my search, nobody does. This situation associates in my mind with the [medicalization](#) of human condition, especially, in psychiatry. I would call it irrationalization of common sense—a psychologist’s fallacy to consider deviation from a vaguely defined arbitrary standard as a disorder or disability. Is an exceptional talent a disability? So many great people occasionally or constantly manifested strangeness and “irrationality,” which in no way ruined their lives.

What does all that tell me? I believe that a united comprehensive and consensual psychological theory is possible. Psychology is one of the most attractive areas of science exactly because it is loose, contradictory, incomplete, and yielding to the pressure of economy. There are a lot of great things to do.

I believe in the most abstract, broad-minded, and comprehensive approach to the mind. I believe in Pattern Theory as the most abstract and rigorous theory of the human mind, inexplicably overlooked even by those who write about patterns.

Why chemistry is the right pattern paradigm of treating complexity of the mind is beyond this Essay. I can only give three hints.

(1) Life has a chemical origin; mind is a product of evolution of life; evolution of exsystems—evolving complex systems—follows the principle of simplicity: complex systems emerge from a simple beginning through a sequence of simple steps because only simple objects can emerge accidentally and simple steps can be made spontaneously.

(2) Chemistry is diachronic: its main problem is the process with the beginning and an end, moreover, with several possible ends. The outcome depends on the speed of competing scenarios. The fastest runner wins, most of the time. The difference of psychology from chemistry is that there is only one runner instead of zillions.

²¹ John Allen Paulos wrote a book *Irreligion: A Mathematician Explains Why the Arguments for God Just Don't Add Up*. I haven't read it. I do not think science and religion have anything in common, although they, like animals and plants, came from the same seed: drive for understanding.

Psychology of the American elections and popular choice in general is more “chemical.” This is a big opaque flask. See [Essay 57](#).

(3) It has been noted quite often, that nature, having once invented some evolutionary trick, tends to repeat it again and again. Chemical evolution had been the first trick and it was generalized and appropriated by all subsequent stages of evolution.

PARTING WORDS TO A YOUNG PSYCHOLOGIST (and more stone)



Economics and business management recommend a beginner businessman to find a market niche. As many as 168 possible niches of cognitive “fallacies,” with more on the ways, are better than a single congested marketplace where the winner sooner or later takes all.

Ambitious young psychologist dreaming of conquering highest peaks of science and loathing to rent a niche in a cliff, pattern chemistry is yours. Have in mind, however, that such exalted goals are irrational, we are told by theory of rationality, because their probabilities of realization for a person taken at random are practically zero.



Essay 59. THE KNOT

HUMANS, IDEAS, THINGS, AND EVOLUTION OF ECOSPHERE



2013

Ist er ein Hiesiger? Nein, aus beiden
Reichen erwuchs seine weite Natur.
Kundiger böge die Zweige der Weiden,
wer die Wurzeln der Weiden erfuhr.

Is he a native? No, his ample nature
emerges from both kingdoms.
He who understands the roots of the willow
is better skilled in weaving its twigs.

Reiner Maria Rilke
Sonnets to Orpheus, Part I, VI

The image of Atlas on the right is taken from the [Nordisk familjebok](#), Sweden's Encyclopedia in 38 volumes, 1876-1926. Mythological Atlas is holding the celestial sphere, commonly misunderstood as the Earth, on his back. Atlas means also a collection of maps, mostly of the Earth. There is a clear evolutionary pathway between both meanings. [Atlas of Brain Maps](#) is a relatively recent development. In this Essay, I am preoccupied with the pattern similarity between the globe that carries us and the brain—the globe we all carry on our shoulders.



CONTENTS

- 1. ECONATION**
- 2. TREE**
- 3. NETWORK**
- 4. CIRCLE**
- 5. KNOT**
- 6. ERGO...**

APPENDIX:

Pattern Theory and pattern chemistry
Mapping
Marximum and social justice

For previous **Essays 1 to 56** see: <http://spirospero.net/simplicity.html>
and <http://spirospero.net/essays-complete.pdf>

1. ECONATION

With time, the difference between my Essays in [simplicity](#) and other e-publications in [complexity](#) has been vanishing. The most benign of the reasons for that is that I have completed a structure of ideas answering my life long questions about the Everything: why is Everything complex and how could it emerge? In short, the answer is that a complex system begins as an object so **simple** that it can emerge spontaneously and it further evolves by **simple** steps. The key to understanding Everything is to turn to the simplest representations—patterns—of its history

My structure stands on the premises of Pattern Theory (Ulf Grenander). It displays an ambitious sign board “PATTERN CHEMISTRY,” although it has gaps, holes, and cracks in the walls. It is not supposed to be as tight as a physical theory, however. It should allow a free flow of time, ideally, like a wattle hut or a dragnet.

I raise the pronoun “everything“ to the rank of noun: the Everything is all things in the world, πάντα in “πάντα ῥεῖ,” *everything flows* of Heraclites.

Following Michel Montaigne, I simply express what flows through my mind. It is not a reliable source of academic knowledge. It could be just a fantasy. Or something already suggested. Or, it could be a source of some new direction of thought, as fantasies often are.

I am coming back to my vision of a strange evolutionary phenomenon, which could be something real and definitive for human history for some time ahead. It is a close, tangled, coiled relation between humans, ideas, and Things, HITs, for short, with organic life and even minerals, water, and air stuck in the coils. To avoid ambiguity, I capitalize Things meant as a species, moreover, as a “nation.” I expect the trefoil knot on the title page to symbolize this phenomenon better than a thousand words. I still need almost 16,000 more.

Technology (man-made things reproducing from blueprints) and ideas (reproducing themselves as memes) have already been looked at as life forms similar to organic DNA- and RNA-based life. I am not sure, however, that all three have been looked at as taxonomic domains of the

single higher super-kingdom. This idea has its precursors. Among them, the ideas of Gaia ([James Lovelock](#)) and a casually expressed and undeveloped but unforgettable concept of noosphere ([Vladimir Vernadsky](#)) should be mentioned. Probably, there are other important ideas of which I am not aware. To follow everything said about Everything is an experiment with infinity.

It would be good to have distinct but egalitarian terms for humans, Things and ideas (HITs). *Technosphere* and *noosphere* are clumsy, vague, and already taken. We can call the natural, not man-made life Bios. It may sound good for organic life, although tainted by computer science (*Basic Input/Output System*), but not to the English ear. I like Technos for Things. *Mentos* (from Latin *mens*, mind) for ideas, sounds artificial. *Humus* for humans? No way! Anyway, *humans*, *Things*, and *ideas* are fine with me. What we really need is the generic term for all three, and I suggest the already existing *ecosphere*, where they could be found. Ecosphere is their habitat and I see the three “super-life-forms” as *econations* (**eco-nations**). I hope something better could be invented. I am for the unpretentious but 100% accurate word *economy*. Like the word *things*, it could be misunderstood, however.

Made of a different stuff—although the difference narrows—but inseparable from humans at birth, Things and ideas seem to be splitting from the initial entirely organic evolutionary branch into separate twigs, following the grand pattern of evolution. The Things comprise man-made things, services, and pleasures, i.e., products of economy, in other words, everything exchangeable for money, as ideas and hired or enslaved humans also are. I include public ideas into products of economy, too, which is a relatively recent phenomenon, if we put aside the history of education. As for Bios, today it is completely enslaved by humans²², although numerous abolitionists try to legally represent and protect it. It has some slim but real chances of cultural autonomy. The independence may be attainable at the very end of serving Growth the Unlimited, the idol of the new global paganism, prophetically [illustrated by Goya](#).

We, humans, Things, and ideas are one **Economy** under the Sun. We are of the same pattern blood. We fight, as brothers do. We all are the metabolites of economy, its masters and slaves. We all can be bought for money, which, changing shape, color, and sound through history, today is hardly distinguishable from ideas (see **APPENDIX 3**). The idealization of money has been the most recent and deepest evolutionary shift and digitalization of ideas is just the other side of the new universal coin.

We all compete for limited resources of energy and matter—even the now naked paperless ideas that need rare earth metals for digital devices, their new dress. We are alive while we can evolve, but toward what? Deciding what is good or bad, we now need to specify for which of the HITs.

This Essay is yet another exercise in pattern reasoning. I will try to minimize repetitions. Details and explanations can be found with Google search in “**Yuri Tarnopolsky**” + **complexity OR simplicity** + [topic].

²² Harmful viruses and bacteria are still waging a guerilla war.

As a believer in evolution and adaptation, I am against condemning modernity. I am for its understanding. I do not sympathize with conservatives of any kind.

2. TREE

The tree of biological evolution has been portrayed countless times. See three examples in **Figure 1**. The curious thing is that very few, if any, “trees of life” go deep enough to the roots which every tree is supposed to have.

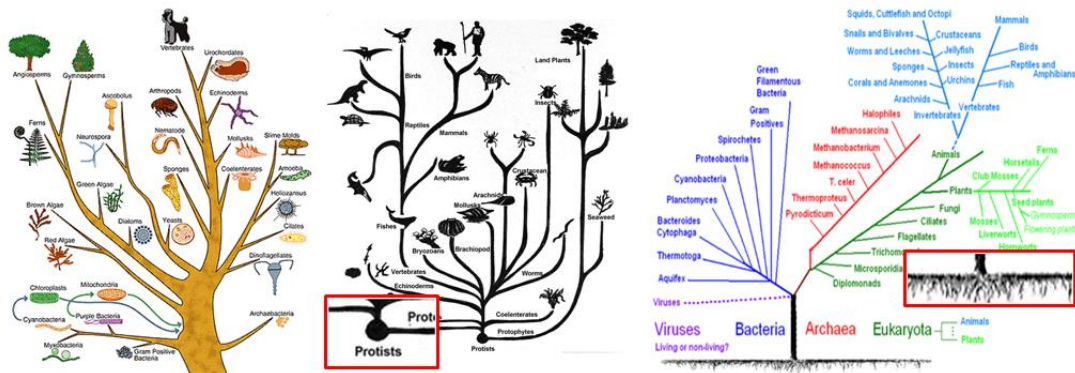


Figure 1. Images of the tree of life. Points of origin are enlarged in red frames.

Figure 2 shows a borrowed from the Web selection of evolutionary trees with some attention to their parts hidden in the distant past but also in the dead substance of the upper layers of the Earth.

Figure 2.1 was one of the first detailed phylogenetic trees for plants published by Heinrich Georg Bronn in 1858.²³ It has roots of no specific meaning, just for botanic veracity. **Figures 2.2** and **2.3**, with some hypothetic amoeba-like creature as the first life form, were designed by the creationists who wanted to fight Darwin with his own ideas, but they are quite expressive.

²³ Source: <http://listoffigures.wordpress.com/tag/phylogenetic-tree/>

There is nothing, at least in the solar system, without a previous state. Both the Earth and life on it must have some predecessor. In **Figure 2.4**, I present my own visual metaphor of the evolutionary roots of life. Its meaning, however, is factual: life emerged from the “dead” physical and chemical substance of the planet. Of course, our planet looked differently without its blue and green outfits.

My epigraph from Rilke refers to the origin of life and everything human with it. I supplement it with a visual metaphor on the right.

Planet Earth is a system. The globe in **Figure 2.4** represents the ecosphere of the earth: the outer layers of lithosphere (minerals), hydrosphere (water), and atmosphere (gases) in which life (biosphere) exists together with, in my perspective, humans, ideas and Things. I certainly follow the Vernadsky pattern and I have no serious objection against *noosphere*.



The concept of noosphere has never been clear cut and today it looks especially muddled. Russia is currently (2013) commemorating the 150th anniversary of the birth of V. Vernadsky. It is not forgotten in Russia that he imagined the ultimate noosphere as the global victory of the Marxist-Leninist “democracy” becoming a geological planet-transforming force. Nevertheless, V. I. Vernadsky was the first to place it in the same pattern as other spheres of the earth. He ascribed the invention of the term to [Édouard Le Roy](#) (1927), although Teilhard de Chardin suggested it in 1922. Both French philosophers had listened to Vernadsky’s lectures in Paris.

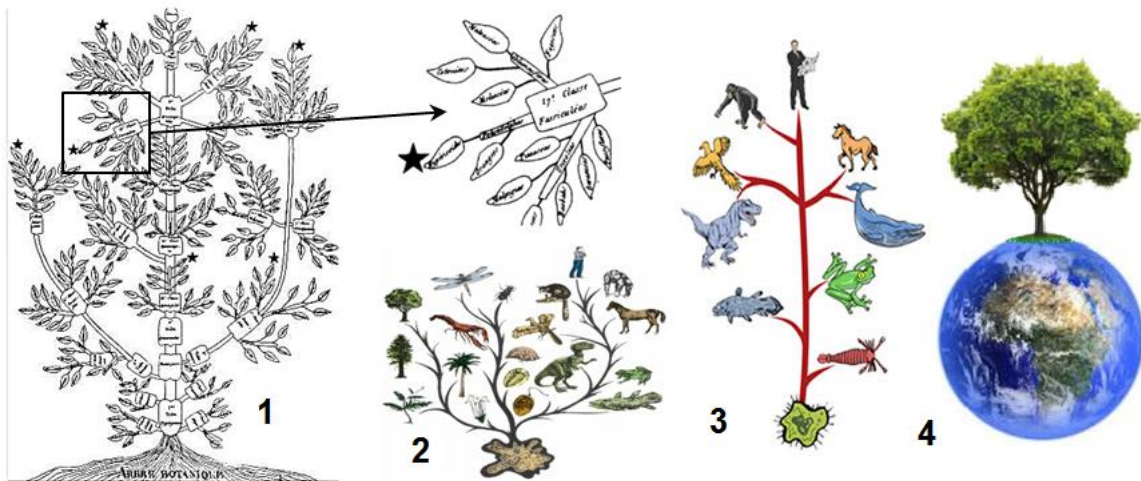


Figure 2. Evolutionary trees with “roots.” See text.

I include Technos, the man-made Things²⁴, to the “sphere of spheres,” or [ecosphere](#). The outer layers of the Earth are a place for **cohabitation** of Bios (organic life), humans, their ideas, and Technos.

²⁴ “Man-made” is a simplification. Things are also made by Things: cell phone accessories are made by cell phones as much as by humans.

rocked by the planetary rotation and all periodical and irregular processes on earth.

The spontaneous origin of life was possible because the first life was simple and simple systems have a limited number of possible configurations. The roots of life grow down into the geochemical substrate of the upper crust of the Earth (lithosphere) and its fluid components. The soil and oxygen in our ecosphere grow from organic life. Technos devours soil and exhales carbon and nitrogen oxides. It sounds metaphoric, but it is the language of patterns.

Figure 3 connects the trunk of the evolutionary tree with the roots: the available elements form simple molecules and ions which further aggregate and recombine into organic mass under the influence of geophysical processes. The figure symbolizes not a state but a process of evolution that started as a cosmic planetary development.

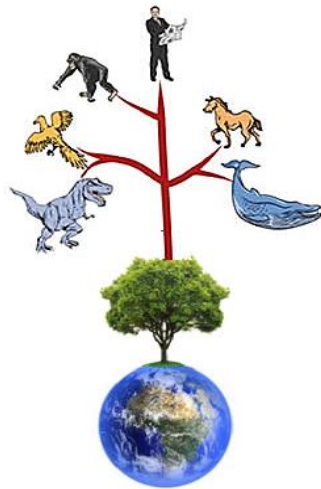


Figure 4. What's next?

The tree in **Figure 4** bears a new fruit: the man, his business suit with stuffed with Things pockets, and the newspaper full of ideas. Evolutionary biologists could recognize it as [coevolution](#), the typical example of which is the bond between bees and flowers, which needs only to hook up honey production by beekeepers and their equipment to be considered a mini-ecosphere, a module of the larger agricultural module. In a module, the components evolve along their own pathways but stay together.

Can the newspaper follow the evolutionary pattern of the dinosaurs? Yes, the *NYT. rex* is already evolving toward dematerialization. But it stays in human environment and employs human staff, don't ask for how long.

The triad at the top of **Figure 4** is also a **modular** mini-ecosphere inhabiting an individual human body and its outer space.

Figure 5 illustrates the evolution of another module: horse riding. As some humans acquire newspapers, some horses acquired humans. Or, we can say, humans developed horses as removable organs before the first newspaper. The bond between humans and horses, although on the wane, still persists. Similarly,

In **Figure 3**, the system of minerals, water, and gases generates the dramatically different **organic** life. I stress *organic* because there are other life forms, such as Technos with Things, human societies with culture, and culture with memes. The major difference between the HITs is the phenomenon of memory, i.e., information stored in inorganic, as well as organic matter: genome, books, human and computer memory. It is something that survives individual Things, organisms, and great thinkers and evolves by elementary steps.

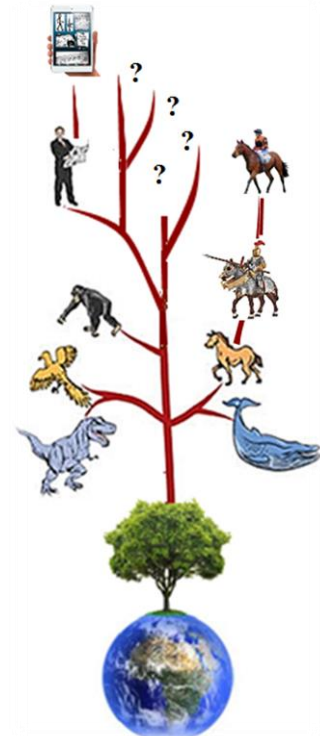


Figure 5. Then what?

although each member of the trio will evolve along its own pathway, as a newspaper branches off into a mobile computer, they will stay close to each other, like humans and horses. This is what I call modularity and we will come to that matter regarding a different kind of the globe.

In production of honey everything stays **close**: the beekeeper, bees, fields and meadows, and the equipment. But what does it mean? Our language is anthropocentric because it was originally for humans only. Its ancient vocabulary comes from humans and their limited in space habitat. Some words, like to have, make, want, good, and bad lose meaning in science and others, like **close**, acquire new one. Mathematics and theoretical physics are full of such aristocratic descendants of humble ancestors.²⁵

Most of the subsequent parts of this Essay are about closeness. What does it mean to be close on the map of the world and on the map of the brain? How does closeness evolve? I am going to take a very narrow pattern chemical angle of vision.

Things, except business suits, evolve fast. They cling to human body and sneak into it. The wearable computers are already putting a foot in the door, anxious to interfere with various daily activities of humans and the “smart” phone already does it, even pushing the classic wristwatch into the company of mechanical typewriters. It matters less and less whether a tablet or a phone lives in your pocket or head. But wait for **Google Brain™**.

Can we say that horse evolved into automobile as a means of transportation? In a sense, yes, but not in a biological sense because there are no intermediate steps between the horse and the automobile. Neither there is a middle stage between paper and computer. Yet cars and computers have been evolving through mutations, quite like species, reproducing from a design template in the womb of technology.

Things and ideas came into the world inseparable from humans. Being human means to have ideas and make things. It also means to have a limited life, the last half of which usually runs in the visible shadow of mortality.

Can the taxonomic super-kingdoms of humans, Things, and ideas be really independent econations? What does it mean to be independent in the ecosphere in which nothing except the geophysics of the earth seems to be independent? My tentative answer is: no. The words like “to have,” “to make, and “independent” are of little use in untangling the web of relations between the inhabitants of the ecosphere grown on the tree of life. The econations are all similar in how they form exsystems with their template (DNA, blueprint, text), inherent instability, and dissipation of energy. Why would we say that humans keep the ultimate control over what they make and think? Not everywhere and not always have they the power to say what they think, let alone act and make.

The image of a tree of life masks the fact of an evolutionary drive to total interdependence, called economy.

²⁵ Michael Pollan has wonderful examples of this deficiency of language in his *The Botany of Desire: A Plant's-Eye View of the World*.

Even the ancient dinosaurs from Mongolia are pulled into economy²⁶, not to mention the distant past, in which the Big Bang, the theoretical beginning of Everything, pushed aside the story of Atlantis, the attraction of the previous centuries. As for the future, it has been a profitable industry for ages, contriving all kinds of aliens, almost universally powerful and repulsive.

The inclusion of different spheres of ecosphere or, in my terminology, different econations into a network of connections as result of the weakening and loss of metric distance in time and space is a novel and striking pattern of modern ecosphere. I was lucky to observe its emergence throughout my life, which, by the way, began under sounds of air alert and bombardment, the lullaby of the WW2.

By the end of my long exploration of Pattern Theory, with my mind, irreversibly tuned to patterns, I detect a seemingly far-fetched **similarity between**



the ecosphere and human mind. It is surprising for a moment, as always with the New, but then it looks obvious. Moreover, it is an idea with ancient roots and a great obsessive power. But I cannot afford another distraction here, go astray, and drown in philosophy.



is

²⁶ In what was called a [million dollars dinosaur scandal](#), the bones of a Mongolian dinosaur were illegally smuggled out and put for auction in US (2012).

3. NETWORK

The growth of network science within the computer science was stimulated by Internet and its money-making endeavors.

DISCLAIMER: The network science is today a very large area, in which I am absolutely not an expert—as well as in computer science, brain anatomy, geophysics, economics, etc., with a limited exception of fundamentals of chemistry. But the language of patterns does not recognize academic maps of the world.

Dynamic network analysis, in particular, the Internet connectivity and the new exploding area of study of [connectome](#) (connectomics) is a new intensive area of research. Both offer a striking imagery, which I borrow in **Figure 6**, adding to them the humble thousand year old road maps because they belong to the same pattern as the Web networks and connectome. There is a deep similarity between not only their configurations, from the point of view of Pattern Theory, but also between their imagery. Unfortunately, to discuss all that would take a lot of space.

All such networks consist of points and lines, or at least lines with endpoints. The similarity of all physically different networks is well realized in scientific community.

Historically, many non-neurophysiological systems have been used as explanatory metaphors for the brain, perhaps the most recent examples of which are the computer and the Internet [72]. The mind–brain dualism has been simply likened to the relation between software and hardware in a computer system. Due to recent advances in diffusion weighted imaging, the large-scale wiring diagram of the human brain has been estimated and its organizational structure has been directly compared to that of computer chips, specifically very large-scale integrated circuits [7]. Striking similarities are evident, suggesting that both technological innovation and natural selection have discovered similar solutions to the problems of wiring efficiency in information processing systems.

Danielle S. Bassett¹ and Michael S. Gazzaniga, **Understanding complexity in the human brain**, *Trends Cogn Sci.* 2011 May; 15(5): 200–209. doi: [10.1016/j.tics.2011.03.006](#)
<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3170818/> . See also Bassett DS, et al., **Efficient physical embedding of topologically complex information processing networks in brains and computer circuits**. PLoS Comput Biol. 2010; 6:e1000748, <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2858671/>

The difference between pattern and metaphor is subtle and controversial. In my view, metaphor takes a configuration *A*, which is the subject in the focus of interest, for example, human life and puts it side by side with a similar configuration *B*, for example, journey, but without any interest

the brain, which I see as similar to the mapping of the world fifteen hundred years ago, I ask myself the following question:

If brain is similar to the globe in some way and if it is very old and changing very slowly, if ever, what can our understanding of the brain contribute to the understanding of our fast evolving global ecosphere?

I believe this kind of question is natural within the framework of Pattern Theory. I want to use pattern similarity of the human brain to ecosphere as of one configuration to another. Since by human standards²⁷ the brain is evolutionary old and stable, while the ecosphere with the three eonations is evolutionary young and fast changing, where is the ecosphere going as configuration? Is the changing since the Industrial Revolution with dizzying speed world means that we are in the pattern-chemical **transition state** between two dramatically different relatively slow **stable states**, one of which is the age of the ancient great empires, strict class divisions, and constant wars, and the other something either new or just different old?

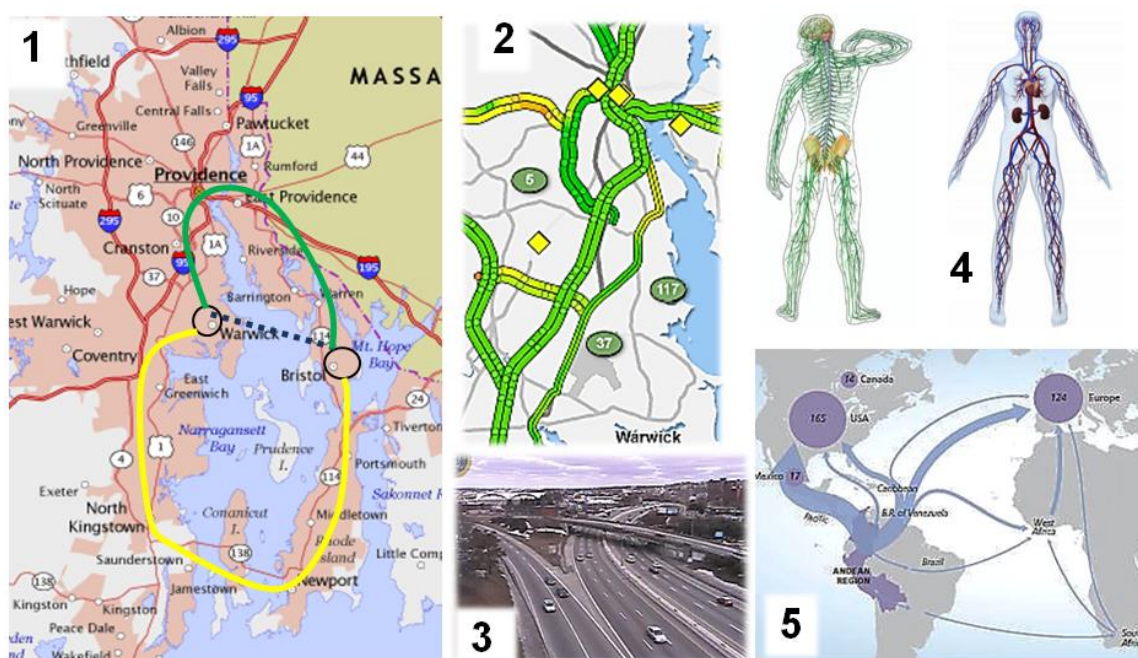


Figure 7. Down-to-earth networks. 1: Distance; 2, 3: function; 4: nervous system and blood circulation; 5. South American cocaine trafficking routes ([UN source](#))

I see evolution in terms of points and lines.²⁸ A combination of points (nodes) and lines (edges) is a graph. Configurations of Pattern Theory are graphs that can behave like real objects representable as graphs. They could follow the laws of conservation and have a preferred

²⁷ Taking human life as a unit of time.

²⁸ See Yuri Tarnopolsky and Ulf Grenander, [History as Points and Lines](#).

direction of events toward the most probable state, which is the essence of chemistry as paradigm. Distance on graphs can be measured in the number of nodes along an uninterrupted sequence of edges. Most generally, nodes and edges can be attributed any properties, quantitative or qualitative.

To approach the evolution of ecosphere inhabited by humans, Things, and ideas, I start with the oldest networks the HITs—brought to the globe.

Evolution of transportation of matter, joined by the transportation of ideas, has been one of the driving forces of history. Historically, the first way of communicating a message in a verbal form over a large (beyond horizon) distance was through a human messenger. Therefore, the minimal cost of information transfer was that of moving a human over a terrain, possibly, with challenging topography and various hidden dangers. The emergence of fast long distance communication, destined to run far and fast, is an interesting example of a (topological) revolution rather than evolution. It is still running, transforming the ecosphere, mixing and reshaping matter, ideas, and human ways of life and extending its reach over the solar system.

From the pattern angle, teleportation, still the favorite trick of sci-fi is by all means real and rather cheap. From artificial insemination over a distance to a hacked and stolen US trade secret materialized in China with local minds, hands, and materials and to 3-D printing are the first steps of teleportation, some of them not even too slow.

Figure 7 presents examples of material networks of the most ancient origin: road maps for movement of people (**7.1** to **7.3**), blood and nervous impulse (**7.4**), and illegal substance for sale (**7.5**). The latter is incomplete because it shows no back routes for money.²⁹

The networks are characterized by topology, in which Euclidean distance plays little role.³⁰ Topology, however, is complemented by functions measured in various ways. For example, the main cocaine supply highway in **Figure 7.5** moves at least about 165 ton of cocaine a **year** to the USA. Digital networks measure throughput in MBps (Megabytes per **second**).

Figure 7.1 shows a map of the State of Rhode Island, USA. As any roadmap, it has a lot of common features with the maps of blood vessels and nerves. Thus, the thickness of a line reflects the throughput of traffic.

Two towns, Warwick and Bristol are separated by the Narragansett Bay so that the actual geographic distance between them is much shorter than along either of the two routes shown by the green and yellow lines. Topologically, both lines and the imaginary connecting bridge across the bay are equivalent. Topographically, the two towns are connected with two very different lines on the road map. In fact, there is a multitude of ways to get from one to the other, all but two of them impractically long and making no sense.

There are many different distinct patterns of topology, some of them illustrated in **Figure 6.7**. The typical topology of New England streets (**Figure 6.8**) is mystifying to somebody from

²⁹ Although the materiality of money is questionable in our digital era, the drug money moving back home is pure paper without a shadow of the doubt. Its outflow from USA to Mexico counts tens of billions.

³⁰ There is also such powerful thing as cultural distance. In America it is exemplified by Blue and Red states, as well as big towns and rural communities.

Chicago. As for random pattern, it seems to me that nature, all the more, humans, do not produce anything random.

Figures 7.2 and 7.3 show the function, which is, obviously, transportation of matter. In particular, they reflect the lack of congestion in early morning hours.

The topologies of blood circulation and nervous systems are essentially the same while the functions may appear dramatically different: the vessels transport energy and the nerves pass information.³¹

I like the term **topography**, description of the place, which covers all qualitative and quantitative **local** specifics superimposed on topology. The primary concept of topology is neighborhood and topography includes everything about the place, including its neighborhood.

Topology versus topography is like black-and-white line drawing versus color photo. By looking at the topology alone we cannot see the function. Topology is necessary to navigate the colorful jungles of modern knowledge as well as the tangled streets of Old New England. Order betrays a free human intent, while a dash of chaos implies free evolution.

Three pounds of flesh, with its billions of neurons, can hold big chunks of the world. The nervous system of a tiny worm is a far cry of human brain. An army of enthusiasts is working on mapping the human brain, with functional topography and the mouse's brain as an intermediate station on the way from the worm to the man. It became possible with the development of highly sophisticated methods and instruments used previously in medicine and organic chemistry.

I believe this is the latest great story of scientific exploration comparable with the discovery of America and the structure of DNA. It also promises gold and spices of a kind, and there is no shortage of investment. Will this onslaught on the globe we carry on our shoulders do the same the West did to the indigenous population of the Americas? I would prefer to live on a reservation in the Brave New World. I will be in a good company.

The lines on the pictures like **Figures 6.11 and 6.12** connect not individual neurons but small parcels and modules. There are big expectations, as well as doubts, regarding the level of individual neurons and synapses. I believe that if we fully understand how some simplest and smallest areas work and how form and function makes the next small step toward complexity, the complexity itself will become transparent. The principle of emergence of complexity is: from simple beginning through a sequence of simple steps to complexity. I am not sure if this is correct Latin, but let me try: *Ex simplicibus per simplicem ad complexu*. For mistakes blame Google Translate.

Next I want to note the universality and ubiquity of networks, alternative ways of their representation, and visualization of connectivity.

Let us draw a pathway of similarity between the town streets in **Figure 6.4** to the tiny—1 mm—but illustrious worm Caenorhabditis elegans in **Figure 6.9**. It consists

³¹ The difference looks exaggerated. Information cannot be transferred without energy and work (form of energy) is not supposed to be performed without a signal, i.e., additional energy.

of 1031 cells (959 for a different form), 302 of which constitute its nervous system. The neurons are topologically similar to houses of a town interconnected with bonds of communication over electronic media, which normally does not fully depend on street topography. Most neighbors can even talk face to face.

I expect **Figures 8 and 9** to save me a lot of words explaining the meaning of points and lines arranged in circles. I will need this kind of visualization to report from the world of **ideas**. Those ethereal creatures have neither mass, nor time, nor terrain, and seem to have no topography. All these points and lines are naked ideas. They can be clothed with substance, however, which is what Pattern Theory is about. They can be a whole world with numbers, weight, color, and struggle, a kind of a live video from the world we live in.

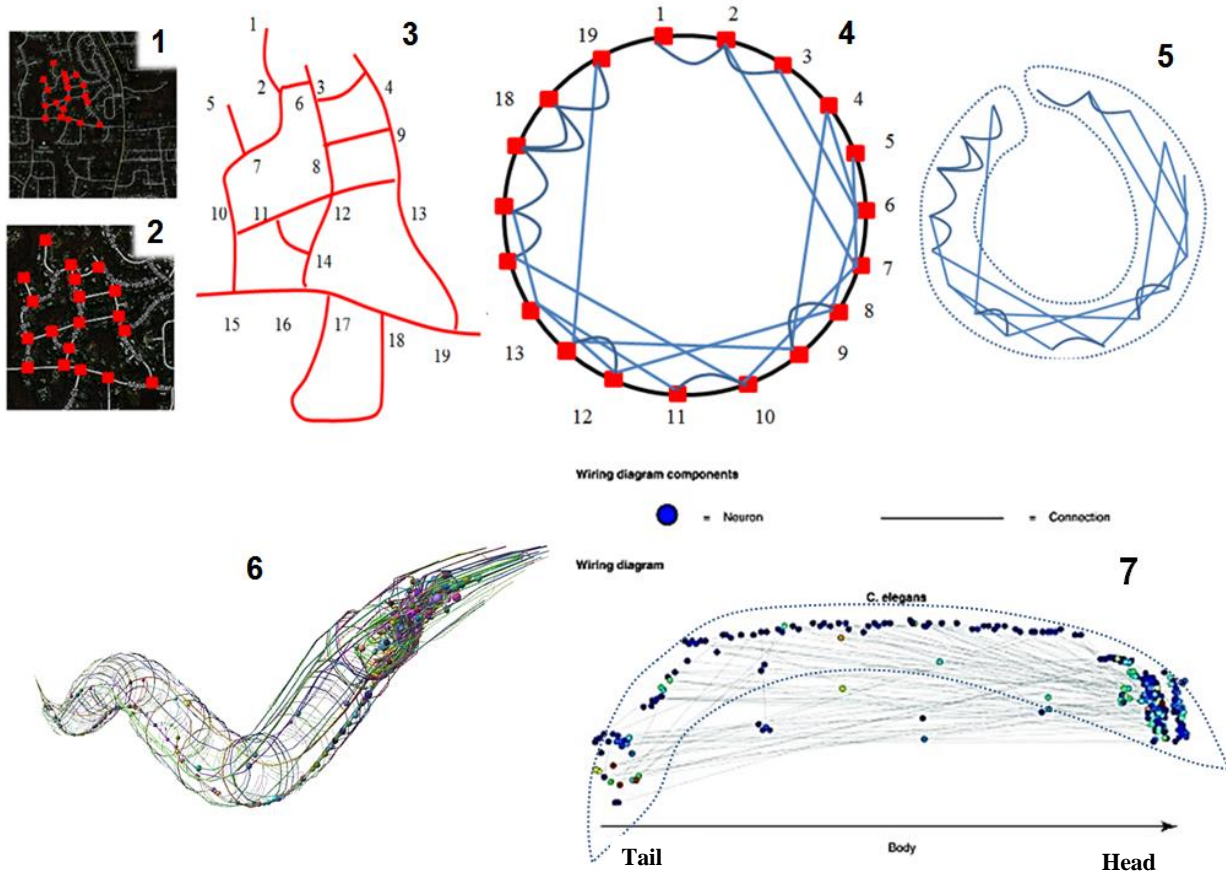


Figure 8. Topology. Upper row: A neighborhood. 1, 2, 3: street intersections; 4: intersection connectivity; 5: connectivity reflects distance. Bottom row: Nervous system of *C. elegans*. 6: its topography, source: [OpenWorm Project](#); 7. partial connectome, source: D. S. Bassett and M. S. Gazzaniga, see page 11 of this Essay.

In **Figure 9**, I take a 4 x 4 table as an object of real—on the screen or paper—world, in which each cell is presumed to be connected to its neighbors in rows and columns, but not diagonally. I use two different numerations of cells: orthogonal and radial. For example, cell 1 in

orthogonally enumerated table is connected to cells 2 and 5. With radial numeration, its neighbors are cells 8, 6, 2, and 4. Although both tables are topologically identical, they look visually different.

Square matrix, with each row marking connections of a node in the column, is an alternative way to visualize connectivity. It reveals interesting things when they are enumerated reflecting not only topology but also topography, i.e., spatial order as directly perceived by humans. In Pattern Theory, what I call topography is the **image** to be analytically processed into a **configuration** of a pattern.³² Image is something all normal humans perceive by senses more or less the same way but may interpret differently, as politics exemplify.

In **Figure 10**, which further illustrates the two alternative ways of representing connectivity, the matrices reveal the regularity masked in the circle form.

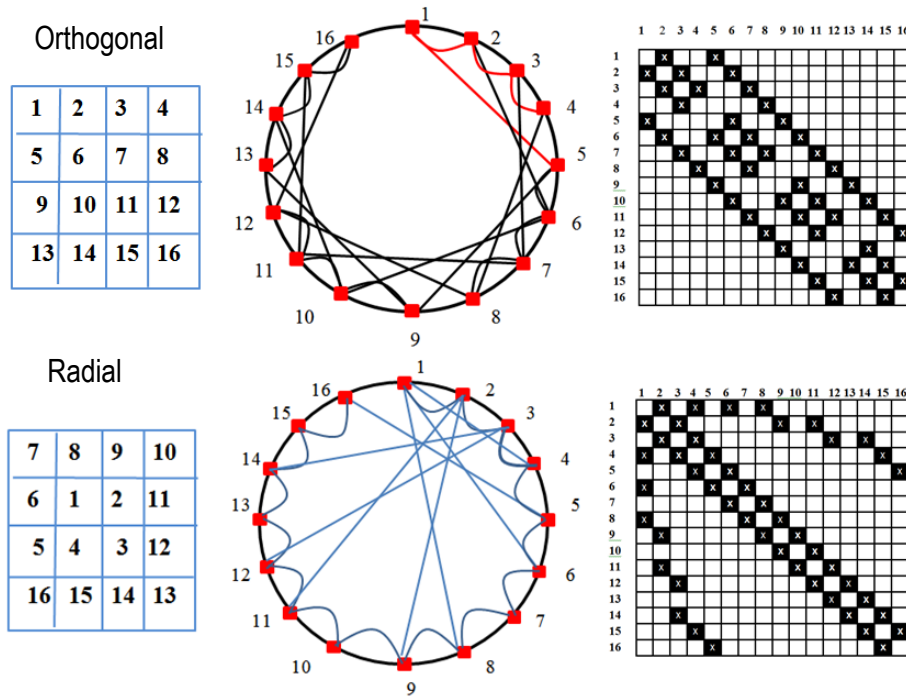


Figure 9 Circular and matrix visualization of the same connectivity at orthogonal and radial numeration of nodes. Cells of a small table are presumed connected with neighbors in columns and rows.

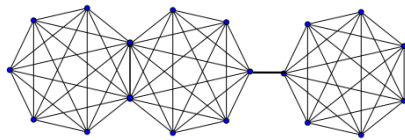
Figures 9 and 10 metaphorically hint at a seemingly irrational importance of the way the same content is presented *ad hominem*. It is a fact recorded in behavioral psychology.

Ideas enter our mind through our senses. Advertisement in the business—whether of donuts or firearms or politics—depends on this property of an average mind to look into things not deeper than the surface. To

³² See also my [Pattern Chemistry of the Origin of Mind](#), in particular, its APPENDIX 3.

look deep into things, as science does, has its cost and we do not pay it unless it promises some return. The borderline between art and science, therefore, runs between the visible and invisible: science is the art of invisible or, more generally, not perceived by senses. The key to the science of Everything, which is trendy to associate with complexity, is to fraternize it with art where we do not look at the back side of a canvas.

There is a particular type connectivity represented by a complete graph, in which each node connects to all other nodes. The “completeness” can be relaxed, so that there will be no nodes separated by more than N other nodes. This important type of network is known as the “small world” topology.



Small worlds can be connected through a small number of channels, which results in modular connectivity. The three giant “small worlds” are economy, Internet, and human brain. They combine many kinds of connectivity, among them star, modular, hierarchical, etc. I doubt, however, that it is random, although there could be random segments. To prove that something is random, or even that such proof is practically possible, is a problem the solubility of which is also problematic.

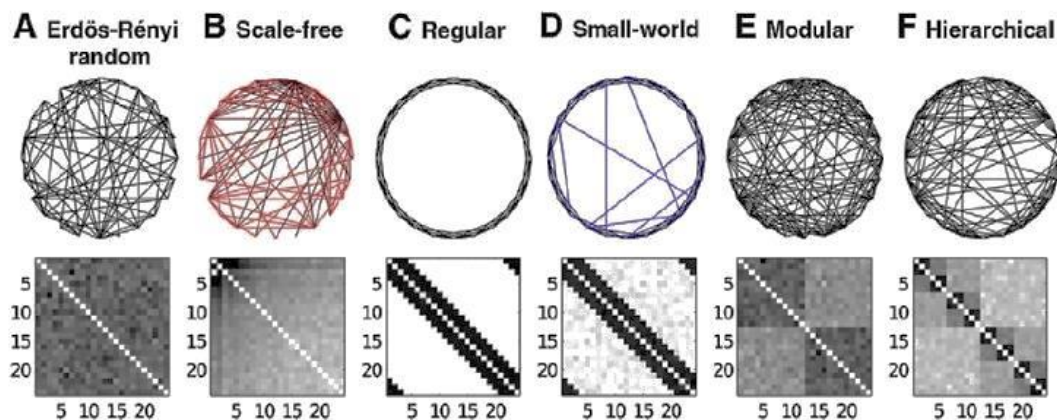
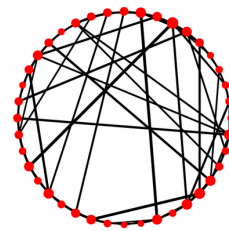


Figure 10. Networks in circular and matrix representation. Degree of black color corresponds to number of connections at the node. Source: Marcus Kaiser, [A Tutorial in Connectome Analysis](#): Topological and Spatial Features of Brain Networks, Figure 6, p.15.

The points and lines of a graph are nothing but ideas: they have no other attributes. Networks are much less ghostly: their nodes and connections have qualitative and quantitative labels or measures, variously visualized. Thus, the intensity of communication can be portrayed by the thickness of a line and the number of connections of a node by its size. Graphs with properties of elements other than topological are known as labeled and weighted, which networks are.

Configurations of Pattern Theory are more than that: they have thermodynamic properties. Their generators are similar to atoms, differ in mutual affinities, and they, as well as bonds, can be described in terms of statistical mechanics.



What I want to see in the company with Things and humans is the econation of ideas. It has been always difficult to find a firm ground with these otherworldly products of gray matter. The discovery of information as measurable quantity revealed nothing about its qualitative properties. A chemist, however, is on a sufficiently firm ground with molecules none of which can be seen other than a combination of symbols and connecting lines, with no mathematical formulas attached. We can always manage what we can draw.

4. CIRCLE

In this segment I want to introduce ideas as equals (sort of) into the company of humans and Things. This kind of intimacy is best achieved by arranging the seats in a circle, like in **Figures 8.4** and **9.1**. The circle is a symbol of close relations, not necessarily positive: family circle, circle of friends, or circle of rivals. The links between the members could be different or even non-existing. It is important that people at the round table can address each other with the same physical ease, at least theoretically, in the absence of noise. Yet the number of two-way conversations is limited to half the number of members, assuming that a conversation fully involves two members. Everybody's attention can be focused on one source during a monologue, but it could be also wandering in search of a personal contact, in a competitive atmosphere. The contacts can vary from complete chaos to complete order regulated by the chairman, schedule, or just physical distance.



Thus, 54 out of 55 African states have a round table in the African Union, with rather complex relations between the members. The 193 members of the United Nations are united in the name only. The UN Security Council is physically round, but inherently split horizontally and vertically.

The connectivity of the brain, economy, and world politics is modular.³³ Densely interconnected areas form a sparsely connected network, often hierarchically layered, see **Figure 11**. It is not a round table, but rather a circle or a hierarchy of circles of round tables or ballrooms. Fine details are still scarce for humans, but could be further known for mice.

³³ There is a lot of material on the Web. For example: David Meunier, Renaud Lambiotte and Edward T. Bullmore, [Modular and hierarchically modular organization of brain networks](https://doi.org/10.3389/fnins.2010.00200) Front. Neurosci., 08 December 2010 | doi: 10.3389/fnins.2010.00200. [Abstract with a link to pdf](https://doi.org/10.3389/fnins.2010.00200). PDF: <http://www.frontiersin.org/Journal/DownloadFile.aspx?pdf=1&FileId=4837&articleId=7572&Version=1&ContentTypeId=21&FileName=fnins-04-00200.pdf>

Regarding economy (modern politics included) this topology is of a relatively recent historical origin. The modern map of Africa is much younger than me. The map of the brain has a much longer history measured in millions of years. It is densely modular anatomically, as well as functionally.

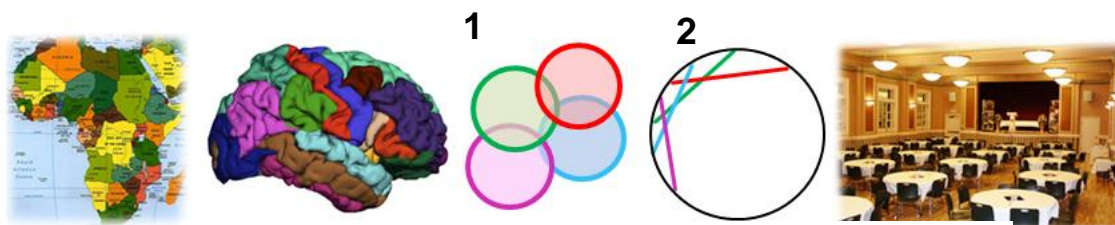


Figure 11. Variations on the theme of modularity.

1 and 2: various compact ways to represent topology of the brain areas

I have a chemical template of the round table pattern: chemical interactions in a solution of chemicals. Although only two particles most probably participate in an interaction—a triple collision is less probable—all molecules behave like any one interacts with any other because of their number and large frequency of collisions. In a macroscopic volume, the process does not depend on the volume. It depends on relative concentrations of reagents—quite like in politics. Situation is different in the solid state, which is more like a prison.

The brain is made of a composite material: it is both solid and liquid. Its powerful connectome works like a solution of chemicals. Instead of multiple collisions of numerous copies, the solid functional parcels (redistricting is possible) communicate by making “phone calls” through the powerful neuronal fiber network. Today, numerous individual minds can conflict and unite through the global network of social media, although it is naïve to believe that we all will benefit from it without paying a price (which we are already paying). Political geography will be influential for a long time, but for how long? This question is all the more intriguing if we, humans, are not alone on the globe: powerful ideas and Things compete with us for the limited but fluctuating resources of fiat money.

Things compete with farmers for land in China today as they did it in England of land enclosures. In Stalin’s Russia, **all** land was taken away from farmers in the name of idea and, as [some believe](#), with the help of American tractors. Millions of people lost their lives, property, and freedom.

‘What is that?’ said the Cardinal: ‘The increase of pasture,’ said I, ‘by which your sheep, which are naturally mild, and easily kept in order, may be said now to devour men and unpeople, not only villages, but towns...’ Thomas Moor, [Utopia](#), 1515.

I reiterate here the main theme of this Essay as a question:

If topology of the modern all-encompassing global economy is evolving toward a global network with topology similar (in the sense of Pattern Theory) to that of the brain, what could it mean for the ecosphere and its econations?

Are the relations between the HITs really close?

To answer this question, any human has only to cast a quick look around. I am surrounded by **Things**, bombarded by **ideas**, most of them about **Things** and **humans**, my books are **Things**, but they are tightly stuffed with **ideas**, and the screens of my computer and TV are spewing what looks like **ideas**, but most of them are about **Things**. With my secluded way of life I rarely see more than one **human** nearby, but the crowds of **Things** are always mixed with the crowds of **humans** whose minds are dominated by **ideas** and images from TV. Moreover, **human** face-to-face and even voice-to-voice communication have been more and more taken over by **Things**. The free flight of fantasy is reduced to menus. **Ideas** are pummeling each other with **humans** paying with their lives for the show, as seen in fragments on flat rectangular **Things** flickering with colors. As for the **Things**, they die by billions, sometimes living for minutes. Automobiles, computers, and cellphones—sophisticated man-made **Things**—are coming for a one-night, one-week, or one-year stand. **Ideas**, euphemistically called “information,” are forgotten the very moment they are perceived, although a few infect millions of minds for decades.

I am reluctant to use the term information instead of ideas. Why ideas and not info? It is not an easy question because information has a lot of meanings depending on context. Different humans respond to the same ideas differently or not at all. They can also spontaneously generate ideas. Ideas can cause unpredictable actions.

If you believe that you know what information is, for example, in information theory, then idea is the elusive quality of information. As a chemist I can compare idea with a chemical structure: it is a structure built of simpler ideas as a molecule is built of smaller fragments or atoms. It is one of uncountable number of other structures, some still unknown—as a chemical structure is one of uncountable number of other structures, some still not only unknown but even unimaginable. Idea possesses individuality: it makes sense only as a unique one among all the others. What idea does not have—unlike man-made **Things**—are multiple copies. The concept of idea is inseparable from human evolution: there were a few simple ideas in the beginning and then they started multiplying, growing, and recombining, quite like organisms. It is evolution and not so much DNA, blueprints, and ideas that demonstrate the unity of the ecosphere and its econations.

The problem with idea is that we can define it only with other ideas. This is why I believe that the best way to deal with idea is to drop all definitions and to shape the concept of idea simply by using it, as physics does with energy and work. Idea will be defined not by what it is, but what it is not. It is a node in semantic network, i.e., not the rest of the nodes.

Idea is a human thought that can be expressed in language and transferred to another human.

Being human means producing and consuming **Things** and ideas. Being alive means consuming and dissipating energy. The evolutionary novelty is the density of the distance and borders defying links between the HITs. The world is topologically shrinking and becoming small.

The most dramatic manifestation of the evolution of topology was for me the triple Islamic terrorist attack on America on September 11, 2001 designed on the other side of the globe in one of the least economically developed spots on earth, driven by an idea, and performed with large

sophisticated flying Things stuffed with, fortunately, not always predictable humans having strong ideas of their own. It makes me substitute the word revolution for evolution.

Another episode of the topological revolution was the US stock market of 2012. It was periodically spooked for a day or two by a few words from Europe and places mostly irrelevant for what was going on in America, but fundamentally important political and economic long term factors did not prevent it from relentless bull chase.

High level personal and corporate information hacked by China and Russia in 2013, “Made in China” as far as the eye can (and cannot) see in America, chopsticks for China “Made in USA,” the digital Great Wall of China erect against Western ideas, the idiocy of the American politics, the ongoing war of the Christian Right against Darwin, women, and Enlightening, the hysterical worshipped Apple face into dust like a monument to an overturned dictator—all that tells me that the econations of the world are continuing the history previously—until the Industrial revolution—made by kings and emperors. History is no more driven by individual human will: Things and ideas compete with humans and each other because economy is not only international but also inter-econational.

I would compare the last decade with the Age of Discovery of the 15th and 16th centuries when as result of geographic exploration the whole Western hemisphere was put on the map. The twenty-first century has already brought a re-discovery and mapping of both hemispheres of human brain resulting in pictures like **Figure 6.11** and **6.12**. This is a fast developing area.

The explorers of the brain are running into the same problem as the explorers of the globe: mapping. Both have the topology of sphere and cannot be projected onto plane without change in distances and angles. **APPENDIX 2** illustrates the deformations of the maddeningly crumpled cortex during its mapping onto sphere and plane and some spectacular pictures of global connectivity.

Figure 12.1 and **12.2** presents two more illustrations. The rest of it offers a hypothetic view of the connectivity between ideas not as semantic networks but as configurations in a dynamic succession, forming and breaking bonds quite like molecule in another ancient spherical vessel: chemical flask.

I have already touched lightly on the relation between mind and brain, which has been heavily handled by philosophers, later joined by computer scientists, from time immemorial. I see the mind as a function of the brain. The function consists of maintaining a population of ideas in a system open to exchange with other minds. If this sounds like the function of an economic unit, n mind and brain, which has been heavily handled by philosophers, later joined by computer scientists, from time immemorial. I see the mind as a function of the brain. The function consists of maintaining a population of ideas in a system open to exchange with other minds. If this sounds like the function of an economic unit, all the better: I see ideas in the metabolism of



The Pattern Theory of ideas as not just a combinatorial gallery but a process, “Calculus of ideas,” has been developed by Ulf Grenander. My version of it is a lightweight modification inspired by fundamental concepts of chemical transformation.

The upper row in **Figure 12** shows the already familiar circles of connectivity, which could be also presented as matrices-like square images. The points on the circle are not individual neurons, but small areas of the brain topography, including functional aspects. The Figures in the middle row are reproduced from Ulf Grenander, *A Calculus of Ideas: A Mathematical Study of Human Thought*, World Scientific Pub Co Inc., 2012, Figures 5.4 and 5.5, p.117.

The points on the circle there are elementary ideas (generators) and lines are links between them established during a simulation of a spontaneous thinking, which consists in selecting, along a generated probability distribution, configurations (connected generators) of **regular** ideas. Regularity, very approximately, is what makes ideas meaningful and coherent. The criterion of meaning is, of course, human.

Figures 12.3 and **12.4** are separated by a time interval and the red dot corresponds to the idea SELF, which becomes highly connected. The elementary ideas are placed on the circle, exactly as in the circular presentations of connectivity, but they do neither imply nor exclude interpretation as topographical points on the cortex. This is something we do not yet know. The connecting lines are formed and broken in the process of spontaneous thinking, but in the picture all of them leave a trace. This is why the density of the picture grows.

The system, nicknamed GOLEM, can be opened to an exchange with other similar systems, as well as to the outside world. It is not a piece of Artificial Intelligence, however, but a seed of a concept that points to a different, non-algorithmic direction: intelligence based on random processes, which gets rid of homunculus once and for all.

The lower image is reproduced from my *Pattern Chemistry of Thought and Speech and their Hypothetical Ancestor*. It is the circle of elementary ideas and their doublets, similar to the middle row, taken for the story of *The Three Little Pigs*. The circle, compressed here into ellipse for convenience, is what I call, the WORLD of the story, i.e., the content of a mind thinking about it. The lines connect the adjacent ideas in the linear story. Ideas correspond to nouns and verbs. They are numbered in the order of appearance in the story.

The difference of my approach is twofold.

- (1) I do not pay attention to linguistic regularity of a thought, believing that thought is a pure configuration, not necessarily linear, produced in a universal way by all humans and further **linearized** into a verbal expression in a way depending on the language.
- (2) I believe that configurations of thoughts are competing for a limited resource (supply of energy by blood) in a non-linear manner, as in the population dynamics. The patterns of thought that maintain the supply of energy survive natural (trial and error) and artificial (education) selection.

I do not think that the above differences contradict in any way to the main idea of Ulf Grenander's GOLEM: human thinking is probabilistic and consists of random acts from which order emerges. I use the same principle of selection of content and connector from a probability distribution.

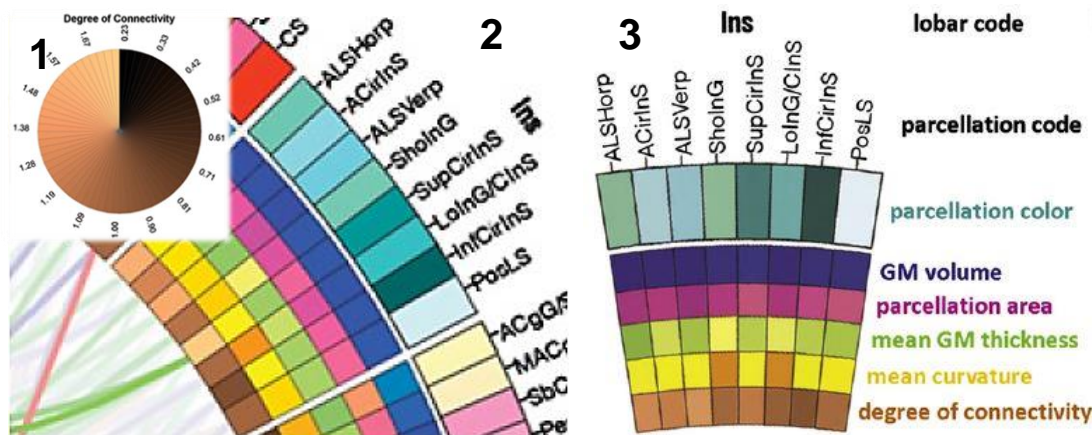


Figure 13. Labeling the topography map of connectome. 1: Color coding of degree of connectivity; 2: Fragment of the map; 3: Labels and codes ([Source](#))

Figure 12.2³⁴ is for many reasons extraordinary in the context of this Essay: it is the apotheosis of topography. It shows the possibility of circular connectivity as a universal way to enrich abstract topology with many material details. Both nodes and connections can be labeled in many ways, including metric distance, statistics, frequency, whatever.



Insula (red)

Figure 13 illustrates the rich topography of the connectivity map and ways of visualizing it.

The large parts of the brain (lobes) are marked by names (for example, **Tem** is temporal lobe) and their smaller regions by abbreviated labels as well as colors. **For example, Ins means Insular sulcus and LoInG/CInS means Long insular gyrus and central insular sulcus.** The degree of a property, for example, connectivity, gray matter volume, *etc.*, is reflected in the color, and its intensity, of the connecting lines (blue, red, and green). The color intensity also labels the degree of “fractional anisotropy,” (how much the shape is close to a fiber and not a sphere) and relative number of fibers in a bundle.

³⁴ [Source](#): Andrei Irimia, Micah C. Chambers, Carinna M. Torgerson, John D. Van Horn, Circular representation of human cortical networks for subject and population-level connectomic visualization. *NeuroImage*, Volume 60, Issue 2, 2 April 2012, Pages 1340–1351. <http://www.andrei-irimia.com/uploads/2/9/3/8/2938292/028-2012-irimia-connectogram.pdf>. [See also this.](#)

The ecosphere as a whole, the human brain (and any nervous system), ideas, Things, living organisms, Technos, and just any part of land, populated or not, can be represented this way. It is the same that to say that they have something in common. What is it? Obviously, representation. Not so obviously, pattern. Does it mean that anything we can draw or paint or even talk about belongs to the same pattern? Of course, but these questions and answers belong to philosophy, which is little interested in the practical importance of its conclusions, never consensual.

What matters to me is not the universality of representation of different large objects as configurations of Pattern Theory or networks or topographies but the **similarity between the objects themselves**: nations and econations, market economy and ecology, ideas and technology. It is meaningful to me—and here is a dash of art needed for the science of Everything—that they are all parts of global economy. This view is not exactly science, it will not convince everybody, nor change the world, neither will it make new products, nor end conflicts. I consider it a step in the evolution of knowledge. To answer the questions, we need more steps.

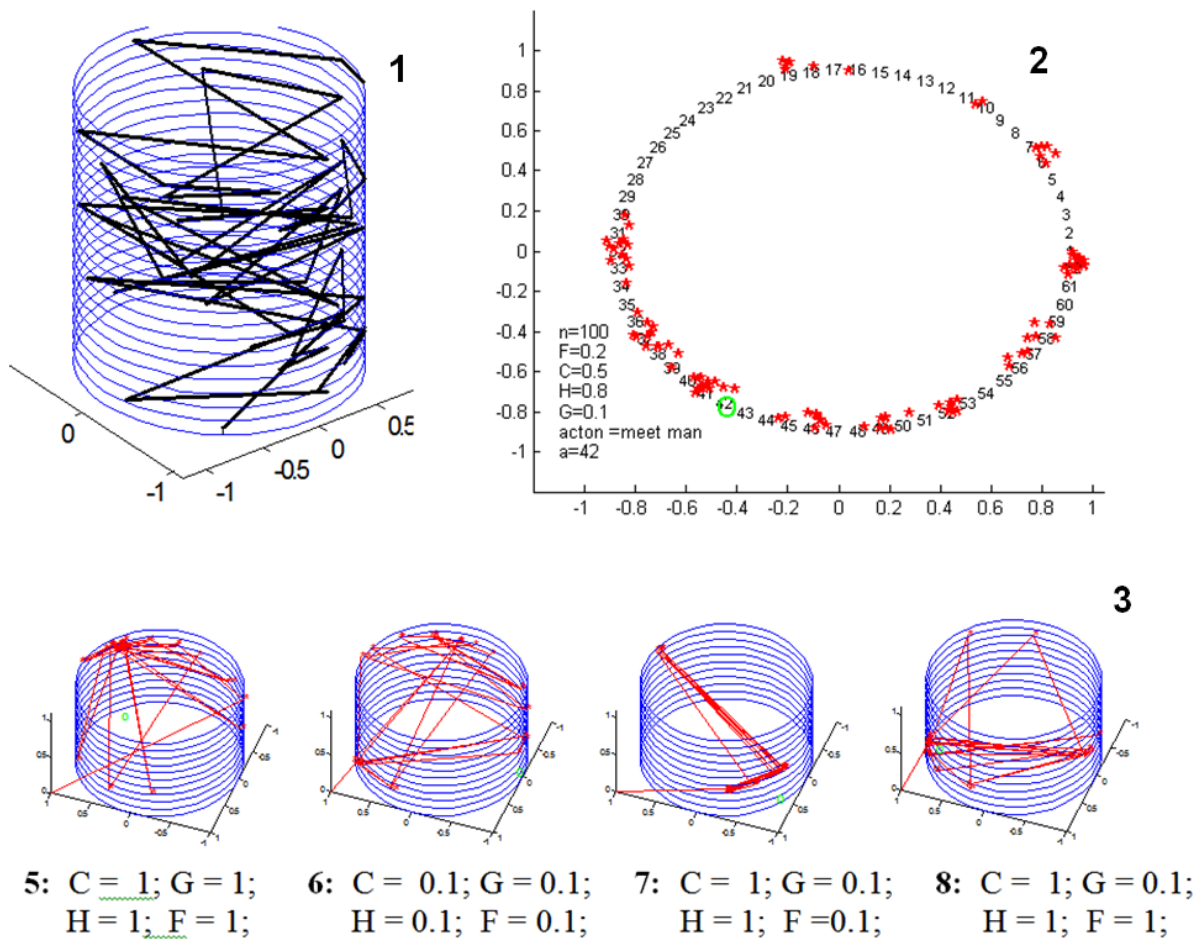


Figure 14. Experiments with *The Three Little Pigs*. 1: An example of time trajectory of thought; 2: Summary retrieval of elements of the story; 3. An example of “world” trajectories of thought with changing global parameters.

Figure 14 visualizes some results of competition between ideas according to a modified very general model of “chemical” reproductive competition first suggested by Manfred Eigen.

Figure 14.1 is a trajectory of consecutive ideas during a spontaneous thinking. The vertical axis is time and the circle in the horizontal plane is the WORLD of **Figure 12.5**.

Figure 14.2 shows the retrievals of ideas (red stars) from the WORLD after 100 iterations. The green circle marks the initial idea, which here is the doublet: MEET MAN.

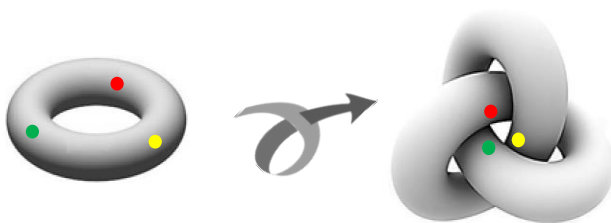
Finally, **Figure 14.3** shows how the result varies with changing four major parameters in the equation of the competition. They characterize such thing as the strength of interaction between ideas, depth of memory, influence of the preceding act of thought, etc. The vertical axis here is not time, but the numeration of points of WORLD, arranged along a spiral. Thus, the difference between the second (14.3.6) and third (14.3.7) pictures can be interpreted as the difference between intensive, jumpy, imaginative “thinking” and a rigid, narrow, constrained one.

5. KNOT

It seems to me that we are currently in a transition state to a distinctly new stage in history of the ecosphere. The indication of transition state in chemistry and pattern chemistry is the onset of instability and a relatively high speed of transformation from one stable state to the next. The “information revolution” moves on with mind-blowing speed. Sometimes the speed is illusory: a novelty is just a variation. Seeing history in terms of points and lines, I am interested in the topological revolution because it could lead us to a better understanding of our habitat and its economy.

I find it difficult to explain in unambiguous terms what is happening with the connectivity of ecosphere. Terms like “small world” topology, connectivity, data, information, and even probability require choosing from a set of available definitions because they depend on the human point of reference. In spite of my difficulties, I have a term for the typically ambiguous “topological revolution:” knotting.

There is nothing exotic in this idea. We hear every day that new Things and new ideas transform



our physical and spiritual world. In our everyday media clatter, ideas and Things are like horse and carriage carrying us, the coachman and the passengers, toward a brighter future. Who is the driver if we are passengers?

Knotting. NO MYSTICISM OR LITERALISM, PLEASE!

I hope the illustrations to previous chapters of this Essay already introduced

some of my points of reference in the language of gestures, on fingers instead of words. The picture on the left is yet another such gesture to appeal to vision rather than logic. It should not be taken as a mathematical statement. Both sides of the picture have a topology of torus on

which the three color points are distant. The right side, however, although it can be mapped onto the left side and *vice versa* (homeomorphism³⁵) shows the three points close in a 3-D space.

My pictures of the knots are not what are called knots in mathematical theory where knots are “circles embedded into 3-D Euclidean space.” The knots here are “thickened” knots, i.e., *tori* (*plural* of torus). Alas, with knots nothing is simple. By the way, theory of knots had its beginning in Lord Kelvin’s vortex theory of atoms.

The following is an example of knotting, inspired by the massacre of children and faculty at Sandy Hook Elementary School (Newtown, CT), December 14, 2012. However much I dislike any stick-in-the-mud bunch of pious acrimonious opportunists, in no way do I blame the Tea Party for that.

Figure 15 combines three pictures. **Figure 15.1** consists of six visual labels for six interconnected nodes of **Figure 15.2**. They are:

1. The Tea Party movement (“The Tea Party is America”).
2. A poster at a right-wing demonstration (“We came unarmed this time”).
3. The US Capitol symbolizing the US Legislation.
4. US Constitution.
5. Assault weapon.
6. An American.

In terms of Pattern Theory, they are six **generators** (components, elements) of one of the innumerable sub-configurations of American life, December 2012 – January 2013. The first four are, **in this context**, ideas. The last two are a Thing and a human.

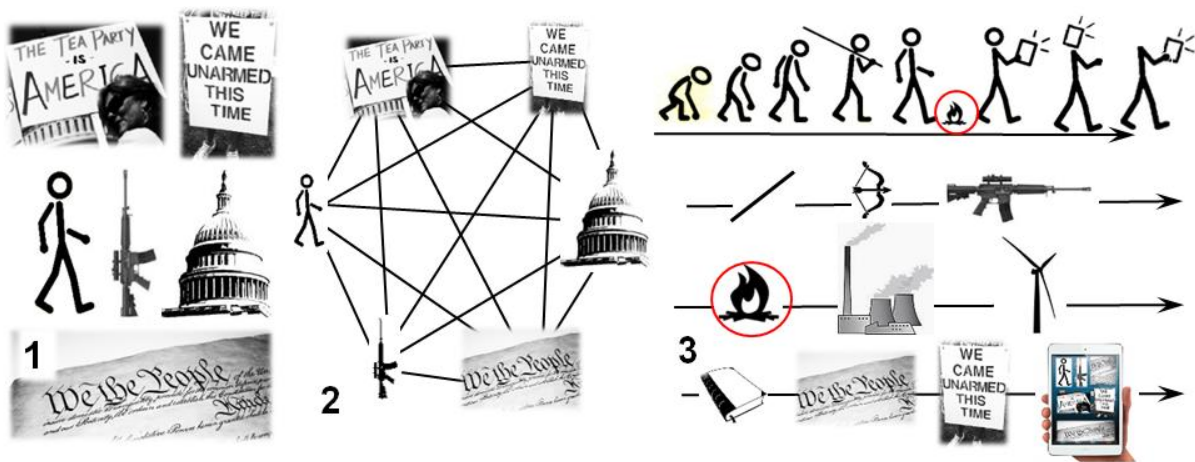


Figure 15: A knot: a small configuration of American life, 2012-2013

1: Generators. 2: Configuration. 3: Evolution of generators; top to bottom: humans, weapons, energy, ideas.

³⁵ “In the [mathematical](#) field of [topology](#), a [homeomorphism](#) or [topological isomorphism](#) or [bicontinuous function](#) is a [continuous function](#) between [topological spaces](#) that has a continuous [inverse function](#). Homeomorphisms are the [isomorphisms](#) in the [category of topological spaces](#)—that is, they are the [mappings](#) that preserve all the [topological properties](#) of a given space.” ([Wikipedia](#))

Configuration in Pattern Theory consists of generators and connecting bonds. The bonds between the generators in **Figure 15.2** form a complete graph, so that each generator is connected to all others.

For example, the fate of the murderous firearms in the USA depends on the interpretation of (1) the US Constitution, (2) behavior of US Congress, (3) the anti-government ideas—or pretense—of the Tea Party and its faction on Congress, (4) the perception of the right-wing activists by American public, (5) human nature and the far from equal distribution of its components over the US population and map.

The slogan “We came unarmed this time” is a threat of violence in response to actions of the elected government. “We” there resonates with “We, the People.” Similarly, the slogan links to the rest of the components of the knot, US Constitution to Government, Tea Party to human nature and its capacity for anger, hate, intolerance, and violence, Tea Party’s “no-matter-what” and “hell, no” frame of mind to political road blocks, etc.

The interests of each of the six members of their respective econations are represented by different organizations and associations, committees, and commissions, some of them of with diametrically opposite views.

Thus, the National Rifle Association (NRA) represents the interests of people, firearms, and related ideas in a package—or knot—which is not easy to undo. The idea in the foundation of NRA and the Congress come from the Constitution. The Congress is elected by the people. The



Figure 16. The Knot.

interests of people and the legitimacy of the idea are being debated. Some adherents of Tea Party accompany the debates with threats of violence.³⁶ Firearms thrive under the wings of NRA and *vice versa*, for which some humans pay with life. Speaking of patterns, to be fair, environment and humans gain under EPA, for which they and Things pay with some loss of space.

In this way all six nodes are connected with each other. Each of the six is a sub-knot of controversies, contradictions, influences, interests, and conflicts in which all three econations are embroiled. Each idea has a material carrier, each Thing comes from an

idea, and each human is bound by ideas and aided or harmed with Things. And everything costs money. This is what I call the modern knot. I reproduce it in **Figure 16** from the figure on the title page. Within the US borders each Thing and every idea are accessible—topologically

³⁶ Google “tea party” + “we came unarmed this time”

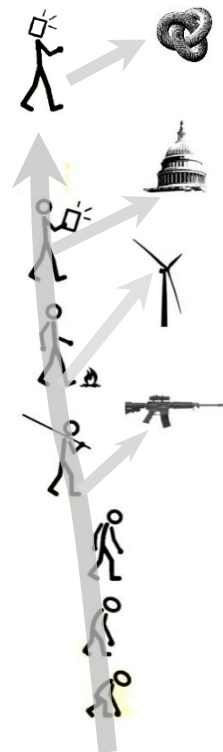
close—to every human and there is practically no geographical distance, no censorship, and little discrimination.

The anthropocentrism of the previous paragraph has a long history, which could be mapped onto evolution of topology from the social structure of a pack of primates through pagan religions, monarchy, monotheism, Renaissance, Enlightenment, and the entire Western history to the unique Serengeti Plain of ideas coming—or returning—from all ends of the world to America.

Figures 15.3 and 17 draw attention to the evolution of each econation. [Evolution of ideas](#) is much less known and inviting than general history of humans, but the latter inevitably includes history of technology and ideas as attributes of humans. Ideas and Technos have been regarded attributes of humanity as a whole, also known as (human) civilization, the development of which I have been witnessing for a long time from contrasting points of observation.

The cartoon of human evolution in **Figure 15.1** is a modified promotional bookmark of the *Scientific American* Magazine. The last stage symbolizes a transformation of the book into FaceBook accessed by a tablet computer or smart phone. As the great Stanisław Jerzy Lec wrote, *the window on the world can be covered with a newspaper*: for the lack of a newspaper (R.I.P.), a notebook or a tablet will do the job. As for the face, it has always been able to shield as well as betray the mind.

I am in no way bemoaning the past. For every generation the sun moves across the sky from dawn to dusk and the perception of the world landscape changes with the light. The shadows move, stretch, and shrink.



In the paradigm that I envision, which is not supposed to override the intellectual zoo in any way and is just a view from the pattern angle, humans are in the transition from the control over their ideas and Things to the position of a forced player in a tripartite game with cooperation and competition controlled by the pattern-chemical rules instead of human will.

The rules are more and more constrained by factors out of human control. They are universal rules of evolution as competition for a limited resource (Life sucks!) and **adaptation to its consequences** (Life is good!). In this paradigm, all three econations compete for limited abstract resources, beginning with energy and ending with abstract space, time, and probability.

By space I mean any extensive quality: land, wealth, energy, rare matter, number of dedicated voters, allegiance to an idea, etc. Probability is a kind of a limited resource because the sum of probabilities (if we know the full space of outcomes) is always 1. Not as sharp as mathematical probabilities, but human life time is limited, period.

Figure 17.
Econations: tree
of life.

From pattern-chemical perspective, the three econations are a non-

equilibrium system of species, very different in nature, but much less different as patterns. For example, every Thing, idea, and human is trying to persuade you that it is good for you or somebody else. If a gangster or an Islamist terrorist wants to persuade you that he is bad for you, it is only because he offers you a better choice than to resist. More seriously, all three can be products of economy, have an itemized price tag, and propagate similarly to organic life forms. There is some similarity between a human body with its complex molecular biochemistry, physiology of organs, and the function of the nervous system. All three are drastically different, but tightly knotted.

I included into **Figure 15.3** a line (second from the bottom) symbolizing the evolution of energy sources and, therefore, the entire Technos, from fire to steam and electricity from fuel to renewable energy. Ultimately, it is the energy production—as well as dissipation, i.e., waste—that defines the most radical changes in the evolution of humans, Things, and ideas.

History of the enclosures in England (18th century), the Chinese experiments with limiting human reproduction (since 1979) as well as with explosive growth of Things and massive removal of people from land, the Soviet experiment with limiting Things in human possession (since 1917-1930 to 1990) and their resulting decline, the world-wide constraining effect of Things on human fertility, the possible observable evolution of species as result of climate change—all those large-scale phenomena have not yet been discussed as an inter-eco-national pattern. I have not researched this subject, though.

The ultimate cause of the **knotting** in ecosphere is the evolution of connectivity **from the big world** with landscape, distances, natural obstacles, and man-drawn borders **to the small world**, in which you do not need to send a risky seafaring expedition for the spices of India: they are in a store or available online and delivered to your door, as almost anything else. As a trade-off, if you are in the cross-hairs, your bank account and your intimate thoughts could be open to others without much ado. Moreover, your thoughts can be easily manipulated in the age when Things are rarely accessible to Do-It-Yourself maintenance and are disposable on a grandiose scale.

This is a huge and public topic and I am afraid to be lost in this sink hole, one of many when you deal with Everything.

I realize that granting pattern independence to ideas looks no problem in democracy, but leveling the plane between humans and Things is more questionable in the context of knotting. Ideas are clearly not aliens in the world of Things, however. They have economic value and humans erect the Great Walls of Intellectual Property to protect them from abduction. They dump money into ideas because they expect return. The difference is in the cost of access, transportation, and dissemination.

The decrease of the cost began with writing and has been the latest evolutionary trend since practical implementation of telegraphy after 1850, radio after 1900, and Internet after 1990. The way the giant [Google data centers](#) look implies that the cost is far from negligible and grows. I quote:

"There's no way around it. These things burn a lot of energy, and a lot of the energy in a data center is done to cool it down so the computers don't melt. Data centers in general consume 1.5 percent roughly of all the

world's electricity," Jordan G. Teicher, [The Brain of the Beast](#), NPR, October 17, 2012. See also: James Glanz, [Power, Pollution and the Internet](#).

It is an understandable anthropocentric habit to consider data and Things “belonging” to humans, but to me the opposite equally natural. Humans “belong” to “their” data because the data influence the fate of their human providers. Data “belong” to Things because they store the data. The concept “belong” makes sense only in the context of economic transaction. I see no reason, however, to generalize this relationship over entire econations. I venture into this casuistic area only because I see there yet another argument for the pattern similarity, to put it cautiously, between HITs. **To belong** has a whole spectrum of meanings. The reader can try to sort it all out, but I will stand “my” grounds.

Since the volume of stored ideas of Things, alias **data**, grows exponentially, the data (overwhelmingly junk) will be felt as an energy burden rather sooner than later. Competition of **data** for storage may result in mass culling of data, controlled by some proprietary data and algorithms, quite like mass murder of humans. Will it be possible to predict whose teenage texting, kitten photos, or proprietary data survives and which of Plato’s *Dialogs* succumbs when a cloud in the info-skies spills some info-slop down the earth? The past could be rewritten (“refreshed” in the Newspeak) daily, quite like in Orwell’s *Nineteen Eighty-Four*.

The pattern kinship of Things and humans is hardly an extravagant idea: they both have mass, volume, can move, and evolve, multiplying from a blueprint: DNA and culture for humans and a digital file for Things. Things need humans, humans need Things. They are no twins, of course. Humans need to consume energy from food, allowing only short interruptions, while Things can be stored for years and even—in museums—for thousands years, although only few of them, like the treasure of Tutankhamen, actually can boast that kind of storage time.

What makes humans different from Things and ideas is mortality. While organic life—mostly water—stays perpetually unstable, i.e., far from equilibrium, Things can be stable and completely solid, although even a laptop contains liquids (sort of) in the battery and display.

Most idle solid Things decay very slowly and their vulnerable parts are replaceable. The problem with Things is that they are completely disposable and not just individually but as a species. Ideas do not care about time: they material carriers do.

Time—daytime or lifetime—is the most strictly limited resource of humans and this is what makes them vulnerable long before the end of life. Things have thousand ways of sequestering humans from the productive time: in stop-and-go traffic, at the game terminal, in compulsive texting, attempts to understand fine print, years of unemployment, hours of re-learning a new version of Windows. Moreover, the Things have been constantly taking over human occupations and inserting themselves between humans and other Things, as well as within both econations. The previous sentence will be regarded by most readers as a typical metaphor. I am personalizing Things and use “taking over” and “inserting themselves” as patterns. See Essays [15](#) and [54](#) on “inserting themselves.”

It is a cliché that time is a limited resource. Google: “time as a limited resource” OR “time is a limited resource”. *Memento mori. Ars longa, vita brevis*. My Essays started with this topic, see [Essay 2](#). Since “time is money” (another cliché), time attracts buyers and burglars.

I want to illustrate the concept of time as a resource in somewhat more than a trite sense. Let us take the hot problem of digital security and compare it with physical security. For ages, the cost of security breach was measured in energy needed to perform work on matter. The Great Wall of China is the best pattern template: it took over a thousand years and enormous work to build and maintain. It takes substantial **energy and time**, more accurately, **work**, i.e., **work per unit of time (power), multiplied by time** to breach the wall at a chosen spot. The same destructive task, even for the most of the wall, could be performed simply by quietly waiting for the forces of nature. Thus, the first stretches of the Great Wall, built before 206 BC, left without repair, are today in ruins. The switch to bricks from earth and stones began in the 14th century AD. We shall visit the Wall after 3600 to see the full effect of the improvement.

A sufficiently long and random password is a typical recommendation regarding personal digital security, I suppose, at least for non-celebrities. In the digital world where pecking on keyboard is the effective equivalent of putting 22 lb. (10 kg) bricks into the Great Wall of China, the creator and the detractor of data have comparable chances. The reason for that is the ongoing dematerialization—and dehumanization—of important aspects of modern human life. As the gunpowder and dynamite had leveled the plane for creating and destruction of stone, dematerialization (=digitalization) leveled the plane for a smart teenager and a team of computer scientists.

The thoughts of Things (i.e., data), can be protected by increasing the time needed for breaking in and stealing or corrupting them. In this role time seems to work as a substitute for physical energy. But it does not mean in any way that time is energy or, for that matter, anything else, from the point of view of physics. It is just the equivalence of small power for long time and big power for short time.

I suggested in **Introduction to Pattern Chemistry**³⁷ the use of natural scenes and non-electronic channels as a way to materialize the password and make it fit the pattern of the Great Wall.

There could be a way to stop the hand of a hacker. As for ideas, in the land of the Great Wall another experiment has been conducted with walling some ideas off. I remember how much the Voice of America and BBC radio service in Russian had done to destroy my Soviet illusions in spite of jamming.

America is still the open frontier, if not quite for humans³⁸ then for all Things and all humanitarian, liberal, conservative, hateful, philanthropic, genial, violent, tolerant, and just crazy ideas ever produced not only all over the globe but also over the entire span of human history, with a lot of recent inventions. My comparison of ideas with animals is not an extreme metaphor, but a reference to the pattern of a **life form**, however different from organic life. What is this difference? How big is it?

³⁷ See **Introduction to Pattern Chemistry**, Part 4, Chapter 8: PATTERN CHEMISTRY OF INFORMATION INSECURITY.

³⁸ *"Income Growth For Bottom 90 Percent Of Americans Averaged Just \$59 Over 4 Decades"* ([Huffington Post](#)); original source: [Income Inequality: 1 Inch to 5 Miles](#), by David Cay Johnston.

Literature on the structure of ideas is enormous. It has been built on the foundation laid by Aristotle. Ideas are combinations of basic parts, quite like flowers, computers, bones, DNA, and airport novels. They propagate, populate minds, and evolve by principles of memetics³⁹ instead of genetics. Politics is the husbandry of ideas counted by heads they inhabit for the lack of their own heads. Ideas mutate, multiply, fuse, and emerge. They are remembered, some of them as stored fossils or reconstructions of mental dinosaurs. Inside the individual mind, ideas compete for the share of time in consciousness where only one few ideas can be present at the same time. Some ideas usurp the minds of their unfortunate hosts and turn them into possessed. Other ideas make

Any omnipotent tyrant dies. Anything of matter decays. Do ideas die? I always denied it. The resurrection of the old imperial ideas in Russia, neo-Nazism in Western Europe, and never-ending fight against Darwin in America confirm that ideas never accept defeat.

When the ideas of pattern chemistry began to solidify in my mind, the most surprising realization was the role of size in the behavior of configurations and patterns. What can be duller than size? I skip repeating the principles (see Introduction to Pattern Chemistry) and limit myself to how it applies to ideas.

Horace: *Odes* III.3

*Exegi monumentum aere perennius
Regalique situ pyramidum altius,
Quod non imber edax, non Aquilo impotens
Possit diruere, aut innumerabilis
Annorum series et fuga temporum.
Non omnis moriar multaque pars mei
uitabit Libitinam...*

I've raised a monument, more durable than
bronze,
one higher than the Pyramids' royal towers,
that no devouring rain, or fierce northerly gale,
has power to destroy: nor the immeasurable
succession of years, and the swift passage of
time.

I'll not utterly die, but a rich part of me,
will escape Persephone...

[Translated by A. S. Kline © 2003](#)

Shakespeare: *Sonnets*

Sonnet 64

*When I have seen by Time's fell hand defaced
The rich proud cost of outworn buried age;
When sometime lofty towers I see down-razed,
And brass eternal slave to mortal rage;
When I have seen the hungry ocean gain
Advantage on the kingdom of the shore,
And the firm soil win of the watery main,
Increasing store with loss, and loss with store;
When I have seen such interchange of state,
Or state itself confounded to decay...*

Sonnet 12

And nothing 'gainst Time's scythe can make
defence
Save breed, to brave him when he takes thee
hence.

Sonnet 60

And nothing stands but for his scythe to mow:
And yet to times in hope my verse shall stand,
Praising thy worth, despite his cruel hand.

³⁹ Meme, “an idea, behavior, style, or usage that spreads from person to person within a culture” (Merriam-Webster Dictionary) is a great idea—and a widely spread meme—of Richard Dawkins (1976).

While I see humans, Things, and ideas stirred in the cauldron of evolving ecosphere, I try to formulate what is so different and even bizarre about the apparently immaterial information expressible in words and emotions as compared with material Things. Can they somehow escape, as Horace and other poets believed, the steamroll of **time** (the ancient word for entropy), which was incomparably expressed by Shakespeare?

He mentioned two ways to immortality: to breed—whether ideas (verses, following Horace), or progeny, or both, deserving the title of the founder of memetics. And yet Shakespeare still lives, as much because of school indoctrination as in spite of it, while Horace, full of ideas and images that became seeds of Western civilization, seems distantly antique.

There is a particular pattern reason for the immortality of ideas: they can be so small that their self-assembly in a human mind can easily be spontaneous. It is the same pattern as in the emergence of organic life and it applies to Things, too. The apes, our caged and tortured messengers of evolution, supervise the spontaneous emergence of Things from rocks and sticks. In pattern-chemical terms, they play the role of enzymes.

“Life is good,” “Life sucks,” and “I must change my life” are examples of ideas that arise in human minds without a prompt from a T-shirt or spare tire cover. By a minimal mutation, a lot of things can be substituted for “life” or its description.



Large complex ideas have low probability in Ulf Grenander's *Calculus of Ideas*. Small ideas win competition.



The secret of longevity and invulnerability of ideas is not exactly immortality but the ease of spontaneous generation. There are few degrees of freedom in small systems. Probably, instincts and emotions are the closest precursors of simple ideas. The simplest ideas are just two bonded elementary ones⁴⁰, but the latter also come from somewhere. I am not aware of a systematic work in the field of emergence of ideas but the Pavlovian dog comes to my mind.

Very complex ideas⁴¹ can emerge in the minds of scientists, but they involve with very exotic notions grown in a well processed and enriched soil from other worlds and available only to a few minds. Complex ideas are not fully remembered or even understood by all specialists: they are kept on record in books and files. Of course, complex ideas consist of simpler ones, but the hierarchical pyramid of simpler constituent ideas in science is itself a complex structure, usually built over time in trial-and-error manner. As for the emotional perception of life, the mechanisms of our mind supply the few needed parts for assembly without any conscious effort.

⁴⁰ See [TIKKI TIKKI TEMBO: The Chemistry of Protolanguage](#) and [Pattern Chemistry of Thought and Speech and their Hypothetical Ancestor](#)

⁴¹ For example, Gödel's incompleteness theorem, Andrew Wiles' proof of Fermat's Last Theorem, and modern particle physics.

Simple ideas, especially, prejudices, do not need to be put on paper, let alone a T-shirt. They just keep circulating and spreading over new generations of minds. There is always a hysterical party for every historical time.

As a long time believer in simple reasons, I just cannot resist a short digression.

What is the true driving force of the American politics in the first decades of the twenty-first century? It must be something really simple because it is so persistent. On the surface, it seems that the American elections are driven only by simplest germ-like ideas capable of spontaneous generation and biting into human emotions like bedbugs. What could that be?

I believe it is the irreconcilable conflict of free market democracy. It is the clash of two incommensurable numbers: wealth of the minority and voting power of the majority. The depletion of the middle class causes the reduction of the buffering center and this is the primary reason of the current Cold Civil War in America. With all the incredible concentration of wealth, the giraffes of [Essay 57](#) cannot overpower the crocodiles because both exist literally in different dimensions, while the US Constitution ignores the difference. To get into the same universe, either the crocks must raise and concentrate a comparable pile of money (which Barak Obama did both times) or the giraffes must whip up the passions of half the crocks, which is possible because of the perpetual contrast between urban and city life. As for the hippos, they are a majority only regarding the intellectual power.

A somewhat similar Hot Civil War comes to my inflamed with patterns mind: the Russian Civil War (1917-1922) between the minority of the upper classes and the majority of the lower classes with a small middle class between them.

This is a dispute not just over apples and oranges but, rather, over pounds and yards.

It would be logically to ask here, what is social justice? Is there anything objective? See **APPENDIX 3**.

Simple ideas are greatly vulnerable to confusion when the context evolves. What can be simpler but more confusing than the Second Amendment? Ideas like that need an interpreter with the mandate of heaven and a deafening voice. The idea is simple:

A well regulated Militia, being necessary to the security of a free State, the right of the people to keep and bear Arms, shall not be infringed.

The idea is simple but its components are context-dependent: *well* (what is “well?” what is “poorly”, *regulated* (by whom?) *Militia* (what does it mean today, if anything?), *security* (from what? from whom?), *people* (all human beings?⁴²), *Arms* (machinegun? rocket launcher? tank?

⁴² “When the country was founded, in most states, only white men with real property (land) or sufficient wealth for taxation were permitted to vote. Freed slaves could vote in four states. Unpropertied white men, women, and all other people of color were denied the franchise. At the time of the [American Civil War](#), most white men were allowed to vote, whether or not they owned property.” ([Wikipedia](#)). See also [A](#), [B](#), and [C](#) (“...repel invasions, suppress insurrections, or execute the laws”).

chemical weapons?), *infringed* (how does it go with a good regulation?). Now, *being necessary*: does it mean *in case it is necessary* or is it *always necessary*?

Simple ideas are simple at birth and in simple times. Tied in a knot with Things and humans, pulsating with the circulating money, they can be hopelessly complex.

We are surrounded and overcome by Things. They penetrate our physical, physiological, psychological, and cultural space. They are inside our bodies (pacers, stents, and joints) and in the air (the newest micro-drones⁴³ that will soon be disposable flying assassins peeping into our windows and hiding under the bed). Ideas are still visible on pages and monitors and heard on the radio. If we can move prosthetic hands and legs by our thoughts, sooner or later something will wedge in between our brain and somebody else's and will gently whisper that whatever evolution brings us is for the better.

What makes each citizen of an econation surrounded by other nationals as by masked doctors with sharp instruments? Why aren't humans bothered by the visions of millions smartphones killed in the prime of life and bulldozed into ditches like cadavers in an extermination camp? Aren't we afraid of the revenge of the Things whom we have given the gift of ideas deceitfully called data and algorithms? Will the ideas of freedom, human rights, and pursuit of happiness win a competition with ideas of submission to Heavens, class inequality, strong hand, predestination, and order no-matter-what? There must be some universal physics in the ecosphere that determines the preferred direction of events as well as the impossible one. If we create millions of ideas and Things, what will counterbalance the creation by destruction?

What is the place of humans in the future? We are the slowest evolving econation on earth, unless prodded by Things and ideas. Can we compete with the fertility of Mother Apple Inc?

“There have been six generations of [iPhone](#) ([original iPhone](#), [iPhone 3G](#), [iPhone 3GS](#), [iPhone 4](#), [iPhone 4S](#) and [iPhone 5](#)), five of [iPod Touch](#) (1st to 5th generations), and four of [iPad](#) ([iPad \(1st generation\)](#), [iPad 2](#), [iPad \(3rd generation\)](#) and [iPad \(4th generation\)](#)).” ([Wikipedia](#))

Those would be idle questions if we did not know well that the future has already started yesterday.

The power that ties everything into a single knot of economy is money: the now universal form of energy in the ecosphere that circulates inside the triple knot of economy, coming from sunlight, mineral fuel, and planetary rotation and dissipating with heat, garbage, and carbon dioxide. Things and ideas that used to comply with human preferences, however silly sometimes, may also warn us one day with something like “We came unarmed this time.”

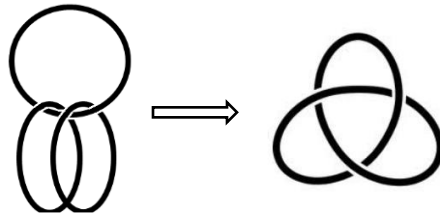
Indeed, money, formerly cattle, gold, and paper, has become an idea in a digital body.

Without even following the laws of conservation, it keeps the ecosphere together. It makes everything close: hand of the thief and your pocket, healing power of a new medicine and its

⁴³ See: [D](#), [E](#), [F](#).

crippling side effects, war and humanitarian aid, striving business and unemployment, assault weapons and school children, freedom of imagination and “press 4” of an automated responder, and only wealth and poverty stay worlds apart. In a bout of nostalgia, the idea materializes back into the pickled cattle of Damian Hirst and finds a buyer.

I am not an expert, but it seems to me that throughout its history America never went back to the past. It is quite possible that the enormous concentration, ubiquity, and fluidity of money are the main reason for the plasticity and dynamism of American society. It is moving ahead. The question is: what is there ahead for America and the world? I ask this question not because I want to stop it or suggest engaging any breaks. As a fatalist, I believe in adaptation—the steering wheel—not the breaks. If we formulate a question about the future, we will get a chance to complete an experiment with history which, unlike experiments on particle physics, will not cost us anything: time alone will do the job and bring us to the answer. Patience is the humming time machine. But we have to ask the right questions now and remember them later.



6. *ERGO...*

Suppose the idea of the ecosphere as competitive cohabitation of econations is sufficiently productive to be saved of immediate brushing off. The following conclusion seems to be in pattern spirit.

A species survives if it is productive, i.e., fertile.

Idea survives if it is productive in:

- (1) generating new ideas,
- (2) linking—positively or negatively—to old ones,
- (3) spreading over large number of minds
- (4) materializing in many Things.

A Thing survives if it is productive in:

- (1) generating copies of itself,
- (2) generating its mutants, hybrids, symbionts, hosts, and parasites,
- (3) bonding with a good idea.

Do I really need to continue with humans?

I believe that the similarity of all three econations is clearly visible from the above comparison. In an ecosphere with limited space, resources, and population, all three econations will coevolve, driven by inherent ability to reproduce and propagate.

I have not mentioned money as a universal measure of energy, a kind of a universal ATP of the ecosphere. Will money shift to the form of a Thing (coin, paper), idea (number, future number, number as a goal), or raw human life, freedom, health, and even body part, as in some extreme ancient and modern ultra-religious, oppressive and genocidal trends?

Let us look at any detailed map of a piece of land, for example, **Figure 7.1**. Before the advent of man, it probably had only animal trails. Then pathways for humans and their animals appeared. Private land is closed to strangers. Modern highways are closed not only to pedestrians but also to vehicles between the entry and exit ramps. Moving around is constrained: it is physically easier, but has less degrees of freedom than in the age of walking and horse riding.

If we look at the map of the brain connectivity, like in **Figure 6.12**, we can see established pathways and highways of the brain paved with bundles of white matter. To compare with the communication on earth, those are underground cables, sometimes through the center of the earth or under the sea.

Like the earth, brain has two very big continuous cortical landmasses—Americas and Afro-Eurasia of the hemispheres—and the Australia of the cerebellum. It also has lots of smaller island formations deeper down. The modules are connected with interstate highways and smaller roadways between modules and parcels of the cortex that can be compared to neighborhoods.

Something like that could be a possible **pattern destiny** of the globe⁴⁴: loss of freedom, fast track for a few options, more irregularity and less individuality. It could be survival of the similar, unremarkable, and run of the mill, as well as depletion of the surprising and unexpected, in short, the minimization and stabilization of the repertoire of patterns in ecosphere, even shorter: **freezing**.

The structure of human brain has been frozen for as long as we remember ourselves, although for a historically short time. Similarly, the evolutionary fluidity of the ecosphere could be freezing into a tight quasi-mechanical system similar of a large company with a very large number of customers, like Verizon, Amazon, Google, FaceBook, etc. How this GlobalMind Inc could be governed is an intriguing question, not to be considered here.

There is another configuration of the pattern of freezing: learning. Riding bicycle, speaking foreign language, or making money out of thin air on the stock market begins with lots of trial and error, exploration, missteps, playfulness, and final stabilization of the routine with some frozen errors hard to rid of. Evolutionary adaptation, however, is constant learning of changing languages, vehicles, and economic idiosyncrasies.

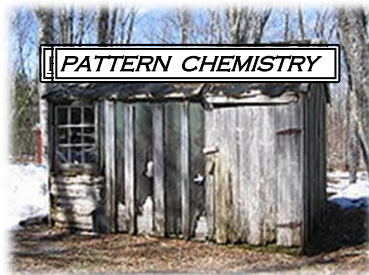
If there is a single ecosphere instead of a population, how can it adapt? This question is equivalent to the following: why is history accelerating, so that a single generation can witness dramatic changes? There are two possible answers: (1) the changes are not as dramatic as they seem, especially, as patterns and (2) the emergence, mutation, and selection of ideas is incomparably faster than selection of genomes.

The main argument for the idea of the ecosphere of HITs depicted in this Essay is that it is already there in the form of global economy. I leave to the reader to look at the economy from

⁴⁴ On verticalization of social structure, start with **Introduction to Pattern chemistry, Part 1, 3.11. Hats and roofs, lizards and dinosaurs** and in subsequent text.

this angle, paying attention to how the process of globalization interacts with national and econational systems. A curious example is the hate of the West by the militant Islamism and the hate of the Socialist and Rationalist West by the militant Right Wing.

I do not have a coherent vision of the future, all the more, answers to my questions. The distant future is not really important. As for the near future, which already has put a foot in the door, the following questions are most solemn: (1) the fate of the political system in the USA, i.e., the dilemma which I defined as “from two parties to one there is only one step,” (2) the outcome of the competition between authoritarian (China, Russia) and democratic (USA, Europe) capitalism, (3) the potential of turning economic inequality into class warfare, and (4) whether the current explosive digitalization of all aspects of life is just a transition state between long slow centuries of the past and the long slow centuries of the future explored in details by historians and Sci-Fi writers with the globe on their shoulders.



APPENDIX

1. Pattern Theory and pattern chemistry

ESSAYS

Essays 1 to 58 (2001-2009) were previously published at:

<http://spirospero.net/simplicity.html> See APPENDIX 1 for full contents.

Essays 1 to 56	http://spirospero.net/essays-complete.pdf
Essays 1 to 20	http://www.scribd.com/doc/11607864/Essays-Part-1
Essays 21 to 40	http://www.scribd.com/doc/12273800/Essays-Part-2
Essays 41 to 56	http://www.scribd.com/doc/12529842/Essays-Part-3
Essays 1 to 56 , pdf	http://www.scribd.com/doc/17164855/Essays-a-la-Montaigne-complete

[Essay 57. THE FEW AND THE MANY , 2012 \(html\)](#)

[Essay 58. PATTERN CHEMISTRY OF RATIONALITY. ALL RATIONAL MINDS ARE ALIKE; EACH IRRATIONAL MIND IS RATIONAL IN ITS OWN WAY 2012](#)

PATTERN THEORY

Ulf Grenander, *General Pattern Theory: A Mathematical Study of Regular Structures*, Oxford University Press, 1994.

Ulf Grenander, *Elements of Pattern Theory*, The Johns Hopkins University Press, 1996.

Ulf Grenander, *A Calculus of Ideas: A Mathematical Study of Human Thought*, World Scientific Pub Co Inc. , 2012.

Numerous sites on the Web.

PATTERN CHEMISTRY

Yuri Tarnopolsky, **COMPLEXITY**, <http://spirospero.net/complexity.html>

In particular:

[Molecules and Thoughts: Pattern Complexity and Evolution in Chemical Systems and the Mind](#)

[The Three Little Pigs : Chemistry of language acquisition](#)

[TIKKI TIKKI TEMBO: The Chemistry of Protolanguage](#)

[Pattern Chemistry of Thought and Speech and their Hypothetical Ancestor](#)

2. Mapping

Figure 18 illustrates two strategies of mapping the brain with preservation of topology. **Figure 18.1** shows the stages of “inflation” of the crumpled sphere of the cortex to a 3-D shape similar to the globe. **Figure 18.2** shows the stages of flattening the 3-D cortex into a 2-D map.

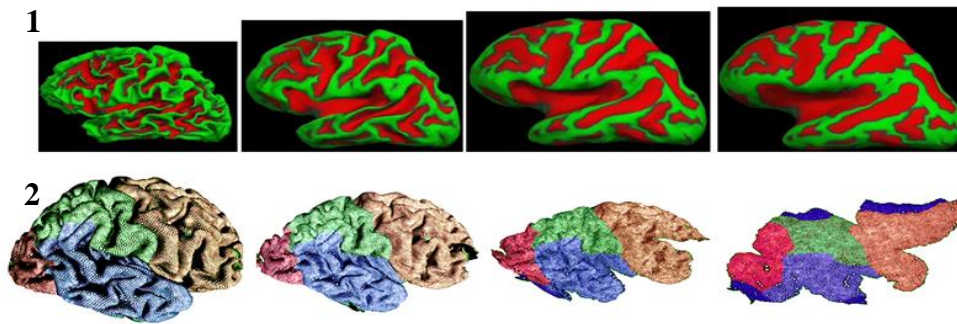


Figure 18. Homeomorphic mapping of the brain.
1. Inflation; 2. Flattening.

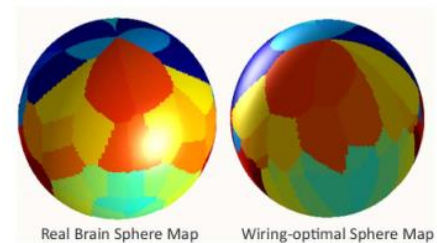
SOURCE

Figure 18.1: Frames from a [movie](#) in: Florent Segonne, [A Short Introduction to Topology in Image Processing](#) .

Figure 18.2: Frames from a [movie](#) in: Monica K. Hurdal, [Visualizing Flat Maps of the Human Brain](#) .

Figure 19 adds three more illustrations of small world connectivity sharing the modularity pattern with brain: world airline routes, internet, and all kinds of land, sea, and air transportation.

The circular representation of the world connectivity would look like a 3-D globe with its “white matter” of bonds filling the internal space. This is not easy to show 2-D plane. Nevertheless, it was found,⁴⁵ that if the brain is mapped on the sphere, its connectivity is very close to maximal economy of wiring. I reproduce here the real brain sphere map and “wiring-optimal” sphere map from the same (open) source.



on

⁴⁵ Ashish Raj and Yu-hsien Chen, **The Wiring Economy Principle: Connectivity Determines Anatomy in the Human Brain**, [PLoS ONE \(2011\)](#).

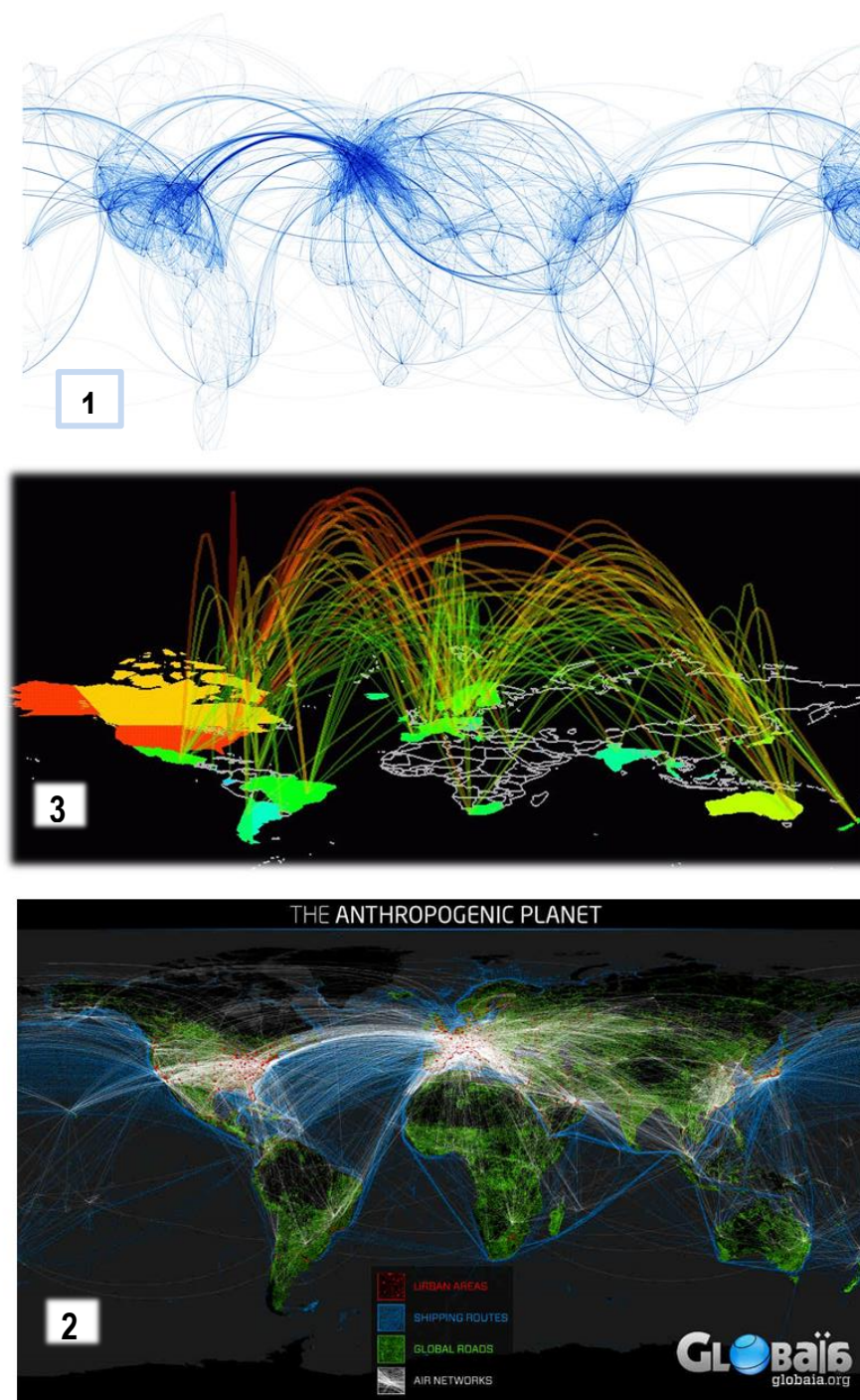


Figure 19. World connectivity.

1. [Airlines](#). 2. [Internet](#). 3. [Land, sea, and air transportation](#) .

3. Marximum and social justice

This **APPENDIX** continues **Essay 57, THE FEW AND THE MANY: Pattern chemistry of 2012 Elections**⁴⁶. In Essay 57, I discussed a particular boomerang-like angular shape of the income distribution curve revealing the income chasm between two classes none of which could be called middle. The middle finger to the middle class.

I am looking for a simple measure or indicator of social justice. This is the area where the lack of consensus is quite natural as in all disputes about something non-existing. The last decades have pushed income inequality in America to a striking and, as some believe, dangerous, even worse, irreversible degree. At the same time, there is a consensus that inequality is natural for capitalist society. I agree with all that. I would add that equality, even if not complete, is unnatural for any society, even the one without capitalism and private property, in which I was born. And yet from all I know about societies I was not born into, **extreme** inequality of any kind—of wealth, power, social status, representation, rights, and duties—is synonymous with instability. This is why history exists and keeps bringing surprises.

Two famous revolutions—in France and later in Russia happened in societies with high inequality in land distribution. Peasants were the overwhelming majority of population in both countries. In France by the end of the 18th century 3% of population owned 35% of all land and paid no taxes (the sweetest dream of the US Republicans). To add insult to injury, bourgeoisie (8%) owned 20-25% of land but had no political representation. The insult could be more painful than injury: bourgeoisie, rather well off, ran the revolution and redistributed the land. In Russia, about 100 years later, 1.5% of people owned 25% of land. The 100 years after the French Revolution had not been wasted: the Bolsheviks who did not represent anybody but the specter of Karl Marx, surfed the wave toward a complete political repression of bourgeoisie as the first step, its annihilation as class next, and the **sequestration** (a US Republican obsession of 2013) of all land afterwards.

I believe the following idea is original, but I have not searched the literature.

I want to draw a borderline between two types of social (i.e. economic, as everything today) justice so simple that it would be not so easy to dispute. It would be completely up to the observer which type to call justice and which injustice. Difference is all that matters.

⁴⁶ [HTML version](#)

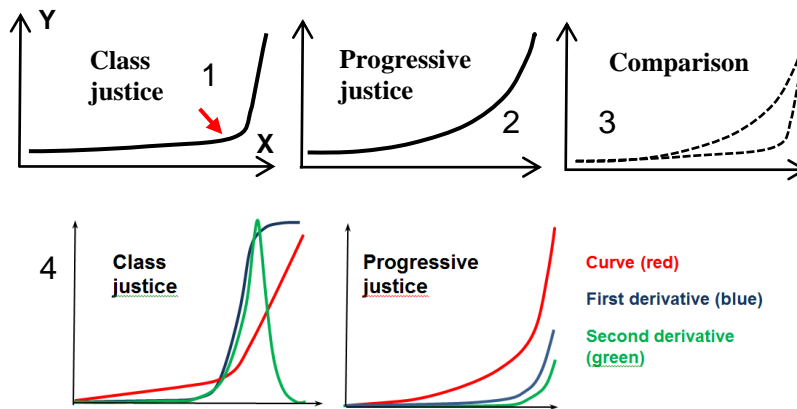


Figure 20. Social justice in terms of wealth distribution. 1– 3: Wealth (Y) plotted against population percentiles (X). 4: Second derivative as test for a social class division.

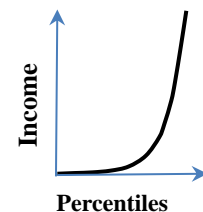
The upper row of **Figure 20** presents two types of justice/injustice. I call them class justice and progressive justice. In fact, it is nothing but two income distributions. They are fictional and not based on any real data.

The income distribution for class justice has the boomerang shape: a visible and abrupt change of the income growth. The transition from one social class to the other is relatively sharp. It looks like the two classes are separated by a barrier and obey different laws of nature. Even a superficial observation, not to mention the recent bumper crop of works on inequality, confirms the striking difference in all aspects of lifestyles.

The progressive distribution is smooth: there is no part of the curve that looks special. It is close to the shape of the exponential function $y = a^x$. It grows rather steeply from percentile to percentile. This is the famous (or infamous) exponential growth, a very divisive notion.

In practical terms, my only requirement to the progressive justice curve is that the income should grow more or less with the same acceleration.

In terms of a mix of differential calculus with a movement of a vehicle, the first derivative of the income distribution characterizes the speed at a certain point and the second derivative gives the acceleration. For exponential growth, the function and both derivatives **have the same shape**.



I am neither mathematician, nor economist, biologist, nor physicist. My platform is pattern chemistry. Patterns are about similarity. I can afford looking as frivolous with serious scientists as poets with serious businessmen. Thus, I consider the mobility of a vehicle and the social mobility along the percentiles **similar**. In this sense I am talking about speed and acceleration. It is natural to measure social mobility in income (or wealth) increase per percentile. If there are one hundred social classes in a society, there could be quite easy to notch up a percentile: such a small step for a man. However, if there are only three, as it was in pre-revolutionary France, or...

by the way, how many are there classes in America? Certainly not less than two: enough wings for a boomerang.

Figure 20-4 shows how would the first and second derivatives look for two types of artificial income distribution curves. If there is a singular increase of the speed of social mobility, a noticeable acceleration, then the second derivative would have a maximum. I have an irresistible term for this maximum: **marximum**, to honor Karl Marx who was obsessed with class conflicts, probably, for a good reason, the future will show.

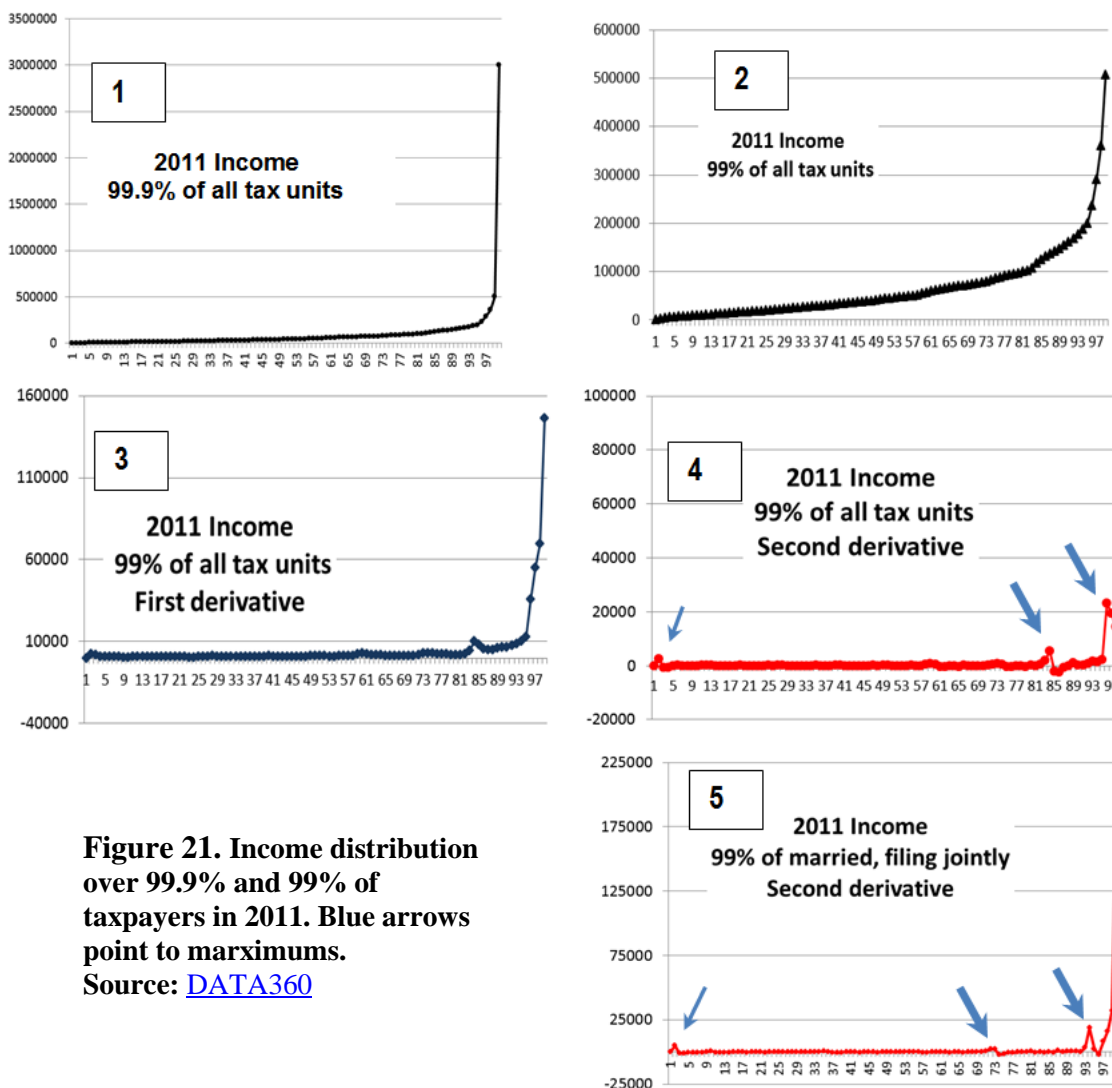


Figure 21. Income distribution over 99.9% and 99% of taxpayers in 2011. Blue arrows point to marximums.
Source: DATA360

I describe the society with progressive justice as the **equal inequality**: the laws of inequality are equal for all. Wherever you are on the inequality curve, your next step will increase your income by the same coefficient. In other words, if your social mobility is described in terms of speed and acceleration, your speed will increase with acceleration which is more or less the same

along the road. The boomerang, however, shows that something happens at a certain point and you jump from an automobile to a supersonic jet accelerating to the space rocket speed. Very few people manage to stay in touch with the earth after that. True, very few people reach that point.

Let us now search for the maximum in the real world income distribution statistics for 2011. The data are available at [DATA360](http://www.data360.org), and could be accessed by search for “income,” which leads to the table [Income Percentiles 2011](http://www.data360.org/pub_dp_report.aspx?Data_Plot_Id=824&count=all) (http://www.data360.org/pub_dp_report.aspx?Data_Plot_Id=824&count=all). Note, that they are based on tax data. The billionaire Warren Buffett famously reminded the people about the enormous gap between wealth and income taxation: he paid less taxes than his secretary. And yet the tax data show the “boomerang effect,” which is, depending on your character, either inspiring or intimidating.

In **Figure 21**, I plot the percentile distributions and their “derivatives.” If 99.9% of taxpayers are included in the data, the boomerang effect is awesome. In the ecosphere it is like Mount Everest, or great white shark, Albert Einstein, the US Constitution, or the Large Hadron Collider, but not all of that together.

What I call derivatives are approximations by differences from percentile to percentile. Mathematical derivative⁴⁷, dy/dx , is, roughly, the difference of two y for two infinitely close x .

The top 1% is a difficult area where income hides in the shade of wealth. For fun rather than fact, I plot in **Figure 22** the **wealth** distribution within the [Forbs 400](#) luminaries (September 2012).

Not surprisingly (for a power law distribution), it looks like a boomerang and shows the same high inequality. The Few are quite like the rest of us. Also, not surprisingly, it does not look like unjust. The small community of giants play by the same rules of human nature, are driven by the same ambitions, and tormented by the same inner demons, only of Godzilla size.

The nervous tremor of the area between the wings of the boomerang on **Figure 22** (red circle) is probably the result of the non-uniformity of the x -axis, which is not fraction but ranking.

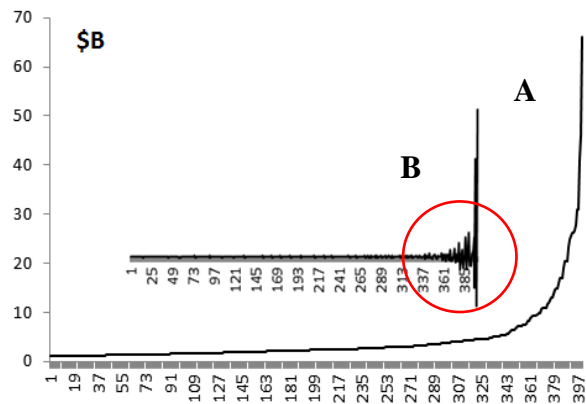


Figure 22. Wealth distribution (A) and its “second derivative” (B) based on [Forbs 400](#), September 2012.

⁴⁷ “In [calculus](#), a branch of [mathematics](#), the **derivative** is a measure of how a [function](#) changes as its input changes. Loosely speaking, a derivative can be thought of as how much one quantity is changing in response to changes in some other quantity; for example, the derivative of the position of a moving object with respect to time is the object’s instantaneous [velocity](#). ”([Wikipedia](#))

When I exclude the top 1% from the data, as in **Figure 21.2**, it looks like my ideal of social justice has been realized in America. Still, the second derivatives show two marximums and a tiny one in the very beginning of the Via Rosa to the 400 Club. They are certainly not large.



The origin and meaning of the multiple marximums is beyond my scope of interests and should be left to professionals.⁴⁸ It could be just an effect of the Byzantine tax laws in America, the high cost of college education, the self-perpetuation of educated elites, or other reasons.

I tie this esoteric subject to ecosphere because I see here a poetic episode of the evolution of the HITs.

Here the pattern-chemical story. One of the most ancient forms of money has survived to modern times in tribal societies and it was unlike any other form: cattle. It could grow and multiply on land and in human hands. So could grain, another ancient currency. Moreover, the Things and ideas have also

diversified the genealogy of money. In pattern parlance, money had split from life as another pattern life form and remains a life form today, although the strangest one. Money is a real child of ecosphere and a genealogical cocktail, combining the patterns of life, Things, and ideas, and, yes, humans, although only as images on coins and banknotes. And how could I forget gold and silver, the minerals? Below is the gallery of money's ancestors, although I find it difficult to visualize the digital money. Instead, I give a link to its various images:

https://www.google.com/search?q=bitcoin&hl=en&client=firefox-a&hs=uNO&rls=org.mozilla:en-US:official&source=lnms&tbn=isch&sa=X&ei=6yJcUfCOL42y0QGDyIDoCQ&ved=0CAoQ_AUoAQ&biw=1474&bih=807



The fourth from left is the now extinct but fondly remembered the 10 Deutschmark Banknote with all three HITs: (1) the image of Karl Friedrich Gauss (1777-1855), one of the greatest scientists ever lived, (2) his best known idea of normal distribution (the “bell curve”), and (3) on the back side, heliotrope, his invention used in land surveys which he conducted in his younger years.

Money could be farmed quite like cattle and grain. Both obey an ultra-sharp Gauss distribution (i.e., physical uniformity) in their materializations as cash, but otherwise in the world of money the normal distribution is powerless. It is the power law that rules and inequality that is normal.

⁴⁸ The marximums have a very abstract physical prototype: phase transitions.

The Few (the giraffes of [Essay 57](#)) are the class in possession of highly productive, actually, industrial means of money breeding. The better-offs among the Many (the crocodiles well above the water) stop short of the ownership in money industry but still can rent some of the slower and more regulated money farms.⁴⁹ Depletion of either species is perilous for society as a whole.

This is a separate and infinitely large subject, however. Capitalist democracy and, especially, the American democracy, is so historically new and the pace of history has been so much accelerating that people still do not quite know all habits and whims of this political order and what to expect of it. I have already got used to its paradoxes and to the most puzzling one: the pious Reds call for revolution and austerity while the Blues tacitly follow the steps of Jesus.

In the very long run, pendulum-like swings between democracy and autocracy are as natural as the change of seasons. Note that pendulum moves the slowest around its extreme points and sweeps fast through its middle position. So does history: from long historical “left” to long historical “right” and back through short fast transitions of wars, revolutions, depressions, recessions, and reforms.

I do not think, however, that the current political tension in America is a class conflict. **Figure 21.2** is still peaceful. The Red-Blue divide could be just a farewell to another handful of ossified marximums. I am optimistic because the conservatives seem to be intellectually in all respects lower than the progressives. As my father-in-law used to say, you cannot shop for what you lack in your head.

As for myself, living in these exciting times, I am less and less inclined to grumble about the Cold Civil War and begin, cautiously, to believe in the possibility of a Cold Civil Peace in America. If a not-snow-white candidate or a woman becomes president, if gay marriage accepted, if the right to die wins, maybe even the atheists will be removed from the category of social lepers and the separation of church and state, now shaken, will be restored.

The pendulum of history is whooshing back and forth, the hands of the clock come full circle, but time runs only forward. It is measured not in days but in generations. I can't believe I am saying that!

2013

⁴⁹ In entertainment industry the concentration of wealth follows the concentration of fame. The fame farming is the very basis of modern art and entertainment. Steve Jobs had put his Apple on that path, but fame...“*e mobile/ qual piuma al vento,/ muta d'accento/ e di pensiero.*” [Woman] is unstable like a feather in the wind; she changes her tone and her mind.

ESSAY 60. ART AND NEXISTENCE

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1. ART AS ART
2. ART AS MATTER
3. ART AS MONEY
4. ART AS REFORMATION
5. ART AS STONE
6. ART AS ABSTRACTION
7. ART AS TREE
8. ART AS SHADOW
9. ART AS BELIEF
10. ART AS MIRROR
11. ART AS FUTURE
12. DOES NEXISTENCE EXIST?

CONTENTS of Essays *à la* Montaigne

Essays 1 to 59 (2001-2013):

<http://spirospero.net/simplicity.html> (contents and links to single Essays)

<http://spirospero.net/essays-complete.pdf> (Essays 1 to 56)

<http://www.scribd.com/doc/11607864/Essays-Part-1> (Essays 1 to 20)

<http://www.scribd.com/doc/12273800/Essays-Part-2> (Essays 21 to 40)

<http://www.scribd.com/doc/12529842/Essays-Part-3> (Essays 41 to 56)

<http://www.scribd.com/doc/17164855/Essays-a-la-Montaigne-complete> (pdf, Essays 1 to 56)

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[Essay 57. THE FEW AND THE MANY](#) , html (pdf)

[Essay 58. Pattern chemistry of rationality](#) (pdf)

[Essay 59, The Knot: Humans, Ideas, Things and Evolution of Ecosphere](#) (pdf)

[Essay 60, Art and Nexistence](#) (pdf)

Essa

MAIN SOURCES FOR PATTERN THEORY

Ulf Grenander, *General Pattern Theory: A Mathematical Study of Regular Structures*,
Oxford University Press, 1994.

Ulf Grenander, *Elements of Pattern Theory*, The Johns Hopkins University Press, 1996.

Ulf Grenander, *A Calculus of Ideas: A Mathematical Study of Human Thought*, World
Scientific Pub Co Inc , 2012.

Numerous sites on the Web.

PATTERN CHEMISTRY:

Yuri Tarnopolsky, COMPLEXITY, <http://spirospero.net/complexity.html>

Demain n'existe pas

Tomorrow does not exist

Lara Fabian

1. ART AS ART

Essay 60 follows Essay 59, *The Knot: Humans, Ideas, Things and Evolution of Ecosphere* and completes my [Essays](#). It is neither a source for art education nor art criticism. Intended as an illustration of pattern ideas, it is a selection of my subjective, biased, and fragmentary observations of a tiny part of modern visual art, taken from different, distant, and sometimes odd points. It should not be perceived as anything but an expression of my curiosity, personal taste, and opinion.

I tried to approach art in Essays 20, *On Artificial Art* and 39, *Painting the Ice Cream Soup*. In the latter, I wrote: “Irrationality is a precious gift of the artist and this is why art is a big mystery for the rational mind.” I could not get half the mystery off my half-rational mind, however, and this is my concluding attempt to reconcile both halves.

I mean here by art, unless specified otherwise, the modern and, especially, postmodern visual art. My intent comes from my belief in prophetic abilities of arts. I am trying to understand what art is trying to tell me about the future in the language of shrieks, whimpers, and bizarre gestures for which we do not yet have appropriate words because words emerge from the past.

In my own private systematics, I divide all Western art history into four overlapping periods:

1. Ancient Art, including cave art.
2. Classical figurative art from the Middle Ages to its retirement after Haussmann’s renovation of Paris, progress of communication and transportation, and decline of European aristocracy. Its maturity was shaped by Italian Renaissance. Experiments and mutations were always rocking the Classical Boat but not as wildly as to capsize it.

3. Art of the 20th century. It jumped out of the French Boat hit too hard by European wars and revolutions, industrial and otherwise. Wassily Kandinsky was its feisty ideologue, major contributor, and the First Prophet. His writings, among them *Point and Line to Plane* and *Concerning the Spiritual in Art*, attacked “conventional beauty” with the zeal of an ascetic preacher cursing carnal sins.

4. Art market of the post-WW2 revival and the Age of Affluence in the West. Andy Warhol, the Second Prophet, left his unambiguous Analects (*The [Philosophy of Andy Warhol](#)*) that erased from the definition of art everything but money.

The two last periods, especially, the Third Millennium, comprise what I mean in this Essay by art. Of course, its roots grew in the two previous ones. The cave art of France could be taken for postmodern art if discovered in a basement of a deceased reclusive artist.

Modern art, like modern culture in general, is fundamentally experimental. The words *fundamental* and *experimental* make an uneasy couple, however. Experiment in science is supposed to make foundations stronger and expand them. Perpetual experiment in art reduces the foundation to the simplest rules of the game, unchanged since the Second Prophet. Yet it is the spirit of the game that makes culture such fun. As for science, it has its own fun and beauty, but there is a huge difference: art is the body of all art ever created, while science is its own perpetually sharpened cutting edge, like the smile of the Cheshire Cat over the receding body.

Art in this Essay is the art of the headlines, multimillion sales, scandalous exhibits, world fame, and delirious or baffled reviews. This is a small part of the whole Art. There is also the huge but invisible, unless you run into it like into an iceberg, the underwater art of small galleries, local artists, art fairs, festivals, flea markets, garage sales, affordable internet sales, and “commodity art” that can be ordered online by your specifications or instructed to do-it-yourself like a true abstract expressionist. The daylight of attention and memory still reaches the surface layer of Whole Art where the most significant interesting original artists, alive and departed, rest among empty dollar hooks and where I had from time to time the treasured feeling of life that was radiating warmth into of my face.

The underwater art represents the entire history of art, its daily content, purpose, and function on the wall or a floor of human edifice, as value, status symbol, and decoration. It supports the presence of art in the cultural atmosphere of the nation and not just in its elite chambers. It is not represented here for the reason of its big size and underwater location, from which it watches attentively, jealously, but skeptically the events above.

NOTE. In this Essays, using almost exclusively Internet sources, I looked for images with appropriate license for my post-stamp size illustrations. In its absence, I am relying on the principle of fair use and loss of detail in small images. The images play the role of buttons leading to original sites. Some well-known art is truly generic on the Web. In any case, the name of an artist alone is sufficient to conjure, with Google, his or her entire artistic heritage, as well as life and foibles.

Figure 1.1 shows a few artworks with the same unambiguous figurative content: horse (see also [Horses in Art](#)). To me they symbolize the eternity and unity of art,⁵⁰ which, as a true time machine, never forgets its past stored as material artifacts and not just verbal ruminations. With Google, the storage is searchable, but you need to know what you are looking for. The Web is full of dark corners with art surprises.

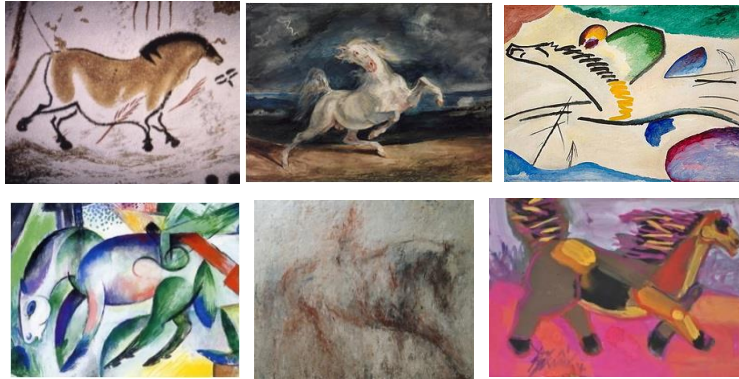


Figure 1.1. Horses.

Top: A horse from Lascaux cave, ca.15000 B.C.; Eugene Delacroix, [Horse Frightened by Lightning](#), 1829; Wassily Kandinsky, [Rider](#) 1911.
Bottom: Heinrich Campendonk, [Horse by the Lake](#) (detail), 1915; Judy Buxton, [Grey Horse](#), ca. 2000; Do Phan (Đỗ Phần), [Horse](#), 2014.

While classical painting was well represented in Russian museums, the “bourgeois modernist” art was repressed in my Soviet time. It could be seen only through some cracks in the boarded up Russian windows on the world. Nevertheless, I was loosely familiar with its main directions and they failed to excite me. I had missed the striking evolution of art during the last 50 years and its turning into an economic phenomenon. In America, only the Internet gave me access to true modernity, which looked anything but “bourgeois.” I have been immersed into Web art for the last three years. I am still making discoveries, like [Richard Pousette-Dart](#) (1916 – 1992) and Alfonso Ossorio (1916 – 1990), but it is difficult to surprise me.

Arts, especially music and poetry, have been as much my spiritual oxygen as chemistry and science. Classical music was the first arts wave that rolled over my head very early, in high school. It was more accessible than any other art in Russia. Poetry was the second, although the best of it was for a long time forbidden and later hard to find. I never missed a chance to visit art museums in Moscow and St. Petersburg (then Leningrad), but the absolute majority of my impressions were from reproductions.

The Web, planted with tollbooths on the highways to movies, music, and literature, leaves images free to look at, as a kind of billboards along the roads. Of course, it is not the same as art face to face, but one can get some idea. Anyway, I do not pretend being a connoisseur of art.

With all its exclusivity, visual arts—painting, sculpture, installation, and performance—are more accessible on the Web than other arts, although as an undersized, flattened, and often miscolored surrogate, with no assurance of reality like the smell and sound of a museum, gallery, or even a city square. The digital images, nevertheless, carry much more content than the shadows in the Plato’s cave. Besides, although many modern originals lose very little on the screen, which reveals something unflattering



Deep Space (photo by Robert Franke)

on why the animals in cave pictures are realistic while human are schematic. anybody see it as prophetic hybrid of life and machine? I can.

about them, the size is always the irreplaceable loss on the Web.

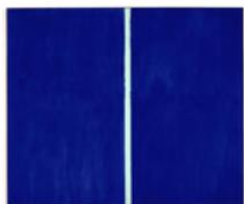
The Venice Biennale of 2013 and Sara Sze's exhibition *Triple Point* there suddenly opened to me a deep space of which I had been largely ignorant and dismissive. Irritated and prejudiced, I entered the halls of fame and infamy of modern art and I am now leaving them, impressed, almost reconciled, and definitely grateful. My reason took a good refreshing rest in this odd niche of our civilization. To lose it would make our life much poorer, like the sky robbed of the Milky Way by city lights. I never saw the Milky Way in America or anywhere else except in the sky over a completely dark Ukrainian village of my college years.

Art opened to me a view of the whole spectrum of pattern concepts and themes addressed in these Essays. Now, saturated with impressions, I am anxious to look behind visible horizons at what can never be seen, touched, and posted on the Web and yet is in highest demand, especially, as long as it either looks and smells good or just gives you goose bumps and makes you panic. It is the future, the epitome of ultimate and unquestionable **nexistence**. Tomorrow does not exist. And yet it does.

I want to use art as a *pattern window*, unobstructed by technology, into the future of the *Knot* of **Essay 59**, i.e., the future of all of us: humans, ideas, Things,⁵¹ our pets, toys, and fetishes, our masters, slaves, friends, enemies, buttons, icons, shortcuts, accounts, and whatever else might spring up in the man-made ecosphere of the Third Millennium, A.D.

One of my first discoveries was Barnett Newman.

A large painting of a vertical white line on a blue background, *Onement VI* by Barnett Newman looks like a window with curtains drawn together. Having in mind that the painting was sold in 2013 for \$43.8 million at Sotheby's, New York, what could we see with the curtains parted? Is



Barnett Newman (1905-1970),
Onement VI (1953; 102 x 120") and its
counter-abstraction (concretization?).

there anything behind? What if there is something non-existing, which is neither something nor nothing: **nexistence**, as I will further call it? I use this contraction of **non-existence** for anything that cannot be perceived by human senses, may not make any logical sense, yet is a source of either debate or agreement, or influence on earthly matters, with a great real power, or even being a cause of war.

I see the world as patterns⁵²: similarity airways between distant continents and worlds. One of them connects *Onement VI* with a photo of a curtained window. In this case, a **similarity** can be recognized by most observers. I am interested in what

⁵¹ I capitalize man-made Things as an evolutionary domain, on par with humans and ideas; see **Essay 59**. To capitalize also humans and ideas would probably make more sense, but they do not evolve as fast as Things.

⁵² Patterns are typically regarded as stable regularities. Pattern Theory of Ulf Grenander and my chemical background guides me to the intimate mechanisms of pattern instability and change typical for human history and individual human situations. See [Introduction to Pattern Chemistry](#).

is not visible to eye, however, and, especially, cannot be sensed in principle, even with most sophisticated technology.

I am intrigued and excited by what does not exist at all yet exerts force like some physical field, shaping the present and the silhouette of the future. I want to understand it. What can we see through the slit in the Newman's curtain? I will come back to it in the end. Meanwhile, I am using an opportunity to present more of Barnett Newman, **Figure 1.2**. See also his [Stations of the Cross](#). Much more can be found on the Web, for example, Christie's [lot notes](#) accompanying *Black Fire*.

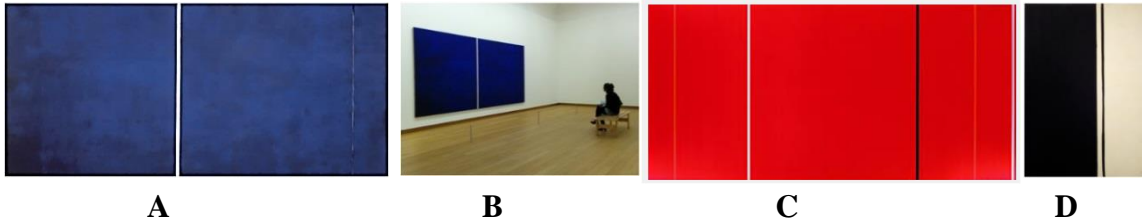


Figure 1.2. Barnett Newman (1905-1970): A, B: *Cathedra* (1951), sold for \$12 million in 1997, C: *Vir Heroicus Sublimis* (1950-1951); D: *Black Fire* (1963), \$84.2 million in 2013. B: Photo by Autopilot, from Wikipedia.

Modern visual art is, probably, the only man-made object on earth that can be taken entirely by its face value. What is art? Is *Onement VI* art or wall painting?

“What is art?” This has been a simple question if limited to classical art. With modern art, which accompanied, somewhat trailing behind but looking far ahead, the emergence of modern industrial civilization, it is not so simple. The already *post-post*-industrial civilization is on its way but it has not yet arrived. It is like a mathematical expression with the opening bracket (but no closing one. If we trust sci-fi prophets (I do), it will be appropriate to call it post-human. And if we trust modern art as prophesy, we are coming to the same conclusion, watching the shrinking presence of life, human body, passions of the soul, and surrounding nature in modern art.

A regular commercial urinal, a pile of rocks or pieces of bread, dead animal, industrially made and bent gigantic sheet of steel, a canvas chaotically splashed or evenly covered by a paint of single color ([monochrome](#)), an unmade and untidy bed—is all that art?

Art is more than what you **believe** it is. My position regarding art as a whole is: everything that is called, presented, exhibited, advertised, handled, sold and bought, as well as forged, stolen, and destroyed as art is art. I will repeat this mantra, with a few variations, more than once in this Essay.

There is no art but art and to make art is an art in itself. But why is this art so different from the so-called classical art of all centuries before the twentieth one? What does this pattern of transition mean for the entire domain of human exsystem? Does the all-you-can-eat art buffet symbolize some radical unique turn of history? Can anything like that happen in social life (the

loss of Federal Powers over the disUnited States of America) or science (synthetic life that, as Craig Venter promised, can create life forms without a preceding evolutionary history⁵³)? Reviews of modern art exhibitions or particular works, whether landmarks or new and obscure ones, are often written tong-in-cheek. One can clearly see the critic's bewilderment and vacillation between masked mockery and forced dutiful praise. Yet the apparent duplicity is not necessarily cynical. I can understand that perception of art even by a seasoned professional strongly depends on the viewer's mood, state of mind, personal memories, and even the weather outside. For a common viewer, the artwork seen for the first time is the best approximation of an accidental exchange of looks that could start a personal relationship after mutual ground testing.

There is no generic definition of art the way we define bread or bicycle because there are no limits to the variety of the tangible stuff of modern art. The world of art is huge but insular. It is the strangest domain of economy, an industry in which to produce more may mean actually to produce less: a unique object in a single copy for a narrowest segment of consumers, often, made with minimal labor, hired labor, or no labor at all. It is the kind of work where to be innovative is to repeat the same pattern, with some predictable variations (like the size of the iPhone?). Art is where speaking about art means composing phrases that have dozen possible meanings or no meaning at all. Is it the multi-speak, the descendant of doublespeak? Squeak-speak? Shriek-speak?

Like an astrophysicist, observing the stars and planets in deep space, hopes to trace the origin and the future of our solar system and planet Earth in it, I believe that art can tell us something about where we are and where we are all going as civilization. I believe in the prophetic power of art because art tells us, in a kind of sign language, our future before we can even invent words to describe something new and never seen and heard. As for "traditional beauty," it is abound in the lower tiers of the art world and some of it, not much, seeps up to the top.

"Art is what you believe it is" or "what is sells as art" or "art is nexistence" cannot satisfy anybody whose professional habit is to ask meaningful questions and answer them in a non-circular way. Art has monetary value and seems to be made of matter, which sounds like it is brimming with existence. Next, I am going to look at art from those two angles.

⁵³ ["Synthetic biology frees the design of life from the shackles of evolution"](#)

2. ART AS MATTER

So, here we go again. Repeat after me: art is what is made, called, exhibited, and sold as art even if somebody says it is not art.

Is that so? If that is true, art is as much a matter of belief as a matter of matter. “A matter of...” is a figure of speech, but belief is not about matter. Doubt is the signaling smell of belief, its pheromone. If the believer stands firmly by his faith, then he will doubt your beliefs and, occasionally, his own. Yet the palpable and measurable physicality of art is unmistakably and unconditionally there. It is a thing like any other and it does not need any belief to assert its existence. Why is it so difficult to define art in a non-circular way? Moreover, it is difficult to speak about art as we speak about bread, stone, money, and the fabric of everyday life, even though all that can be the stuff of art.

Modern art reveals to public in the ornate and gilded Klimtesque attire of *artspeak*. Here is a small taster of its vocabulary:



Gustav Klimt, *The Kiss* (1909). [From Wikipedia](#)

Abstraction, aesthetics, aggression, allusion, ambivalence, awareness, beauty, challenge, concept, context, controversy, creativity, declaration, depth, efflorescent, elemental, elusive, elucidatory, emotion, energy, exaltation, existential, expressive, ferocious, gestural, glyphic, harmony, humanism, imagination, individualism, innovation, inspiration, intensity, interpretation, invocation, irony, libidinal, meaning, motivation, muscular, mystery, mythological, melancholy, noble, palimpsest, poetic, pivotal, projection, purity, reference, rejection, scatological, signature, somatic, space, speculation, spontaneity, subjectivism, sublime, sumptuous, symbol, syncretic, syntax, talent, taut, texture, visceral...etc.; “dwelling on the threshold,” “silent space between and around words,” “mobilization of the space between reading and seeing,” “bondage to form,” “bounteous exchange,” “brutally human,” and more.

The most primitive, crudest, and offensive piece of modern art can still be presented and analyzed in *artspeak*. *Mea culpa*, I fall into *myspeak*, which is no better.

Rarely can we find something that contrasts with artspeak as much as this quote from a fiction book about art:

“...on the one hand fun, sex, kitsch, innocence; on the other trash, death, cynicism.”⁵⁴

I realize that almost any review of art, music, and book is a balancing act for the professional critic. I rarely read art books and reviews, except in *The New Yorker*, where nobody wants to be hurt by falling off the high wire. Yet Sarah L. Thornton’s book *Seven days in the art world* (2009) lets you sneak into modern art world through the back door. In her later book *33 artists in 3 acts* (2014), she sets the matter straight from the start: “Artists don’t just make art. They create and preserve myths that give their work clout” (page XIII).

I have noticed two outstanding art reporters: Jonathan Jones, *The Guardian* (UK), and Sebastian Smee, *The Boston Globe*. I now suspect that artspeak has a range of dialects, some of them intelligent, serious, and delightfully ambiguous. Reviews of Peter Schjeldahl in *The New Yorker* can offer the artist a Greek gift with stratospherically higher artistry than their targets.⁵⁵

Art, however, is not what anybody says about it. Art appears to a viewer as honest man-made and often defiantly raw matter. By physical materiality I do not mean the properties of the medium of artwork which today varies from excrement to gemstones, from brick to bread, and from cadaver to live flesh. I mean that, whatever we all say or hesitate to say about a piece of art, it is a **thing** that takes space, has mass, can move or be moved, reflects or emits light, smells, sounds, and can be licked to taste it. Moreover, this thing, like you and I, is not made in thousands of copies and, strictly speaking, cannot be considered Thing: a loop of the Knot ([Essay 59](#)), on par with humans and ideas. It is unique by definition, although it can have twins, clones (prints), close variations, and imitations. Modern art grows in big and supportive incest-ridden families, but not without divorces and remarriages.

No electronic microscope can find any harmony or melancholy in the cracks of paint. You can be invited to put an artificial paper-on-aluminum stone on your windowsill (Sarah Sze in Venice), walk on art and occasionally steal it (Ai Weiwei at Tate Modern), and annoy or hurt the artist (Marina Abramovic, Naples, 1974). You can put your finger on expression, harmony, and mystery, but only metaphorically. The X-rays and electron microscope may help with suspected forgery but are mum on the poetic, romantic, and libidinal.

Paintings, sculpture, and installations can be seen, touched, weighed, measured, appraised, mangled, and kept under lock. In market economy, art is tangible investment: something you can lay a hand on, literally, not metaphorically. Tyrannical regimes, religions, and ideologues can proclaim art subversive and ban or destroy it, even together with the artist. Yet art could replicate and spread because artists borrow from each other, paying back in the currency of fame.

⁵⁴ Michel Houellebecq, *The Map and the Territory*, Knopf, 2012, p. 129.

⁵⁵ “When I think of Richard Serra’s work as art, or of art as what Richard Serra does, a bracing bleakness descends, like that of a stern northern region, where people live gladly, while under no illusion that it’s the isle of Capri.” Peter Schjeldahl, *Industrial Strength*, *The New Yorker*, 2007/06/11, p. 146

Originality is power, but so is similitude. Photography, initially the threat and then the blessing of visual art, combines both and turns one into the other.

Performance art is witnessed and recorded on films and digital media. Reproductions are more like reductions, but they make art available to those who, like me, are far from museums and galleries.

Art is as different as framed squiggles and splashes of paint, rusty sheets and rods of steel, heaps of refuse, pointless human labor, sleep before an audience, countless paintings of apples, lilies, parallel lines, and color blots. The heart-squeezing Rembrandts, monsters of Goya, self-mutilations of Francis Bacon, Raphael's *Madonnas*—all those things are art. As we have no choice but to accept all the gore, greed, glut, and glory of human history, we have to accept art as art whether we like it or not because it **is** history. It is the future that we can squabble about.

Obviously, I dislike a lot of art. Modern art, which I am trying to understand, forces me to look at myself and try to uncover the reason of my apprehension. My habit of a chemist to ask the childish question “what is it made of?” could be part of the problem. I need to look at the backside of everything and take things apart down to atoms.

Figure 2.1 illustrates the physicality of art.



Figure 2.1. Art as thing. Left to right: Michelangelo, *David*, front and back; Van Gogh, *Bedroom*, front and back; Richard Serra, *Fulcrum* (steel); Ai Weiwei, *Sunflower Seeds* (porcelain).

Yet as money has lost its exclusive materiality so has modern art. As an image or a video from a digital file, even the purebred material art becomes less material—or sometimes more so when it involves live matter, as performance art does. Modern art can be made of anything, including nothing, and the borders between something and something else dissolve in modern art as in a dream.

Modern painting uses a lot of historically new stuff, like anything that can stick or be glued to any vertical surface, from elephant dung (Chris Ofili) to gunpowder (Cai Guo-Qiang). “Anything” says it all. Thus, Mark Quinn (UK) has been making realistic sculptures of his own head from his frozen blood.

In addition to “anything,” modern art has added a whole spatial dimension with the genre of installation, which is the same “anything” but in 3D space. The fourth dimension—time—is put to work in mobile sculpture and variations on the theme of flowing liquid. I think that metabolic life can be considered the fifth dimension of art, as it is in theater and circus.

Cai Guo-Qiang created an [installation](#) so awesome that I am out of both artspeak and myspeak (Google: **Cai Guo-Qiang Head On**). This could be a case for silence in talking about art.



Cai Guo-Qiang, *Head On*. Photo: Tony Hisgett, Flickr.

But I can't shut up. I ask myself: Are the wolves "we" or "they?" Are the wolves made of sheepskins or dog skins? Do they hint to "a wolf in sheep's clothing?" Does the glass wall allude to the Great Wall of China or the wall of censorship (you still can make it transparent)? I like art that prompts questions other than "is it art?" and stimulates my brain. It is the practicality of an engineer.

I mention *Head On* here because, being completely immobile, it manages to unroll in space and time. The probable trajectories of each of the 99 wolves can be traced [from the next room to the glass wall](#).

There is also a one-dimensional art of geographical and, therefore, time-consuming magnitude. The *Running Fence* of Christo and Jeanne-Claude runs on the spot for almost 25 miles across hills, ravines, and roads from Northwest of Petaluma to Bodega Bay in California. The enormous size of this ephemeral and quickly extinct creation is counterbalanced by miniatures and the microscopic art accessible only under magnification (**Figure 2.2**).



Christo and Jeanne-Claude, *Running Fence*, 25 miles. Sonoma and Marin Counties, California, 1972-76 (Smithsonian).



[Vincent Gandia](#) (1935- 2009), [Miniature etching](#), 2" by 2" including the margins.

Figure 2.2. Size in art.

It occurs to me that installation by its very "anything goes" nature never looks as authentically abstract as point, line, or a color field in painting—the flat Mother Earth spans under all kinds of art. Installation can be regarded as a transformation of flat painting. Abstract art, which, along

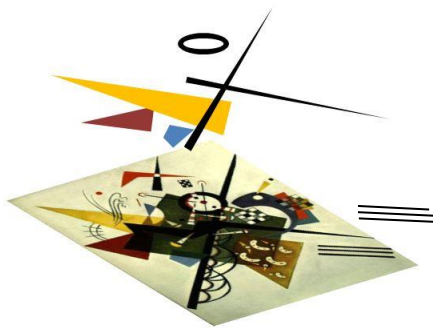


Figure 2.3. Wassily Kandinsky (1866-1944), *On White II* (1923) and its partly deconstructed 3D "pile" pattern.

Kandinsky, should be just "points" (fields) and lines on a plane, instinctively wants to have flesh on its thin bones.

How can everything develop from nothing and anything from something? This is the topic of the chapter ART AS TREE, but it seems appropriate to give a fully speculative illustration here.

Figure 2.3 shows one of the most famous paintings of the one of the

most famous founding fathers of abstract art: Wassily Kandinsky, *On White II*. To me it looks like a **pile** of flat abstract forms seen from above, i.e., a projection of a 3D object onto a plane. Why pile? First, the figures overlap in a sequence so that the lower ones can be seen through the semi-transparent higher ones. Second, the center of the picture has the highest density of the figures. It seems that we could take them one by one from top to bottom, as if it were a pile of cards and toothpicks. Could we turn it into installation with a 3D printer?

When I began to immerse myself in the tickling waves of modern art, I found it as much daring and innovating as dull, repetitive, and mutually imitative work.⁵⁶ The worlds *modern*, *avant-garde*, and *experiment* for anything as old as modern art, which already is well over 100 years old, are really misleading, even if it has been made today. It is now a mature, entrenched, and conservative movement that deserves, desires, and dreads a **new**, real, full-blooded and sweeping avant-garde. This is where the future lies, prepared to jump in on us like the wolves of Cai Guo-Qian. But will the glass or (the Great Chinese) wall of money stop and scatter them, tails between their legs?

How can you create anything new in the genre of anything? I call this conundrum “the trap of anything goes.” Whatever you create is not new: it is just different version of the same.

Pile is a popular and already iconic genre of modern art. There are piles and heaps, and stacks and mounds, and piles of piles, some of them shown in **Figure 2.4**. I shun here the esteemed sub-genre of trash and poop piles.

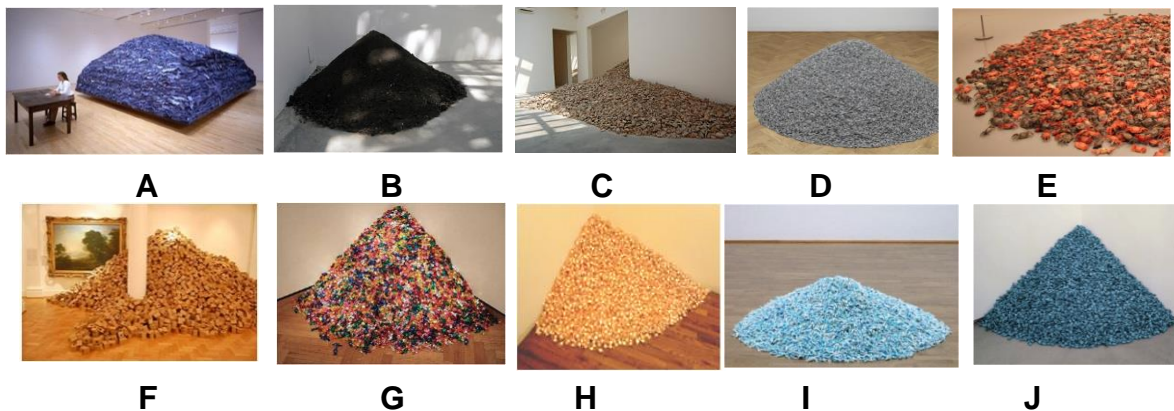


Figure 2.4. Piles. A: Old denim clothes (Ann Hamilton); B: dirt, C: gravel (Lara Almarcegui); D: porcelain sunflower seeds, E: ceramic crabs (Ai Weiwei); F: *Yellow bird boxes* (Carwyn Evans); G to J: Felix Gonzales-Torres, *Lover Boys*, wrapped candies displayed at four out of many different exhibitions.

Pile presents an interesting case from the point of view of complexity. If it is large by the number of components but homogenous by composition, is it complex? I classify it as simple. It

⁵⁶ I am sure the boredom and monotony goes up with higher rankings of the artist, but I cannot figure any objective measure for boredom. In principle, monotony can be measured as an average distance in configuration space.

can be described in a few words and made with little mental effort. If a big physical effort needed, the teamwork in art is not mortal sin.

I believe that complexity, mental effort, physical effort, and uniqueness (originality, inventiveness) are the main components of the artistic value. It is my personal belief, it tells something about me, not about art, and I will come to that in ART AS MIRROR. From this point of view, the lack of effort looks like the chronic anemia of modern art. The pile art form is an old hat but it is in vogue because it is both easy and respectable as new retro. I am mean, I know.

Modern outbursts of minimalism—from giant steel labyrinths to polished steel toys—try to compensate for the simplicity and monotony with oversizing and industrial technology. This explains why modern art has only a few biggest stars: the lightning in art typically comes from a loud bang, not *vice versa*, as in the nature. In the business of technology, the winner takes (almost) all.

Proclaiming the unfettered combinatorial self-expression, Kandinsky caused an incurable affliction of art. The abstract combinatorial pattern space, contrary to the promise of freedom, presents an extreme restriction. Once you (or maybe just people like myself) have seen a couple of configurations, you (at least I) have seen them all. The digits from 0 to 9 generate all possible numbers. If you saw ten digits, you saw all numbers. It is only for the mathematician working in a particular area of number theory that all numbers are different. The problem of modern art is pernicious aging,⁵⁷ for which the best remedy is not to talk about it. Besides, in art, age is an asset.

Even though the combinations can never be exhausted, the simple principle “anything goes,” further fortified by Warhol, is becoming a totalitarian dictate.

This is something Marcel Proust anticipated, in my opinion, when he wrote:

We invariably forget that these [beauty and happiness] are individual qualities, and, mentally substituting for them a conventional type at which we arrive by striking a sort of mean among the different faces that have taken our fancy, among the pleasures we have known, we are left with mere abstract images which are lifeless and insipid because they lack precisely that element of novelty, different from anything we have known, that element which is peculiar to beauty and to happiness.

(Marcel Proust, *Within a Budding Grove*, translation by Moncrieff, Kilmartin, & Enright; Modern Library, 1998, p 318)

Constraints in visual arts are never as tight as on the balance beam in gymnastics, rhymed poetry, or musical performance. Yet from the cave beginnings of art, there was a powerful constraint of

⁵⁷ As Peter Schjeldahl writes in *The New Yorker* (11/09/2015) about Frank Stella (born in 1936): “Even groundbreaking ideas have life spans”. I gratefully add to my artspeak collection *cynosure*, *apothegm*, *deathly glamour*, and *more strenuous than ecstatic* from his article. But, unlike typical artspeakers, Schjeldahl can be really critical and get to the bone, if not to the very heart.



likeness of the picture to its object, even if the object was a fantasy. Even a weak subconscious click of recognition connects the picture with the **viewer** who would otherwise pass it over.

Naturalistic likeness retains its downsized and renovated home in art. Most non-representative artists have their own constraints, too, which I would call self-similarity constraints ((Piet Mondrian and Mark Rothko are stellar examples of self-similarity boredom, I am adding sacrilegiously in double parentheses)).

Marcel Proust casually noted the role of constraint in arts:

My mother was obliged to stop, but she derived from this very constraint one more delicate thought, **like good poets forced by the tyranny of rhyme to find their most beautiful lines:**

"We can talk about her again when we're by ourselves," she said softly to Swann.

Swann's Way, Translation (heavenly done) by Lydia Davis, 2003, p. 24.

"If you never tasted slavery, you never know freedom." Self-imposed constraint is masochism, but no slavery. It is mastery.

The solid constituents of pile art—soil, gravel, stones, candies, bird boxes, tiny figurines—cannot be arranged exactly the same way twice. Piles allude, unintentionally, to Heraclites' "you cannot step in the same river twice". Pile art is as much fluid as it is solid (typical artspeak, but true). Thus, bulk rice and coins are solid but conform to gravity and the shape of the container.

A pile can be just a part of a complicated scene. The pile **A** in **Figure 2.4** serves as a centerpiece of the installation [Indigo Blue](#) (1991, 2007) of Ann Hamilton, which I, a sceptic, like it more than I like to say. It is irresistible.

In the center of the space, a 17' x 24' steel platform was piled with 14,000 pounds of blue work clothing. Built layer by layer, the pile was formed by smoothing successive strata of pants and shirts until a volume of clothing the size of a semi-truck was formed. At the back of the space, obscured from view by the pile, an attendant sat and erased slim blue books at a table borrowed from the central market, which formerly housed one of Charleston's pre civil war slave markets. Using a Pink Pearl eraser and saliva, the books were erased back to front. The eraser waste was left to accumulate over the duration of the piece. Although the space was entered at ground level, a window accessible in the small upstairs office of the garage gave another view of the pile of work clothes and the activity at the table. One wall of the office was hung with udder-sized net bags of soybeans that sprouted and later rotted in the leakage of summer rains. With the humid weather, the space was filled with the musty smell of the damp clothes and the organic decomposition of the soybeans.

I can say why I love it: the installation is a dense complex web of associations in which Things, humans, and ideas (Knot of **Essay 59**) are bound tighter than men and serpents in *Laocoon*. It is a complex act of thought constrained by logic and links with reality.

[Tobaron Waxman's](#) installation *Lechem Oni / Prusa*, which means "the bread of poverty, sliced" in Hebrew, is a pile of 400 glycerin soap bars. A [comment](#) says:

“Lechem oni - prusa invokes iconic Holocaust imagery with the intent of criticizing the misappropriation of the Holocaust as a means to bias mainstream opinion. The artist makes the soap bars in the gallery,



**Tobaron Waxman,
Lehem Oni. Prusa
(2006).**

encased in each bar is a piece of hand-made matzah baked by the artist in the traditional manner in a matzah factory. The soap bars are then assembled in piles, recalling the piles of Jewish belongings and Jewish bodies discovered at concentration camps, with the soap itself an allusion to the Nazi practice of making soap from the fat of Jewish bodies.”

I, a contemporary of Holocaust, better abstain from comment. OK, I have one. Abstract art, to escape boredom, is desperately seeking some kind of anchor in real life. It can be a reference to natural scene, trendy idea, political protest, historical association, national icon, celebrity, pop merchandise, etc. It tells me about the genes of advertisement in the DNA of modern art. Abstract art needs nutrients as much as the artist does, but, asking for bread, **you** expect to get a rock. Or a candy, if you are at the right place.

Ai Weiwei’s zillions of handmade sunflower seeds are, unlike his aggregations of [6000 stools](#) and [1000 bicycles](#). They have been presented in piles, as well as in the form of a field or, rather, shallow pond.

What did Ai Weiwei want to say with his sunflower seeds? I saw various interpretations, most under constraint of political correctness, others critical. Here is what his work tells me.



Ai Weiwei: Sunflower seeds. Left: Chinese craftsmen paint the seeds; right: Visitors trample the seeds at Tate Museum.

When I look at the photo of the field/pond of seeds opened to visitors to walk and sit on at the [Tate Gallery exhibition](#) (2010), I think about the Chinese porcelain craftsmen who for two years were paid to paint millions of seeds with a tiny brush. I perceive Ai Weiwei’s project as a mockery of human reason and work.⁵⁸ It is my strictly personal interpretation. I do not intend to put down the artist or anybody else. This interpretation may not say

anything about the work, but, again, it says something about me. I belong to the generation of people who believed in the sacred value of human work and lived in a country where this sacred work was either symbolically paid civil duty or forced labor. This is nothing but my belief. The problem with belief is that there is **no way to find out** whether myself, the artist, and the critic really believe what we all are saying, all the more, what it means. This is what **nexistence** means, why it is not nothing, and how it moves human hands, can sustain life, and can kill.

The reason why I cringe at some modern art and wince at another does not have any objective connection with the art. It is my reaction to it. Art can be an undecipherable self-expression of

⁵⁸ See Evan Osnos, *Age of Ambition: Chasing Fortune, Truth, and Faith in the New China*, (Farrar, Straus, and Giroux, NY, 2014) on Ai Weiwei.

the artist, to which we have no clue, artspeak or not, but it is also a self-impression of a viewer, to which nobody else has a clue, either. Modern art and modern public are playing volleyball over a brick wall, never really seeing each other. Just myspeak. More about this later, in ART AS MIRROR.

The piles of Lara Almarcegui do not look revolutionary in a lineup of piles, **Figure 2.4**, but neither are they as primitive. She exhibited similar piles at [Vienna Secession](#) in 2010 and in [Rotterdam](#) in 2011 and there is a story behind her work that is truly relevant and can be trusted, which is unusual in art. The piled up materials are the actual components of exhibition halls. The weights of the piles reflect the real proportions of the components. She deconstructed it somewhat similar to the way I tried to deconstruct Kandinsky's pile in **Figure 2.3**. See more about it in ART AS STONE.

From stone to its absolute opposite: life. **Figure 2.5** illustrates art made of human body, but not the body painting.



Figure 2.5. Art as living matter.

Janine Antoni, [Slumber](#) (1994). She sleeps in the gallery for 28 days while an EEG machine records her REM patterns. She then weaves them into a blanket from her night gown under which she sleeps. [Source](#).

Tilda Swinton, [The Maybe](#), 1995/2013, MoMA. Listed as: "Living artist, glass, steel, pillow, linen, water, and spectacles." [Photo by M Liao](#). [More photos](#).

[Petr Pavlensky](#), [Carcass](#), May 3, 2013. "Assistants brought him naked and wrapped in a multilayered cocoon of barbed wire to the entrance of the Legislative Assembly of St. Petersburg."

Although already desensitized to modern art, I lost my equanimity for a moment at the sight of the otherworldly actress Tilda Swinton (I am her visceral fan) sleeping in a glass box as a component of her installation *The Maybe* (1995 and 2013) at New York Museum of Modern Art (MoMA). The explanatory note listed her among other material evidence: "Living artist, glass, steel, mattress, pillow, linen, water, and spectacles." The living artist, however, was absent most of the time and was supposed to appear without warning. Therefore, her **absence** was as much part of the installation as presence. As the museum staff explained, the **uncertainty** was part of the **concept** of the appropriately entitled artwork. I had a sweet tingling feeling of deep ambiguity. I instinctively felt charmed by the inventive power of art. The platitude of both idea and its realization was *post factum* evident but woman's body always adds a level of complexity to anything around it.

The Maybe was created by Tilda Swinton and Cornelia Parker. The latter also worked with stone (ART AS STONE). Cornelia Parker has, probably, the widest range of imagination and sense of material among all installation artists I know. She works with body, stone, metal, fabric, meaning of words, and pure nexistence in the form of physical absence! I, entranced, surrender to her art without vacillation, like Odysseus to Circe, with the magic herb of doubt just in case.

I was also greatly impressed by the [fearless and adventurous Janine Antoni](#). Her *Slumber* (1993, 1994) was inventive, complex, and poetic, combining scientific and vaguely fairytale motives. In *Slumber* (1994), Antoni⁵⁹ lives in the gallery for 28 days. While she sleeps, an EEG machine records her REM patterns, which she then weaves into a blanket from her night gown under which she sleeps. [More about her](#).

[Petr Pavlensky](#) represents conceptual street art in its extreme form and in a most oppressive kind of environment. The origin and style of his techniques could be recognized by those familiar with self-mutilation of convicts (not by political prisoners, whose craft is hunger strike) as protest in Russian prisons. Here is a [description](#) of the act:

On May 3, 2013 Pavlensky held a political protest action against repressive policies of the government. His art performance was called *Carcass [Tyua]*. Artist's assistants brought him naked and wrapped in a multilayered cocoon of barbed wire to the main entrance of the Legislative Assembly of Saint Petersburg. The artist remained silent, laying still in a half-bent position inside the cocoon and did not react to the actions of others, until he was released by the police with the help of the garden clippers.

When on November 9, 2015, I saw the headline “Controversial Russian artist arrested after setting fire to the door of secret services building,” I knew it could be only Petr Pavlensky.



The ephemeral and sometimes masochistic genre of performance art has a substantial and fascinating history with roots in theater and family entertainment (*tableaux vivants*). The radical and disturbing [Marina Abramović](#) is the leader in balancing on the edge.⁶⁰ There is a [documentary](#) about her: *The Artist is Present*. She says that performance art, unlike theater, is for real.

Modern art is literally anything you can call art and exhibit as such, and yet a few artists are always more daring and inventive than others without being vulgar, offensive, or scheming. But would I feel sympathetic to “lady in the glass box” as a concept if I disliked the actress instead of being her admirer? I emotionally accepted *The Maybe*, but rationally, I saw the specter of futility

⁵⁹ A [Ph.D. thesis](#) on Janine Antoni: Stephanie Ann Karamitsos, *The Art of Janine Antoni: Labor, Gender and the Object of Performance*, 2006.

⁶⁰ Some of Abramović’ experiments involve interaction with public with results, to no surprise after the “Zimbardo experiment” (also known as “[Stanford prison experiment](#),” 1971), that human crowd is naturally distributed between sadists and saints. This contradicts the assumption that the prison environment is the main reason for cruelty. Bullying is another natural experiment. See documentary *The Artist is present*, 2012.

and dehumanization hovering over the absolute majority of modern art where humans play the parts of Things. That was when I suspected that I never see art *per se*. It is always the image in the center of the whole web of my individual intellectual and emotional associations, memories, preoccupations, and even current physical sensations. In other words, art is a mirror, and the mirror right now shows me myself, holding the poster “Add *homo sapience* to Red List”



Art is as tangible as rocks and bodies. You do not need to understand it, just touch the stretched out of nowhere hand of art. You will feel, however, that it is not the same as touching the warm living body. In spite of all experiments with nothing, modern visual art—painting, sculpture, installation, etc.—is overwhelmingly **thingish**, geometric, calculated, man-made (sometimes, industrially), and corporeal without any trace of the **soul**, except, probably, in environmental art, with its life dimension. The double nexistence of the spirit and matter in the minimalist outgrowth of modern abstract art is truly awe-inspiring. On the contrary, the full-bodied necrophilic art (Damien Hirst’s animals in formaldehyde and Gunther von Hagens’ plastinated human corpses) is as material, real, natural, solid as any exhibit in a museum of natural history or the notorious *Fountain* of Marcel Duchamp, which is not even the original urinal but its substitute. Even an elephant in brine, however, could not compete in my eyes with the absence of Tilda Swinton on her bed, still losing the warmth of her body. Am I really saying that?

As for [Andrey Kuzkin’s, *Whatever is out there*](#), 2010, ([movie](#)) I do not know what to say or think. No, he is no rival to a fully dressed Tilda Swinton. But it is art, too. Say the mantra.

3. ART AS MONEY

Every great artist, writer, composer, inventor, and scientist was driven by instinctive fear to repeat something already done and known. Innovation is the magnet that separates the iron filings of greatness from the wood sawdust of mediocrity.

Why could the skimpy, defiant, arrogant, and violent novelty of the first abstract painters become routine mainstream with historically breakneck speed, while similar extreme innovations in music and literature are still confined to minuscule audience (to which I, now proudly wearing the badge “I have read *In Search of Lost time*,” belong)? Not expecting to find an indisputable answer, what else can I do but to keep searching for it at a place where Everything rubs shoulders with Everybody: the marketplace?

There is art and there is art market.

Visual **art for art’s sake** (*ars gratia artis*⁶¹), cloistered in palaces, temples, museums, and mansions, protected from elements and thieves, looks like the most exclusive, hermetic, and immutable human creation, removed from social turbulence, politics, and in fact, from anything else people care about, need, make, and consume. Art has little utility, but it has value. As for utility, in hard times—war, occupation, illness, cold winter—selling a painting could save life and burning could at least make a cup of hot tea⁶². Nevertheless, it is in good times that art sells for the highest price.

⁶¹ The Latin motto appeared not in Antiquity but during the Industrial Revolution.

⁶² In good times, in a novel *You Should Have Known*, by Jean Hanff Korelitz (Grand Central Publishing, 2014), a woman explains her attraction to a man: “He has a Rothko!”

Money circulates through the large arteries and tiny capillaries of global civilization. Art market is one of the body's minor organs, like the spleen, and, however insular, it needs blood. Being just a man-made Thing⁶³, art displays a mysterious special relation with money, something like the relation between the body and the soul, only I cannot decide which is which. In a way, art **is** money, if we skip squabbling over what "is" is.

The price of entry into museums is affordable or even free on some days. Visual arts are better accessible on the Web than published scientific papers. Sculptures, occasionally scandalous or baffling, challenge the weather and vandals in parks and squares. Yet art today is anything but *gratia artis*. It changes hands for weighty, even if digital, wads of money.

I believe in the penetrating power of image. It is not slowed down by logic and syntax. It invades mind as unstoppable front of parallel armed columns. It works its way forward, ringing the bells of associations in unpredictable manner. This is why I illustrate my Essays with small pictures instead of extra paragraphs. It is a habit of a chemist who thinks and converses about molecules not in mile-long chemical terms but in pictures. Here are two images to the point in **Figure 3.1**.



Figure 3.1. Soup can and yacht, one of each.

Andy Warhol's painting (actually, photo-transferred screen print) [Big Campbell's Soup Can with Can Opener \(Vegetable\)](#), 1962, 72 x 52", was sold for **\$23,882,500** at Christie on November 10, 2010 and the [Eurocraft 44 Explorer](#) yacht, 144' 04" could be ordered for **\$18,417,000** in 2015, to be built next year.

I wonder how much Andy Warhol's painting of that yacht could cost.

Although *Big Campbell's Soup Can with Can Opener* "is a highly important and rare early painting by Andy Warhol showing the great icon which quite literally changed the course of Post-War Art: the Campbell's soup can" (quoted from [Catalog](#)), the price is baffling because neither the content nor the form are in any way unique, all the more, artistic. Many people do it every day in advertisement industry and some keep the original in the pantry. What is unique and artistic, we are told—and Warhol insisted⁶⁴ (and I agree)—is the very fact that it is **presented and sold as art**. It is a masterpiece of self-advertisement. Any masterpiece has a golden aura and, even if it is art robbery, can inspire a masterpiece of a movie.



⁶³ Here is a difference between thing and Thing. In performance art, exemplified by Marina Abramovic, the human plays the role of a thing, but the whole performance is a Thing because it is designed for income. Capitalized Thing is a super-species in the realm of economy, of which humans and ideas are two other super-species.

⁶⁴ I highly recommend Warhol's *Philosophy of Andy Warhol (From A to B and Back Again)*, 1975, [available online](#). It is a revolutionary *post factum* manifesto of modern art.



Napoleon is famous (among other merits, as art plunderer) and I am not a bit surprised that his hat, one of several remaining ones, was sold in 2014 for \$2.4 million. The hat caps the enormous historical shadow of Napoleon. But a picture of a soup can?

Andy Warhol's revolution in art was his declaration, influenced by Marcel Duchamp and others, that artist should obey only his own impulses, not necessarily artistic. The artist does not owe anything to anybody. On the contrary—and that was his own contribution to the doctrine—the buyer owes money to the artist for the result of his work regardless of content. The belief in the value of the work is its true content, which is to say that the artist himself, his life, escapades, sufferings, quirks, and, last but not least, financial status can be the exact content of his artwork, whatever is there on the canvas. We will come to that in ART AS BELIEF. Naturally, this content jumps to the largest value after such a grand event in artist's life as death.

I apologize. Sorry, sorry! I am ashamed of my retrograde juxtaposition of art and yacht. I was repeating the argument of the Duchess de Guermantes in Marcel Proust's *In Search of Lost Time* (*The Guermantes Way*):

There was nothing else in the picture, just a bundle of asparagus exactly like the ones you're eating now. But I must say I refused to swallow M. Elstir's [a fictional artist whose prototype was Édouard Manet] asparagus. He wanted three hundred francs for them. Three hundred francs for a bundle of asparagus! A louis [20 francs], that's as much as they're worth, even early in the season.⁶⁵



Édouard Manet
(1832-1883). [Bunch of Asparagus](#), 1880.

The soup can is a kind of a triple point where (1) art, (2) art market, and (3) food market meet, quite like in Manet's *Asparagus*. Still, I ask myself the following question: what was exchanged in the sale of Warhol's work?

Both Manet and Warhol, separated by 100 years, had been ridiculed and both ultimately triumphed, although against different historical backgrounds. Both found supporters during their lives. Both were vilified for their techniques as well as for the choice of subject. Yet my personal impression is that if the legacy of Manet can be discussed in such a way that the opinions of experts gravitate to a certain consensus, any interpretation of the legacy of Warhol seems to be as true (or false) as ten others. For example, the can **opener** has been interpreted as a symbol of violence. Why not as a bold venture that had **opened** a whole new continent of content? Why not the sharpness of art that uncovers the meaning of everyday rot?

I think we have to give Andy Warhol another half-century to mature. It is yet a half-opened can. But it is already huge money.

⁶⁵ (Marcel Proust, *The Guermantes Way*, translation by Moncrieff, Kilmartin, & Enright, *Modern Library*, 1998, p.686). There is a [real story](#) behind this episode. In fact, the painting was sold for 800 francs, but that was not the end of the story.

With eyes already attuned to art, let us now look at money, a frequent and dear subject of Warhol.

As compared with 3D sculpture and installations, the lower grade materiality of 2D painting gives the art form additional similarity with money. The material art is less material in painting. The materiality has potentially some further way to go down.

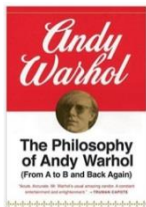
There were [reports](#) that the ultra-rich keep “billions of dollars’ worth of fine art and other treasures” in freeports where their materiality—and taxable value—may hardly ever be explored by human touch. “Under the freeport’s rules, objects could remain in untaxed limbo, in theory, forever.” Sam Knight, *The Bouvier Affair*, *The New Yorker*, Feb. 8&15, 2016.

There is a noteworthy investigation of the profitability of art for artists: Jonathan Jones, *Do rich artists make bad art?* ([The Guardian, 27 April 2006](#)). The title question exemplifies the fundamental problem of art: **what is bad/good art?** This question has no answer. All we can agree on is the *fait accompli* of the sales history.

A single framed painting is neither good nor bad. It is a leaf on the evolutionary tree. It is a point in history. It is a point on a numerical scale. Art as a system (exsystem: evolving complex system) is not as numb as it may look in a gallery: it breathes, moves, morphs, and tries to catch your eye with flirtatious makeup. With such signs of robust muscular life, art is truly abstract in the sense that its only measure is the latest sales number.

Picasso and Warhol were two, among many, pinnacles of modern art who had been considered “bad” art in the beginning of their careers. Pablo Picasso (1881 – 1973) produced over 10,000 paintings, many of them priced later in millions of dollars. Using a great variety of techniques, he also made ten times more prints, some in 500 copies and some in much less. There are hardly any high rank prints on the market below \$1000 and rarer prints cost ten times more. Picasso printed his own money, one could whisper, multiplied by posterity many times over. He hardly used it himself, however.

Picasso the misogynist does not excite me as artist.⁶⁶ But I am certainly a misfit: I am bored even by most of Mozart, as I am confessing ahead of ART AS MIRROR. Andy Warhol, as all pop and minimalism, repels me—something I should probably keep in the dark as a shameful secret, as if shameful secrets have no value in our days.



When [Andy Warhol](#) (1928 – 1987) died, he left over 90,000 works, including 4,100 paintings, 9,000 drawings, 19,000 prints, and 63,000 photographs. This makes his creations, often deliberately cloned—like his posts stamp sheets of multiple Marilyn Monroes or Campbell soups and pictures of money—closer to paper currency or mass products than anything else. Money was his obsession of which he left a record in his [Philosophy of Andy Warhol](#), where money is on the foreground. Here is a quote:

⁶⁶ [Jonathan Jones cites](#) Picasso’s warm relationship with Lee Miller as evidence that he was not a misogynist. But his portraits of the American photographer, not to mention all his other pictures of women, mean in my universe that he was. Jonathan Jones admits the “cartoonish cubist freedom” of those portraits in which Picasso’s “art suffers.”

I like money on the wall. Say you were going to buy a \$200,000 painting. I think you should take that money, tie it up, and hang it on the wall. Then when someone visited you, the first thing they would see is the money on the wall.

In our times of great income inequality (as if there ever were times of equality), it is curious to read Warhol who saw a can of Coke as a unifying and equalizing symbol: millionaire or not, everybody drinks the same Coke (I do not. Long ago, I used to drink Pepsi.).



Andy Warhol, "200 \$1 bills," 1962, fragment

In 1962, Andy Warhol, on his ascent to the status of a megastar of American pop art, painted, rather creatively, 200 \$1 bills on a silk screen. He did not even paint each bill, but multiplied the initial batch by a special procedure. The large painting looked as a yet uncut rectangular sheet from the press of US Bureau of Engraving and Printing. In 2009, after prolonged languishing in a private collection, it was estimated at \$8,000,000-12,000,000 but sold for \$43.8 million at a Sotheby art auction in New York to an unidentified buyer. In the [catalogue](#), it was presented as a "monumental masterpiece," one of "testaments to a pivotal moment in art history" and "a form of art that would remove the hand of the artist."



Andy Warhol, *Roll of bills*, 1962

At the same auction, an untitled 1962 drawing of a roll of dollar bills tied with a string, also by Warhol, was estimated at \$2.5-3.5 million and sold for \$4,226,500. Warhol also painted the dollar sign \$. The very idea of painting numbers and signs was not new by that time.



Jasper Johns, 0-9, 1960

Jasper Johns is recognized as one of the greatest modern artists. In the 1960's, he painted, among other mundane objects, letters and numerals. A set of his ten 27' x 21' color lithographs, a painting of one numeral on each (1969), was on sale at Christie's in 2014. Estimated at \$400,000 – \$600,000, it was sold for \$485,000.

The modern greatness of the three above-mentioned modern artists is undisputable.

There is an unrivaled degree of unanimity about money on earth. There is no such agreement about human life. The world believes that money is always good and the more the better. This is, probably, the only ecumenical belief not stained with doubt, in spite of the frowning Bible with its camel and the eye of a needle.

The nominal value of a money bill is undisputable because (1) it is numerical and (2) it is printed on a solid thing that cannot change its appearance spontaneously or by somebody's wish. It is like an art print on good old-fashioned paper, not a submissive digital file to be processed in a photo shop.

Art is open to endless and irreconcilable arguments about artistic value. Money (for money's sake) is not. A number, accompanied by the same currency sign, cannot have two interpretations. That $2 > 1$ or $345 < 543$ is always true by definition. Not many other things can

be as uncontroversial. We do not argue which day of biblical creation was which: they are numbered by Creator himself.

To deal with zillions of numbers, all we need is the distinction between MORE and LESS and the ability to compare any two numbers in those terms. If neither MORE nor LESS applies, the numbers are EQUAL. Computers run on such simple principles and teach humans not to care whether number 10 refers to people, commandments, sins, or soup cans.

In contrast, the value of an artwork other than in terms of money is never consensual and it changes with time. The money-art-value relation involves the uncertainty caused by differences between humans, as well as by circumstances. The flow of time, if too fast and turbulent, changes everything without warning.

There are strong bonds of similarity between money and art. They did not exist when images were painted on the walls of caves and temples. Paper money looks like a picture, has a signature and a unique number on each bill, and is made by printing, like artistic prints. Money is printed by billions ([36.4 billions of US notes](#) in 2014, to be exact), paintings and prints can be produced by thousands—the difference is only quantitative.

The framed “money” of art wildly differs in the value of its “banknotes.” Still, by “printing” this kind of money, a few artists could make significant fortunes. Art is not a disposable stuff like old paper money. It is not in constant circulation and is protected against damage. This advantage rarely works for the artist whose life is too short. Productivity can prolong the life of the struggling artist but may not be enough to shorten his struggle. Mass production is an inspiration for any artist who, having tasted success, is sick and tired of struggling.

More lasting than ships, bridges, and some buildings, art is the closest object we can find in the vicinity of immortality.

Art can be stolen, which is never easy, always risky, and requires an artistry of a special kind. But the greatest advantage of art money today is that valuable artwork cannot be hacked! Having just finished *Future Crimes* by Mark Goodman (Doubleday, 2015), the latest compendium of cyber horrors, I begin to think that the worldwide art frenzy is driven, subconsciously or not, by a promise of digital safety. Some compare it with the Dutch tulip mania of 1630. Nonsense! Tulips perish and paintings do not. And if they did, modern art could be perfectly forged and imitated because it possesses the never before appreciated potential of ultimate simplicity and self-similarity. This is why minimalism flourishes. Am I carried away? Yes. Maybe not. Definitely.

If painting of money is art, so is paper money *per se*.

Money is designed by artists. The last French and German money before the euro displayed national creativity in arts and sciences. In the German set of paper money before euro, five out of eight bills were related to arts, and the rest to science. The 100 DM (1990) was dedicated to Clara Schumann.

The French 100 NF banknote (1998) was dedicated to Paul Cézanne, who painted hundreds of apples, alone and with other fruit, throughout all his life. It had his portrait and a reproduction of his *Pommes et Biscuits (Apples and Cookies)*. The previous 100F (1991) was a tribute to Eugene Delacroix.

The euro banknotes follow the trend in an ingenious oblique way, showing architectural styles and bridges: the heritage and the very idea of the EU, although bridge is as much a symbol of division as of aspired connection.



Pre-euro French and German money.

**Minimalist money.
Germany, 1923.**

20 francs, France, 1877

Illuminating the essence of art as uniqueness, paper money can be investment of the same kind as art if it is sufficiently unique. Thus, a US \$1 bill with a rare number like C00000001C can cost thousand times its face value on collector markets.

Classical art was like gold: it was difficult to mine and born miners were rare. With the advent of the Industrial Revolution, demise of aristocracy, rise of mass production, growth of middle class and free professions, accumulation of “new money,” spread of media, photography, and kitsch, intensification of urban life, the long centuries of classical monumental glory looked overshadowed by the coins given to Monet for his *Asparagus*.

Art had to undergo some adaptation in the spirit of Industrial Revolution, pick up some soot and dust, and mangle the freewheeling sophistication of natural forms to fit the minimalist geometry of engineering. The mutant and mutinous experimental monsters survived and became mainstream after a historically short fight. The gates opened wide to new art, not photographic, not traditional, easy to make, in abundant supply, but extremely unequal in its market value, with a very narrow flat top of a Mexican-style pyramid where big money was changing hands. In the age of advertising, the novelty and apparent absurdity of extremists worked well for the art as the whole.



The new way of making art more difficult to mine and keep up its value was to let artists compete in running up to the top of the pyramid of success, which is what markets are for, indifferent to what exactly you are bringing to marketplace, just bring your rank of

success. Modern art is the product of modern competitive business, i.e., the interplay of productivity, supply, and demand, with each of the three capable of being manipulated. The artists, accomplished or potential, were reassured: “You can make it. Even if you are not Leonardo da Vinci, you could be compared to him and treated likewise.”

Art remained elevated to the spiritual realm and surrounded by a tribe of worshippers, but the spirit was changing, it seems to me, toward a kind of Paganism—the most democratic religion of all, in which you choose, woo, and pet your god and no distant absentminded God decides whether to punish you or reward for your uniqueness or ordinariness.

Elite can exist only on the shoulders of a big crowd. With the intoxicating vapors of luck and lottery in the air, competition animates promotion, patronage, publicity, and polemic. An establishment of experts grows between the artists and the public. Art expertise and sales becomes art. Art becomes economy. Art comes closer—but not too close, not too sweaty—to sport.

Does art market duplicate stock market? There is an [ongoing discussion](#) on this subject. The difference between art market and stock market is obvious but not overwhelming: absence of volume (exactly one item at an auction—not one thousand identical copies) and absence of an objective measure for the value of art. Yet there is a curious similarity. Both business companies and artists have the so-called intangible (non-monetary) component of the valuation, which is mostly guesswork. For example, in case of Apple, Inc., it is its reputation, fame, rumors, ego, and its performance art of self-presentation. In case of art, everything but sales history is intangible: reputation, fame, rumors, ego and theatrics. Although the demand for art is miniscule, regarding the number of buyers, liquidity in times of affluence seems unlimited, while the term “liquidity” does not make full sense: the acquired piece will not be resold with any immediacy.

Alchemy does not work with gold, but it works wonders with art. Andy Warhol formulated the law of art alchemy this way:

"Well," I said, "it doesn't mean if you don't believe in nothing that it's nothing. You have to treat the nothing as if it were something. Make something out of nothing."
([Philosophy of Andy Warhol](#)).

The “nothing treated as if it were something” is what I call *nexistence*.

The art transformation happened not because there had been any ideology and leadership. It happened because (1) mutations of the classical canon had been accumulating, (2) photography had taken over the pictorial function of art, (3) expansion of free professions had created the audience with a feedback, engagement, influence, new tastes, and new wallets, and (4) a new canon, a new DNA, loosely summarized as ART IS ARTIST'S SELFIE or MAKE SOMETHING OUT OF NOTHING, turned out viable. Every artist can paraphrase Louis XIV, “*L'Art, c'est moi!*” Every beholder of art can say the same (I can), but that will be the subject of ART AS MIRROR, where I will promote the viewer's own *L'Art, c'est moi!*

Anyway, modern art is among the most benign area of human activity and its freedom is unrivaled. Unlike medicine, it is not marred by side effects. You can take it in any dose or not at all.

I cannot expand here in this direction because I am neither art expert nor art enthusiast. My main interest is to “understand the world,” as Ulf Grenander formulated it, in terms of patterns, not facts. Art is part of the world and I am trying to understand it on my terms. The good side of this undertaking is that I begin to see myself better, although not in a better light, while I see art in a better light, although through tinted glasses.

The realm of patterns, similar to mathematical formulas, only with the sign of similarity instead of equality, is unlike the solid, detailed, and provable professional knowledge. The patterns are small, simple, long living, indifferent to interdisciplinary borders, and cheap. The latter is, probably, the main detractor of their appeal. Can you get a grant for studying the Everything? If you can, wouldn't you need the whole Fort Knox for that?

Patterns emphasize not just similarities but also differences. I do not expect professionals to




Ron Mueck, "Mask II" 2001-2. Photo: John Haydon

welcome pattern thinking: that would undermine the value of expert knowledge the same way photography had undermined realistic painting. But do not worry about realists: they turned to hyperrealism to make their own work difficult and have achieved stunning, even if ← disturbing, results.

Traditionally, art should be “mined” by manual labor requiring rare skills, complex techniques, expensive materials, and significant time. It was not intended for resale but could be given as a gift, and could linger for centuries in churches, palaces, and private buildings as part of personal wealth and memory. The difficulty to mine it from the canvass or a block of marble was a large part of its value, the rest being the ability of viewers to recognize the source of content: personality, character, story, nature, thing, situation, parable, illustration, abstract idea. In other words, art was inseparable from craft and reference to something outside art.

While art had been undergoing transmutation from gold to “fiat,” a similar process happened to money. Most money today does not exist either as animate or inanimate matter: it is a **state** of atoms in microscopic grains of matter stored by some institution: bank, mutual fund, brokerage, etc. Unlike matter, which cannot be easily created or annihilated, the **state** of a tiny spot on a magnetic tape, disk, or chip not only can be changed practically effortlessly, but also changed back and forth as many times as the manager (or a hacker) wants. And not only back and forth: it can wander all over the numbers from zero to trillions and more (I do not believe in infinity).

This is something unprecedented in nature. Try to curl back an uncurled staple. 

Reversibility is unnatural. Patterns of history, however, are reversible, as modern Russia exemplifies. The American North-South divide persists today as the Blue-Red one: it is the pattern of divide and, if you want, the Abrahamic religious divides—there are quite a few of them—could be examples on a global scale.

A number as big as 1,000,000 is just a lineup of just **20** such spots: 11110100001001000000. It is still a **small** system and it can be brought into any of its 2^{20} states with just a few finger taps. You cannot do such things with large natural objects and systems. Nobody can turn a \$1 paper bill into \$2, although you may believe it is the essence of business.

Money today is information plus the ability of the government to keep it truthful. Information today is nothing like the clay tablets⁶⁷, stela of Hammurabi, or flammable books. It is just the **reversible** state of matter. The new reality and the essence of our era is that information is created and changed by a **reversible** process, with **irreversible** consequences. This has resulted in the current chaos of hacking and insecurity bringing us back to the night dangers in a medieval city or a forest road.

No one can have full control over irreversible processes typical for evolving complex systems (*exystems*). One can maintain a pattern over significant time, however, which, probably, together with the ability to change or reverse the pattern, is a definition of human power.⁶⁸ Patterns are reversible. As for such evolving systems as arts, only a few despotic regimes have shown any burning desire to control them.

Money is based on trust in the power of the ruler or government—the money artist who makes physical money. Electronic money is still a new element on the surface of the Earth. I do not see any proof that anybody has—or can have in principle—a full control over any **reversible state of matter**. If somebody has brought matter in that reversible state, somebody else can bring it back or elsewhere. Digital money is as different from the however inconvenient material money as chess position from chess figures. Can that be true about modern art, which is always—and often monstrously—material? Art is not reversible, but its value is.

If human mind is just a state of matter in the brain, it can be manipulated and toggled even though the phenomenon of memory makes the state of mind only partially reversible.

In the states of mind attuned to something existing independently from us, existence sounds alarm when we deviate from sensual perception into nexistential fantasies. In the states of mind attuned to *nexistence*, the alarm bell is silent, even if doubt—the satellite of every faith—is quietly humming.

Money is not just numbers in ten colors. The terrain of money is as varied as the surface of the Earth. It has mountains with summits in clouds, jungles full of snakes and predators, prairies, and rivers that replenish the seas of liquidity and loss, sustaining life, work, and fraud along the way. Moreover, the terrain changes from day to day or by the hour.

Money is abundant but it takes a lot of work to make, unless you already have enough of it and do not need it for a few years. Given time, money breeds money like sheep and goats, the ancient form of currency. The hedge of the sheep corral was a precursor of hedge fund.

⁶⁷ Sumerian and Babylonian clay tablets were, in fact, recyclable by soaking in water: the oldest precursor of computer memory after writing on sand.

⁶⁸ Note that such definition grants to robots equality with humans.

Until recently, portraits of “money artists” used to symbolize the power of coins and bills. Money, a piece of paper with pictures, is an equivalent of power, luxury, sex, and even beauty. Power, however, is also a universal currency: the head of state and the terrorist are trading in the currency of human life and fate. There is a poignant similarity between brute power and ethereal digital money: they are cheap to put to work. Bullets are as cheap as small change and they can do their job as efficiently as taps on the keyboard. Threats can ground a giant airliner and empty the schools of a metropolitan area. One can say that digital power was the first way to operate states of matter, if “digital” is used in its original Latin meaning: made by using fingers. In human matters, the fist has been probably the very first both currency and power.

The comparison of art with money (Google “art as currency”) nests snugly in my tuned-to-patterns mind. What makes people collect banknotes, not even very old, with odd serial numbers? What makes them collect art? What makes them pay \$38,000,000 for a painting of a vertical white line on a blue background? There is a whole genre of paintings presenting straight lines, vertical or horizontal, on a monochrome background. There are monochrome paintings without lines or anything else. Tom Sawyer could forge as many of them as you want and, probably, enrich the genre with masterpieces of his own. Poisoned once and forever with patterns, I see all minimalist masterpieces as just one—masterpiece, anyway. This is, probably, not the right attitude for any art lover. Am I really one? I sound like a bigot. See, money makes you lose your head like alcohol does.

Art market is an exclusive and peculiar place. Christie’s art auction is a Carnegie Hall into which one cannot get by exercise.

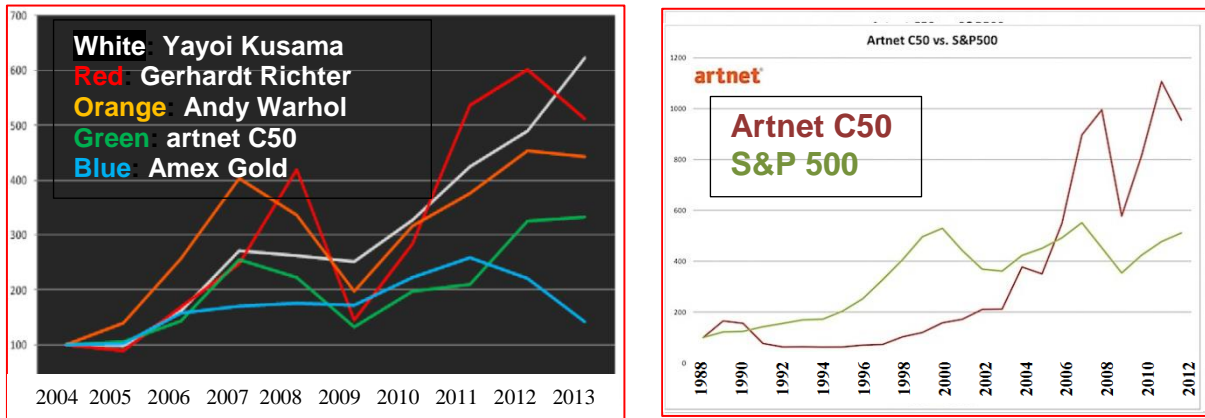


Figure 3.2. Art market. Left: artnet indexes of three artists vs artnet C50 and Amex Gold, 2004-2013. **Right:** Artnet C50 vs S&P 500, 1988 to 2012.

In art market, the seller does not need to persuade the buyer that the artwork will do some indispensable exciting job like Google Glass, Apple Watch, or Viagra. It has its own ticker, Artnet C50, comparable to major stock exchange indexes, and individual entries marked by the names of artists as if an artist were a company, which for some top artists is a quite exact characterization. There is a [description](#) of how the index is calculated.

Figure 3.2 shows two modified index presentations of the art market compared to market indexes of gold and S&P 500. There is a discrepancy in C50 between both, as well as a distortion of Amex Gold (HUI) index.

The crucial difference between any individual artist's index and major stock market indices lies, again, in different liquidity. Artists do not create artworks by millions and buyers of original art are not nearly as numerous as stockholders. In 2013 there were at least 600,000 mid-to-high art collectors in the world (less than 2% of all millionaires), with 36.5 million of transactions in arts and antiques and the volume of sales around \$60 billion. [See a sample of report.](#)

It looks like art market is a more sensitive predictor of a coming economic bust than the leading stock market indexes. The Great Recession of 2008 was preceded by two years of stellar growth of art market. By 2015, we got the next boom. The stock market malaise of 2015-2016 is still in progress while I am writing these lines.

High priced art is from time to time bought by museums to make it public, presumably, forever. Thus, Amadeo Modigliani's *Nu Couché* (1917) was sold for \$370 million in November, 2015, to the Long Museum in China, to make art accessible without going abroad, as the buyer, the founder of the museum, explained. "Forever" is another kind of nonexistence, though.

Money and art are two endless topics, double endless (there are different kinds of infinity in mathematics) if talked over together.

To judge means to compare. The artistry could be evaluated by people familiar with large volumes of art accumulated over a long time, i.e., in historical perspective, against personal and public background of artist's life. This was first done on the grandest scale by Giorgio Vasari (1511 – 1574) who was himself an artist and architect. It remains the main approach of art description, with history of sales never out of sight.

The public seemed to be quite capable to appreciate art as a source of instinctively recognized beauty, which produced an effect close to physiological. This effect has always been my own yardstick for music, poetry, and movies.

I end this chaotic and exhausting, as anything about money, Chapter with the following comforting quotations from [Vasari's Lives of the Artists](#) about Raphael:

[About the frescoes in the Raphael Rooms, Vatican Palace]. It is not possible to write of every detail in the works of this craftsman, wherein every least thing, although dumb, appears to have speech: save only of the bases executed below these pictures, with various figures of defenders and benefactors of the Church, and various terminal figures on either side of them, the whole being wrought in such a manner that everything reveals spirit, feeling, and thought, and with such a harmony and unity of colouring that nothing better can be conceived.

And, indeed, among his extraordinary gifts, I perceive one of such value that I for my part am amazed at it, in that Heaven gave him the power to produce in our art an effect wholly contrary to the nature of us painters, which was that our craftsmen—I do not mean only the lesser, but also those whose humor it was to be great persons; and of this humor art creates a vast number—while working in company with Raffaello, felt themselves naturally united and in such accord, that all evil humours vanished at the sight of him, and every vile and base thought fell away from their minds.

4. ART AS REFORMATION

Something happened to European art between 1870 and 1970, give or take a few years. Let us tentatively call it the Transformation. I am sure there are dozens of theories about that, none of them simple, but I am looking for simplicity.

A big-picture way to see change is in terms of revolution—a historically fast transformation that destroys and replaces. It blocks the way back and even a counter-revolution cannot restore the past. Whatever had happened inside art—I mean, not caused by barbarians—it did not destroy anything.⁶⁹ The past remained opened to the public, treasured, cared for, and valued even more so as it was getting more distant. Art today is perfectly peaceful (reaction to art is a different matter) and inclusive to all its historical stages, styles, and inventions. Whatever monsters it creates today, they are tame and counterbalanced by the lush beauty living in the woods among dreams of good times. Art is capable of enviable acceptance and tolerance, which is its distinction from religion, but about that later.

Was art shaken up by a technological revolution around? The invention of photography and its world-shattering digitalization could have initiated a change similar to climate swings, gigantic volcano eruptions, tectonic shifts, or huge meteorites that used to re-direct evolution of species. But modern photography, as all technology, is not only reconciled with but welcomed and fully absorbed by art as just a technique. It has great achievements as independent form.

⁶⁹ Ai Weiwei's *Dropping a Han Dynasty Urn* could be an exception.

Thinking about the advent of modern art, by which I have been intrigued for a long time, I begin to understand the diversity of change as not only a succession of discrete states, like changing



Ingres, *Comtesse d'Haussonville* (1845)

models on a runway, but continuous deformation in all dimensions, like a magical garment that **continuously and reversibly** changes its design, colors, and size. This is something that the computers are so good at, but what is not supposed to happen in life goaded by entropy in one direction only, and by no means into a corral.

I wonder if a physicist could say that art is like an **ergodic system**, which can pass through all its possible states, wandering back, forth, and sideways, starting from any point.



Figure 4.1. Modernization. Left to right: *Comtesse d'Haussonville* by Ingres (inverted fragment), *Portrait of Dora Maar* by Picasso, [Self-photo](#) of Dora Maar.

What exactly happened in the Transformation? I wanted to understand it since my youth but while I wanted and waited, art was running ahead, its baffling annals swelling and bursting at seams. I finally got to them when they had become available on the Web. Here I am trying to explore art in terms more visual than verbal, with the help of art itself.

I start with Jean-Auguste-Dominique Ingres (1780 –1867). In my opinion, Ingres, whose ideal was Raphael, combines the photographic exactness of detail with airy transcendence and economy in portraying beauty. Too sweet for some tastes, Ingres, in my view, represents classical painting on the brink of reversed metamorphosis: from butterfly to caterpillar. I was only slightly surprised to find out that Picasso, Matisse, Degas, surrealists, and even the stark on the wall but loquacious on the floor Barnett Newman considered Ingres their predecessor. Turns out, Newman called Ingres “abstract painter,” which is not the most extravagant of his opinions. They were typically even brasher than his paintings and certainly more entertaining.⁷⁰



Comtesse d'Haussonville in **Figure 4.1** is a fragment of a **mirror image** of the original painting (1845). Ingres paints the young woman as if seen with misty

⁷⁰ In Ingres, *Grande Odalisque* (1814), Manet, *Olympia* (1863).

969 in [Barnett Newman. Selected Writings and](#)

eyes. It could be also taken for a lightly airbrushed photo for an advert and accused (not by me) of an enhancement or manipulation of reality.

Ingres believed that the most important thing in painting was drawing, i.e., shape, form, and lines. Nevertheless, his *Grand Odalisque* (1814) is, allegedly, anatomically incorrect.



Plain Tiger
(*Danaus chrysippus*)

Ingres followed his esthetic ideal. The reversal of the ideal of beauty was, I believe, an essential component of the Transformation under the slogan “back to caterpillar!” Not that I deny the [beauty of caterpillars](#)! But they just repeat the same segment many times, like the minimalist composer Philip Glass.

Édouard Manet (1832-1883) was at the very beginning of the Transformation. Curiously, it was his nude *Olympia* (1863) that heralded the new era with a thunder, but not because she was nude.⁷¹ *Olympia* outraged the easily excitable Parisians (who had tormented even Ingres) by her “shameless” looking straight in the eyes of the beholder. *Odalisque* had been already accepted into the family by that time. Manet suffered from hostility almost all his life. *Critical* and *hypocritical* are just one hypo apart and today more than ever.

A character in Marcel Proust’s *Search of Lost Time*, where art is also one of the main characters, witnesses the process of posthumous public adaptation to Manet, apparently, around 1898:

But anyway the other day I was with the Grand Duchess in the Louvre and we happened to pass Manet’s *Olympia*. Nowadays nobody is in the least surprised by it. It looks just like an Ingres! (Marcel Proust, *The Guermantes Way*, translation by Moncrieff, Kilmartin, & Enright, *Modern Library*, 1998, p.716)

But *Olympia* does not look like an Ingres. It looks just like a Manet. The most persistent accusation against Manet’s style was that his paintings were “unfinished.” I trust first impressions. That was exactly where the Transformation started.

One of the most important results of the Transformation in art was the breakup of the connection between the object or model and its image and later even with any object at all. To put it differently, art was accepted as pure unconstrained creation, a piece of matter, thing, fetish, object in itself, token, article, caprice, joke, artist’s logo, coat of arms, and a tangible investment—all defined solely by its place, purpose, and function and not content. Art became pure “self-expression,” an enigmatic term that sounds to me as a circular expression of an expression. Or, is it a random act on a whim, like making a circle in the sand with a stick or hurling a rock into a shop window?

Art, in all its forms, stepped through the Transformation into the ambiguous area of performance in a crowded competition for a rank and reward, both measured in numbers. This does not look

⁷¹ *Édouard Manet: Rebel in a Frock Coat* by Beth Archer Brombert (Little, Brown and Company, 1996) is an account of Manet’s life as a reluctant firebrand.

to me as unconstrained creation. It is more like business. Even if the reward is not an issue, the rank in a kind of artistic Forbes Index always is.

The arrows in **Figure 4.1** point to *Portrait of Dora Maar* (1937) by Pablo Picasso (1881–1973). The right arrow comes from the selfie of his model. There is nothing realistic about Picasso’s image of the beautiful and passionate—in life and on her photo—woman. Still, if you see Picasso’s painting, the photo, and the *Comtesse* side by side, not only some facial features of Dora Maar, but also the distilled and homogenized colors *à la* Ingres can be recognized on the picture by her deformer—in life and art—in which I see anything but love.⁷² I feel like I’ve got really infected by artspeak.

Although the portrait of Dora Maar is not a quite typical for Picasso monstrous womanoid, the paintings in **Figure 4.1** exhibit the mystery of the Transformation better than any words: this is what happened with art, for better or worse, but why?

Revolution, mutation, innovation, liberation, reformation... I am looking for a better term and there is an array to choose from.

What happened is a much lesser mystery. It was dissolution of order, constraints, and rules without abolishing some fundamental orthodoxy of art rituals. If so, a more specific term looms as a competitor of Transformation: Reformation, *as if art were* a kind of religion. Is it? We will come to it later. “Reformation” lets you loosen your belt, pull out the tie, and unbutton the shirt, but the suit is still expected. Reformation of a particular kind, however, can also bite off a big chunk of your *joi de vivre*.

Reformation of art means looseness of order, canon, and constraint. It may lead to a greater variety and competition, encourage further evolution, and welcome freedom and equality. Reformation does not have a single human authority on earth, so that the followers of the creed can immediately begin splitting into fractions, each going to extreme in what Emile Durkheim, a theorist of religion, called *effervescence*.

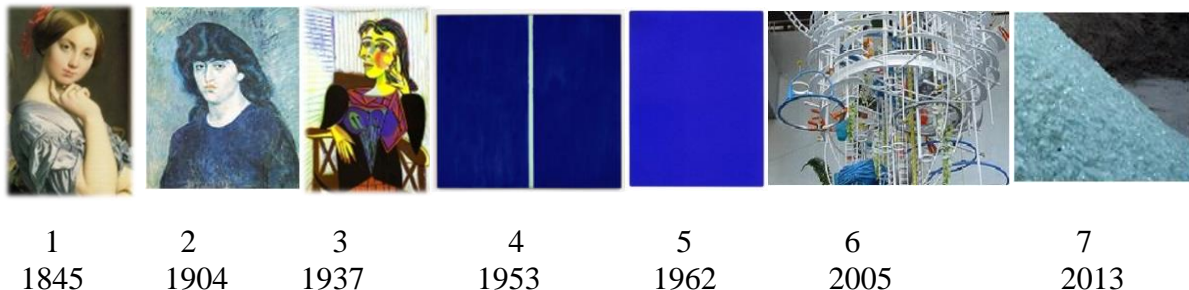


Figure 4.2. Reformation in blue: 1: Jean Auguste Dominique Ingres; 2 and 3: Pablo Picasso; 4: Barnett Newman; 5: Yves Klein; 6: Sarah Sze; 7: Lara Almarcegui (glass rubble).

⁷² There is a remarkable in many ways [website of Barbara Wells Sarudy](#) devoted to history and evolution of pictures of women.

I present two more illustrations of the Reformation.

Figure 4.2 illustrates the process of transition from classical (Ingres) to modern art with artworks ordered chronologically. It leaves only one feature invariant in the series: blue or off-blue color.

The contrast between artwork on the left, right, and in the middle of the series is mystifying, but it can be rationalized.

I see in **Figure 4.2** the three dimensions of the art space:

- (A) The scale from realism (1, 2) to deformation (3);
- (B) The scale from nature (1-3) to artifice (6, 7);
- (C) The scale from complexity (1-3, 6) to simplicity (4, 5, 7).

The contrast between simplicity and complexity is emphasized in **Figure 4.3**.

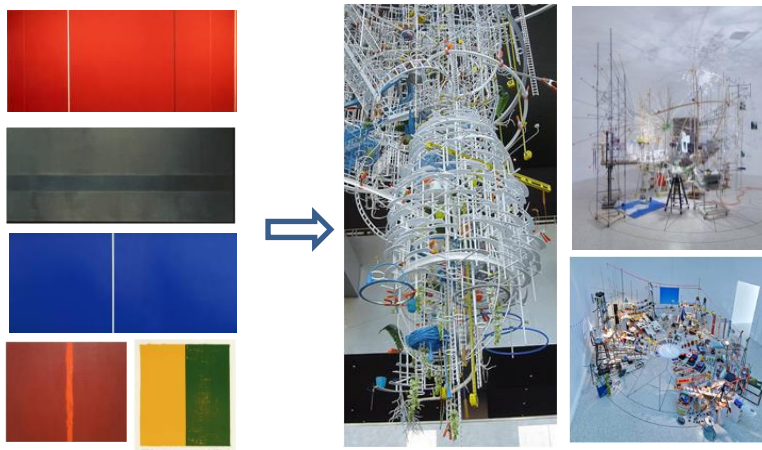


Figure 4.3. Minimalism and maximalism. Left: Barnett Newmann; right: Sarah Sze.

Once something new emerges, it evolves to its logical end until it loses vigor and becomes routine. On the scales of complexity, innovation, content, sense, size, realism, reference, chaos/order, palette, material, labor—everything goes to extremes because the extremes attract extreme attention and suggest extreme performance. Thus, one end of the scale of complexity harbors the stubborn minimalism: the distant pattern descendant of Manet’s “unfinished” manner turned into mischievous laziness. It has its own extremists in monochrome painting. The other end is taken by maximalists exploring grandiosity (Christo and Jeanne-Claude) and number of **different** components (Sarah Sze). If components were the same, as in Ai Weiwei’s installations, I would call it malignant minimalism.

Entertainment is, probably, as old as culture itself. Human culture consists of two contradicting ingredients: routine and surprise. An inherent property of entertainment is its incessant novelty against the background of familiarity. Entertainment without novelty is a ritual. Ossification of novelty into ritual through imitation, self-imitation, and self-repetition, is a persistent trend of modern art. If it is little noticed, it is because the enormous volume of art is dispersed all over continents, cities, and the Web.

The essence of the Reformation was recognition of art as visual entertainment, which automatically integrated it into business. The invisible hand of art market directs the show. That means anything but equality: it is growth, productivity, and competition.

Surprisingly, the kings of the art market offer not the most original but most mundane and universally **recognizable** creations. Those are flags, numbers, anatomical preparations, vacuum cleaners, photos of celebrities and grocery, polka dot patterns, kitsch, blots, and scrawls. This is a great paradox of modern art market, as if the invisible hand was guided by an invisible eye. I would call this effect “anchoring.” It spares the viewer of pains of imagination—the prerogative of the artist.

Modern art tends to increase the base to keep the spire well above the yearning to breathe free artistic masses. In this market, the productive simplicity has an upper hand over complexity of concept and form. The minimalist can simulate ingenuity by multiplying **identical** components (the caterpillarization) and oversizing a simple singular segment. “More, More, More,” the market roars.

I have no proof of what I am saying. Consider it a hypothesis. It could be researched and tested.

Art is what is called, displayed, exhibited, bought, and sold as art. I am not yet tired of repeating this. It is the institution and environment of art that makes a thing a piece of art, not its appearance, private opinion, decree, or face-to-face deal.

This circularity (“a rose is a rose is a rose”) applies to all subdivisions, forms, movements, genres, and styles of modern art. Thus, painting is what has a frame or clear borders, not necessarily rectangular (as in paintings of Ellsworth Kelly, Alan Charlton, Frank Stella), flat, or even 2D. Painting is what is called painting.

The Reformation absolved all previous artistic sins and turned them into virtues.



Figure 4.4 Deformation as creative pattern. Far right: Francis Bacon (1909 – 1992), one of *Three Studies of George Dyer* (1969) .

Transformation is an essential element of the Reformation. Next, let us look closer at the intimate details of transformation in art. How one **style** morphs into another? What are the innermost steps of that process?

There have been two major pattern ways to produce a modern mainstream artwork: deformation, **Figure 4.4**, and recombination, **Figure 4.5**. **Figure 4.4** starts with the picture of the globe and drags it through a sequence of Procrustean deformations of stretching, warping, and color change. Francis Bacon's painting leaves the haircut of George Dyer (1934–1971; a few photos can be found on the Web) as probably the only recognizable feature of the model, but the rest is heavily deformed. Deformation is a canonical practice of modern art styles that preserve some ties to reality.

The abstract picture of Joan Miró *The Smile of a Tear* can be **imagined** as produced from the picture of the globe by color analysis and creating the palette of basic colors and recombined as a new picture, which has nothing in common with the globe except the hint to a blue liquid (**Figure 4.5**). In this way, any picture, whether abstract or not, can be transformed into any other. With a minimum requirements, constraints, rules, and references to something else, all art is accommodated by a single abstract **art space**. The pattern of form is preserved while the pattern of content is absent except as a hint.

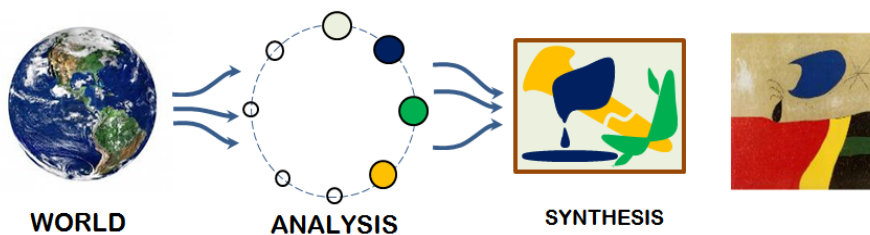
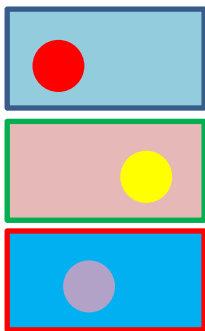


Figure 4.5. Analysis, recombination, and synthesis. Far right: Joan Miró (1893 – 1983), *The smile of a tear* (1973).

The modern artist paints not an object but a choice of rules, preferences, urges, and allusions characterized as style. He opens his bleeding heart to a consilium of shrinks. It looks like confession, but is it honest? We will come to it in ART AS BELIEF.



Artistic degeneracy Deformation is irreversible in the sense that the artist can always deform a model image in thousands of ways, but the viewer cannot reconstruct the model from its deformation, unless there is an independent source. People in cartoons are recognizable if they are widely known and the artist controls and restrains deformations.

Recombinant art is prone to a sinister, in connection with art, phenomenon that is kosher in various fields of science: *degeneracy*. Although the corresponding adjective is *degenerate*, it is not the same as in “*degenerate art*” (*der entartete Kunst* in German) and there is no need to ward off Hitler’s ghost. Degeneracy (not degeneration) in mathematics and physics means, very roughly, the situation when several mathematical objects or physical states are different, but have the same key property, for example, energy. A simple analogy is all

“degenerate” combinations of various coins that have the same total \$1 value. Thus, to my artistic taste, all color combinations of rectangular bordered field with a circular spot in it have the same artistic value: they are degenerate variations. I know, artists will never agree. Sorry, folks, in my *entartete* eyes degenerate art exists. Don’t look me straight in the eyes, however.

I believe that recombination is a degraded creativity.⁷³ Moreover, all spirals and scribbles and (I expect a lightening to struck me next moment) even all Mondrians are more or less the same for me. (It didn’t! How’s that?). But I also admit that in the eyes of an art collector they could be as different as Chevrolet and Maserati for a car buff. This is the moment when art tells me something about myself. What is it?⁷⁴

⁷³ My old manuscript [*The New and the Different*](#) is related to this problem. Each historically “new” circle in a rectangle is different, but not new. By the way, “degraded” is also a physical term applied to energy. The latter is, of course, a term of artspeak and artistic biographies.

⁷⁴ I am overly prone to generalization. I need to be degeneralized. Or degeneratize? Degener... what a nasty word! I am too irritable, demanding, narrow-minded, and intolerant.

5. ART AS STONE

I continue the confessional footnote 25 of the previous Chapter. I am not a believer by nature or practice. I am too introverted, reclusive, and padlocked. I am too rational. I want art to “change my life,” using the popular, on par with “disruptive,” modern cliché, but only for a moment. Otherwise, all I want from life is to let me be myself.

In this Chapter, I compare three modern artists who have unlocked some vaults in the basement of my mind. They are formally united with the theme of stone, as well as with my instinctive attraction to their work. All three of them are women. Their styles divulge some aggressiveness, but I am reluctant to resist it.

When in 2013 I was making my first steps into postmodern art, two names drew my attention: Sarah Sze, the mute Siren who was the first to lure me into modern art with her cryptic visual gestures, and Lara Almarcegui who initially seemed to exemplify with her giant piles of construction debris all that is forbidding in art. It took me almost two years to bump into Cornelia Parker, thanks to BBC, which shows how big but insular modern art is and how much study one needs to become its educated devotee, which I am far from being one.

Sarah Sze is well represented on the Web. There was a [story about her boulders](#) in *New York Times*. They are but a small part of the enormous *Triple Point* exhibition covering, unbelievably, the entire Venice. The boulders are made of an aluminum skeleton pasted over with photos of real boulders. The artist was said to be giving away some boulders to Venice residents to put on balconies and windowsills.

My googling for the rest of Sarah Sze’s creative work revealed a great diversity of her art, unexpected and surprising even after the *Triple Point*. She is an orchestral Mahler-type maximalist, but there are also quartets and solos in her chamber pieces. Diversity, variety, complexity—such qualities seduce me easily. I feel myself a kid in a toy store. Do I begin to sound like Vasari about Raphael?



Sarah Sze. Small part of exhibition at the USA Pavilion at Venice Biennale, 2013. Photos: [Darren Milligan & Brad Ireland, Flickr](#) and [DOMUSWEB](#). See also **Figure 4.3**.

My initial reaction (close to “it can’t be!!”) was a consequence of my prejudice and ignorance regarding modern art, but it did not last a day. I felt instinctively attracted to the exuberant complexity, childish playfulness, and sense of humor of the artist. I suspect even some self-irony. Today, three years later, I understand that Sarah Sze’s flea market art resonated with my personal life long obsession with Everything and what unifies the natures of Things and humans, as well as what makes them different. I was captivated, intrigued, and drawn to something I had missed in visual art. There was also my instinct of a chemist. I projected on the artwork my own pattern-chemical ideas. There was some rapport between my life and the eccentric creations looking at me from the computer monitor. I have never met them face to face.⁷⁵

Then I ran into the intimidating and not less eccentric burial mounds of Lara Almarcegui, Sarah Sze’s Spanish mate at the Venetian Biennale of 2013. What a contrast!

Jean-Pierre Dalbéra, a contributor of great photos of art on Flickr, [noted](#) on Spanish Pavilion: “The pavilion is filled with a huge pile of rubble which leaves visitors perplexed and perhaps evokes the social and economic situation of Spain today.”

This time I did not trust my first impression. After some research, I found out that Lara Almarcegui was interested, quite like a biologist, in the life of the cities, their youth and decay, anatomy and physiology. She “deconstructed” buildings into their primary materials and exhibited their components as piles of stone, concrete, glass, etc., the size of which preserved the ratios of the quantitative composition. That was, in my eyes, pure analytical chemistry. From this angle, the constructs of Sarah Sze now looked like molecular models of Everything. Lara’s exhibition at Venice Biennale, 2013 was a decomposition of the same pavilion in which it was located. There is her [video presentation of the project](#).

⁷⁵ The US exhibition at next Venetian Biennale of 2015 (artist Joan Jonas) and Sarah Sze’s garden of the *Secret Installation* at a separate place look on the Web trivial, second hand, contrived, and tired. Sarah Sze even crudely imitated Cornelia Parker’s hanging bricks, see next page. But it all should be seen live.

In my eyes, the monoculture art of Lara Almarcegui detracts from artistry but compensates for that with rationality. If abstraction is beautiful anywhere, it is not in art but in science. I can only hail such intellectual leaps. They attract me immensely. I happily surrendered to the rocky charms of the second Siren.



Figure 5.1. Lara Almarcegui. 1. Spanish Pavilion at Venice Biennale 2013; 2: Part of its deconstruction (with detail insert); 3, 4: Messe Basel Exhibition Center; 5: Its deconstruction list; 6: Exhibition at Vienna's Secession, 2010.

Truly, complexity is my catnip. Cornelia Parker's contribution to my collection of stone art was hovering between the floor and the ceiling. It was aptly entitled *Neither From nor Towards*. The stones, suspended on thin wires from a framework under the ceiling, were bricks from houses that had fell over years from eroding cliffs in Dover. They were worn smooth by the tide.

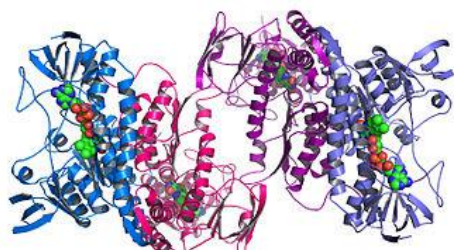


Figure 5.2. Cornelia Parker, *Neither From Nor Towards* (1992). Photos: [Matt Kieffer](#). See also photos by [Patricia Rogers](#).

The wire suspension has been used by the artist on a great variety of things, among them brass musical instruments and silverware cruelly flattened by a steamroller. Self-repetition is a most common side effect of artistic success and, evidently, sometimes its source and necessity. Cornelia Parker is both young enough and famous and her current projects are completely and irresistibly crazy and are “bad in a good way,” borrowing the expression from artspeak.

What can the three Sirens tell the chemist who, like a frog, inhabits both parched science and swampy arts?

Sarah Sze is about connectivity, which is the very core of chemistry, music, and poetry. A structure of a complex enzyme is a finished picture (it is actually, a ready 3D installation) of what complexity is: a hierarchy of selectively interconnected units. A biopolymer is a mostly dull linear sequence the beauty trick of which is elaborate and fragile folding. Can anything in civilization have this kind of structure? A narrative, a text of a novel, a book of ideas, and a computer code come to mind. The best public speeches of Barack Obama remind of the same pattern.



The structure of dehydrogenase from *Colwellia psychrerythraea* (Wikipedia)

Lara Almarcegui is an analyst and a maximinimalist. Her piles consist of almost identical “atoms.” She commands tons of solid stuff to sit in place for a short time of the exhibition. Her heavyweight art, paradoxically, both monumental, and ephemeral, is also brave and thoughtful, but it sits on the very borderline of complexity.

Cornelia Parker is quite capable of explosion, but not that of complexity. She captures in her suspended animation the fleeting moment of transformation, the “transition state,” which is the main concept of chemistry of molecules and patterns. It separates initial (*From*) and final (*Toward*) stable states and is the key concept is to understanding the process of transformation of *Now* into *Next*. To my ears, however, the gagged screech of the tortured musical instruments drowns out the song of the Siren. I don’t like mass murder of Things, not to mention people and animals.

Cornelia Parker is drawn to destruction. She is about connectivity, too, but in an ambiguous way. She said in an [interview](#): (2009): “I first started making wire **drawings** from melted-down objects because the process of making wire is called “**drawing**.” She connects words, ideas, and matter. Tilda Swinton sleeping at MoMA in her performance *The Maybe* (ART AS MATTER) is another example of Cornelia Parker’s convoluted associations.

The topology of Parker’s inventions is unbound. Her connectivity has intergalactic range. But self-repetition begins to stick out. Why not to establish something like patent system in the modern art in order to boost sinking creativity? Thou shalt not steal, even from yourself.



Cornelia Parker at Whitworth Gallery, 2015.
Photo: [Damian Entwistle](#)

There is another common theme in the three songs of stone, as I hear it. They are about off-picture humans in their by far outliving them but still mortal dwellings with their walls, foundations, naturally scattered around detritus of daily existence, and the gentle *memento mori* for which stone is used since time immemorial. (Ha! I am really under the spell of the Sirens)

The stones of the three artists—one fake, the other real, the third dead—again tell me something about myself—the subject I will return to in ART AS MIRROR, which is also about stone, in a way.



Raphael, *The Fire in Borgo*.

balloon dog, or even self-portrait.

I am intrigued by rational aspects and implications of modern art. I appreciate novelty, inventiveness, and originality. I like the play of ideas. This is what attracts me in science. But it is not comparable with the physiological effect that music, poetry, or film and literature can have on me. In my exploration of modern art, I am driven by intellectual motives: I want to understand its origin and message. Yet the conception, gestation, and birth of art are still mostly old-fashionably human. The artist as the behind-the-scene creator or self-performer is for me the main component of modern art, not the shark,

The modern—and now even classical—art as a whole entertains me but rarely excites. Looking at the Raphael's *The Fire in Borgo*, I cannot share the exaltation of Vasari regarding this fresco (see the conclusion of ART AS MONEY). I have the same problem with most of Mozart.

I discern a difference between artistry and artifice. Artifice is about *what* and artistry is about *how*. Anything repetitive is artifice and everything unique is artistry. Nothing is more exciting than uniqueness and the unique evidence of a uniquely talented human.

Music and text are cardinally different from visual art. They blind out the powerful distraction of vision: that big, greedy, and egotistic part of our animal design. Text and sound are not real in the same way image is. They need a preparation, training, or gift to understand complicated music and poetry and untangle their complexity. To understand and love Rilke or Bartok is an art in itself, like the art of human relations and love.

Knowing modern art mostly by reproductions and photos, I find it preposterous, frivolous, and boring. But the more I see and the less I read about it, the more tolerant I become: tolerance comes with knowledge. Then sympathy, longing, and quiet joy of recognition might follow, like the relations with a few people to whom we feel attraction and sympathy. Our favorite artwork starts an independent life in... in... but where? It is hard to find a name for the place. Let us still reserve for arts our belief in however nonexistent soul.

Somebody who stays in contact with large quantities of art, as either fan or professional, can easily acquire the same fine selective taste to it as a wine aficionado. As I said, my access to visual art was very limited for most of my life. Access to music, poetry, and literature was much wider. But in any case, the greatest market icons do not cease to repel me with a glaring absence of artistry. As Sarah Thornton put it, “an actor playing the role of artist.”

Striving for objectivity, I admit that, having been suddenly transferred from Soviet Russia to America over 50 missed years of world history, I could be too conservative and pre-modern to understand the spirit of postmodernity.



Figure 5.3. Stone, canvas, and air. Left to right: Natural stone [Travertino Rosso Persiano](#); Barnett Newman’s paintings *Anna's Light* (1968), and Hurricane Patricia over Mexico, October 23, 2015, satellite (NOAA).

Figure 5.3 is just my accidental association *à la* Cornelia Parker on the theme of stone, air (its extreme opposite), and the nature of abstract art. Consider it my own derivative art, for a moment.

Hey, aren’t the vertical zips of Barnett Newman of the same blood as the wires of the stone hangers?

Art is intoxicating or, in Nietzschean artspeak, Dionysian. Here is an [insightful observation](#) that I want to quote as a prelude to ART AS FUTURE:

This desire to make art more about experience rather than meaning makes me wonder, if modern art is supposed to be a reflection of our modern times, are we approaching a more Dionysian era in society? Is our long grown belief of Apollonian decaying to give way once again to a Dionysian way of living?

I think so. The author is Ian Heckman in his blog [“Roots half-hidden”](#).⁷⁶

⁷⁶ In his new artistically excellent book *Fracture : life and culture in the west, 1918-1938* (Basic Books, 2015), Philipp Blom seems to associate the two world wars with the preceding hedonistic (what I would call Dionysian) culture after WW1. I believe we (or at least 1%) are still deep in another Dionysian phase, inciting comparisons.

6. ART AS ABSTRACTION

The advent of abstraction looks like the sharpest turn in the entire history of art. It came like a thunderbolt or wildfire—the common metaphors of artspeak. Like automobile, which left space for horses, or cinematograph, which left time for theater, it spared classical art. I hesitate to compare it with the onslaught of computers, however, until I am quite certain that they will be as merciful as art is.

Abstraction is typically defined in a negative way as “turning away” from creating **recognizable**, even if simplified, schematic, mutilated and twisted, images of real world. Other definitions sound positive, like “a visual language of shape, form, color, and line” (Wiki). The metaphor of language fits any art and science, if not everything humans do, like “language of sex” (Google: About 327,000 results, 0.26 seconds) and “language of food” (about 13,000,000 results, 0.31 sec.), but the abstract “language” has no common grammar: a mere vocabulary to which the artists apply their personal grammars. Some more cautious definitions realize that abstract, modern, classical, and any other art cover a continuum. If so, definitions lose any utility and the revolutionary effervescence fizzles.

Yet the change of the art landscape has been apocalyptic. It is as if the earth suddenly filled up with all creatures of the past and present, as well as their fragments and crossbred chimeras, suggesting an act of Invisible Hand.



Language is impossible without despotic **constraints** of grammar. Abstraction outside art is a process of formulating a single rule for a set of concrete cases, which usually reserves a place for yet unknown cases. It names many things with one name—exactly what mathematics is about. The grammar is possible because reality—and even dreams—is not completely chaotic but



ordered by strong **constraints**. Thus, an animal cannot be in two separate places at the same time and a river keeps flowing although it is invisible behind a tree.

Although scientific, philosophical and, actually, any idea is always abstract, while observable reality is always concrete, an artwork is never completely abstract for two reasons. The factual content of artwork is largely consensual: “taking Jesus down from the cross,” “color dots on white background,” “a pile of candies,” “red squiggles,” “chaotic color zones.” The impact on a viewer, on the contrary, is subjective. If it is widely similar over large groups of viewers of classical art on Biblical themes, it is under the powerful **constraint** of its textual source, even if it yields to the irreverent spirit of modernity.

I understand art as a whole in terms of combinatorial configurations, which means that there are distinct components selected and connected (arranged) in a particular way. I do not think it is much different from the way Kandinsky saw it. Art is a giant salad bar of ingredients with a stack of small plates, such as a place on the wall, floor, ground, or levitation in the air. The difference between classical and modern art is that the former has constraints imposed by the object, and the latter is constrained by the personality of the artists and the extent of his borrowings from others. Deformation and recombination bridge one with the other.

I bet we can repaint any classical painting, like Velazquez’ *Las Meninas*, while slightly proportionally resizing figures and reshuffling the composition, like moving the dog to the left, and some viewers would not notice the difference. It will be recognized as Velazquez or at least a perfectly classical realistic painting. Classical art preserves large blocks of reality, as if rearranging the same furniture in the room and from time to time replacing the pieces.



Diego Velazquez (1599-1660), Left: *Las Meninas*; Right: It is still Velazquez, isn't it?

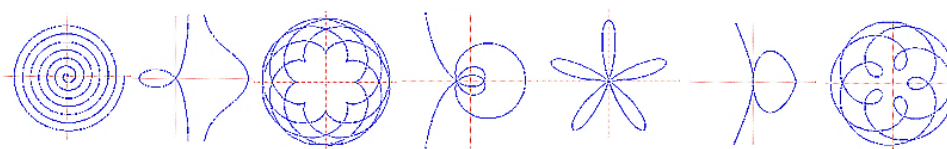
Straight line, curve, polygon, grid, circle, and square, not to mention Platonic solids, are well recognizable objects for somebody with appropriate professional background. So are arbitrary and chaotic squiggle, blot, smudge, curve, and blob.

If we **recognize** a forged cubist portrait by Picasso as ... a cubist portrait by Picasso, it means that we recognize art of Picasso as a natural phenomenon. This is what the cliché “art enriches the world” means.

What makes art “abstract” is the whole image that we perceive but cannot **anchor** it in our experience because we have a different experience or none at all. Instead, we compose an associative narrative from our impressions. Unlike the artwork, it is really abstract because it exists only in our mind, as any idea. Or we can listen to artspeak instead and decide whether we trust the artspeaker as much as we trust, for example, a mathematician.

Mathematicians⁷⁷ work with a big zoo of forms and they have a refined taxonomy of their darlings. Unlike paleontologists, they have no problem with reconstruction of their origins.

Mathematics has its own abstract celebrities. They are as famous, in a way, as Warhol’s *Marilyn Monroe*, although less than the actress herself. See [Famous Curves Index](#). Here is a small selection.



Famous curves. Left to right: Spiral of Archimedes, Conchoid, Epicycloid, Plateau Curves, Rhodonea Curves, Pearls of Sluze, and Epitrochoid

Each curve is a plot of a mathematical function. It is abstract in the mathematical sense, i.e., one standing for many, because there are infinite numbers of Spirals of Archimedes, all described by the same simple equation $r = a\theta$ (in radial coordinates) with different parameters a .

There is a similarity between even most chaotic abstract art and slender visualizations of mathematical objects. They both can be represented by a set of instructions applicable to an indefinite number of images. Thus, there are websites that instruct amateurs how to paint abstract pictures, for example, [5 Easy Ways to Create an Abstract Painting](#).

Mathematical regularity became a source of [Op Art](#), which presents carefully controlled order and chaos in various proportions. [Computer art](#) is its next logical expansion and it generates images of exquisite beauty and wild intensity (**Figure 7.1**), which may suggest that regularity is the essence of beauty. Symmetry is an example of regularity. [Robotic painting](#) is the natural next step. Can the 19th century shock of photography repeat itself in history of visual art as digital shock? Well into the new era, nobody has been shocked yet. Art has a big heart.



Bridget Riley
(b.1931),
Arrest I (1965)

Kandinsky’s *Line and Point* Manifesto looks to me, with hindsight, as a prophesy of the Digital Era. Art is prophetic in a self-fulfilling way. Abstract art is the ideal task for computer with its unlimited imagination, ability produce chaos⁷⁸ and harsh order in any

⁷⁷ Relation between [mathematics and art](#) is widely represented on the Web.

⁷⁸ There is no algorithm for pure randomness and computers use it various surrogates. The pseudorandom number can be unpredictable and cryptographically secure, but randomness and algorithm are incompatible notions.

proportions, and its lack of any constraints whatsoever. The machine does not care about the real world populated with humans, and would not give a dam for the entire universe. The dimwitted humans, with their narrow-minded algorithms of instincts, their quirks, sensibilities, and prejudices, are nothing but impediment for the unbound computer creativity that only another computer can fully appreciate.

Being one of them humans, I kind of like our breed. Humans have an insatiable curiosity toward themselves and their companions. They also have an inborn but not uniform sense of beauty. I believe—no, I hope—that the future belongs to some kind of post-abstract art with a human shadow, if not human face. Not forever, of course, only before the pattern pendulum plunges into the next of its two swings. A small perk of being mortal is that we do not need to care about anything for too long.

At least put your photo on the back of the canvas, painters!

The phenomenon of **anchoring**, the visible or, mostly, hidden instinctive and subconscious gravitation of abstract art toward real world, which I have discovered, to my surprise, during my years of pilgrimage from Sarah Sze to Cy Twombly, makes me, uncharacteristically for my personality, elated. I can even go further into generalization: **nothing material can be abstract in any sense because of its thingishness**. The Thing is always concrete. I have my way of going to extremes.

Artwork, as I said, is not a Thing because it is unique and not mass-produced. Yet the gloomy maniacal self-similarity and self-repetition of some modern artists puts art right on the Thing's side of the border between Thing and thing.

There are two opposites of the term *abstract* if applied to art: concrete (factual) and real (physical). The painting is always both concrete and real, as any piece of matter. It is its meaning that can be recognized or not, and realistic for one person while abstract for another. Arts, whether classical or modern, are vast expansions of Rorschach blots.

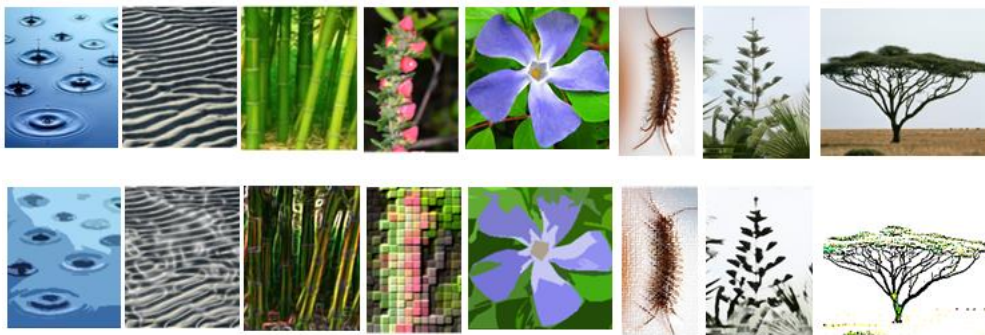


Figure 6.1. Top row: Regularity in patterns of nature. Similar combinations of similar elements. Bottom row: the same with artistic effects of Microsoft Word.

Nature is a rich source of repetitive visual properties that can be generalized over particular cases. Simplification makes them look like abstract art.

Looking at **Figure 6.1**, I begin to think that the main property of abstract art, from its birth to current over-the-hill age, is simplification. Edouard Manet seems to be the true founder of abstract art, although I still do not know what was driving his hand, because he did not associate himself with the new wave.

What is simplification? In art, it is just minimalism, pretense, affront. In science, it is the essence of understanding. In politics, demagoguery. In philosophy, extinct. In modern life, forget about it.

I begin to think that the genre of drawing and the technique of print, which employed simplification by necessity, were among the genes of the classical art that had become dominant in modern art from the very beginning. But the primary reason for that still evades me. If I am right, modern art was a mutation developed and socially justified as Reformation. Didn't the religious Reformation start as a mutation in the mind of Martin Luther? By the logic of Daniel Kahneman, it could be classified as fallacy. For more about that, see my [Essay 58: Pattern Chemistry of Rationality: All rational minds are alike; each irrational mind is rational in its own way.](#) Its long subtitle is all that relevant.

I have already mentioned complexity over 20 times in this Essay. It is time to inquire what the term means.

Simplicity and complexity sound like two opposites, but they are parts of the same scale ranging from zero to indefinitely large values. This is why I think that there is only one parameter, complexity, and simplicity is just low complexity. It is difficult to say how high complexity of something is because different people and different professions may easily disagree.

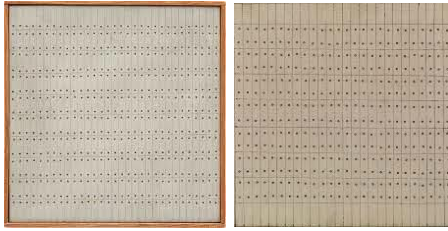
I do not believe in infinity, but I am certain that complexity is a crucial, although neglected and little explored parameter of any aspect of our civilization and human matters in general. For example, we could be interested in the size of a potential enemy's army and its armaments, have our triple numerical advantage, but if the enemy's organization and decision making is three times simpler than ours, we probably have three times less chances to win. The numbers are wild guess, but the bleak history of long American wars could have a truly simple explanation: complexity of political system. Not accidentally, the Civil War (1861 – 1865) was one of the shortest: the complexity difference between the sides was minimal.

There is the concept of Kolmogorov complexity in mathematics: object **A** is more complex than object **B** if its **shortest** full description is **longer** than that of the other. It sounds like oxymoron, but I really cannot go here into details because of the lack of consensus and my own qualifications. Strictly speaking, this concept is applicable to strings of symbols in computation, where meaning of all symbols and words is well defined.

I think that there are problems in science that can be treated only with the inclusion of human presence and subjectivity into the picture. Anthropic principle in cosmology is an unsettling example. Pattern Theory and theories of complexity belong to this type, too. Probably, science needs a marginal Reformation: including

human choice into the subject. Thus, Pattern Theory requires a subjective choice of its basic terms, but no matter how exactly, unlike in cosmology. It is like choosing which of the green beans on your plate to start with.

I will jump to conclusion in the form of an example. A change in a realistic painting is recognizable and it can change artistic values of the artwork because the shortest description is



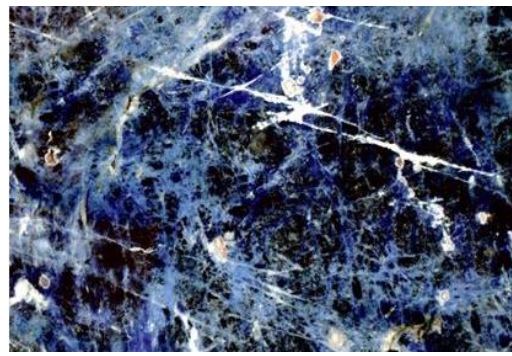
Agnes Martin, [Untitled \(1962\)](#) and [Little Sister \(1962\)](#)

really short. The shortness comes from using large blocks of recognizable information coded by short phrases, like “the return of the prodigal son” or “battle of Waterloo.” Since abstract art is not recognizable, its description can be long, but most of it is artistically irrelevant. It will be noticed if the artist misses an apostle in a “Last Supper,” but the existing difference between Agnes Martin’s *Untitled* (1962) and *Little Sister* (1962) is not easy to notice, at least online and ignoring the frame.

Does the frame matter? The [comments](#) to *Little Sister* (1962) are eye-opening.



Jackson Pollock, *Number 8* (fragment)



Lapis blue granite



Jackson Pollock, *Lucifer* (fragment)



Rouge de Roi (Rouge Antique) marble

Figure 6.2. Are the processes in the depths of the earth and the brain similar? They probably are.

This example illustrates the difficulty of defining complexity because Agnes Martin is **evidently** simple and Leonardo da Vinci is **evidently** more complex. If we notice that Martin repeats the same element many times, Kolmogorov’s definition looks valid, at least for modern art. This is why minimalists add intriguing but totally unrelated titles or scribbles to beef up the meager complexity. Damien Hirst seems to have all the beef in the world, but he still entitles his **shark**

in formaldehyde, which is the exact description, *The Physical Impossibility of Death in the Mind of Someone Living*. Well, I am just mean with minimalists. Verily, art is one's mirror. But aren't they mean with art?

While regularity and repetition can be seen in nature, imperfection (variability, deviation from the mean) is the main sign of natural origin. "Imperfection" should be the very essence of art that has no norm and no rules, but, curiously, even such art has an unstoppable drive toward draping itself into a flag of some style, school, or platform.

But at least Jackson Pollock is anything but simple, isn't he?

Are Pollock's paintings realistic in view of their similarity to natural stones? I do not know how to answer this except by admitting "accidental realism." I see in them a **pattern** of partially ordered natural process. I also suspect that the use of textured marble, granite, and malachite for internal decoration responds to the same human attraction to ordered chaos that was met by Jackson Pollock the pioneer and by his epigones. What is undeniable, they evoke an emotional response. Clouds and stones do that as well. Pollock's beauty is richer because it is more complex, even though it uses the same pattern all over the canvas.

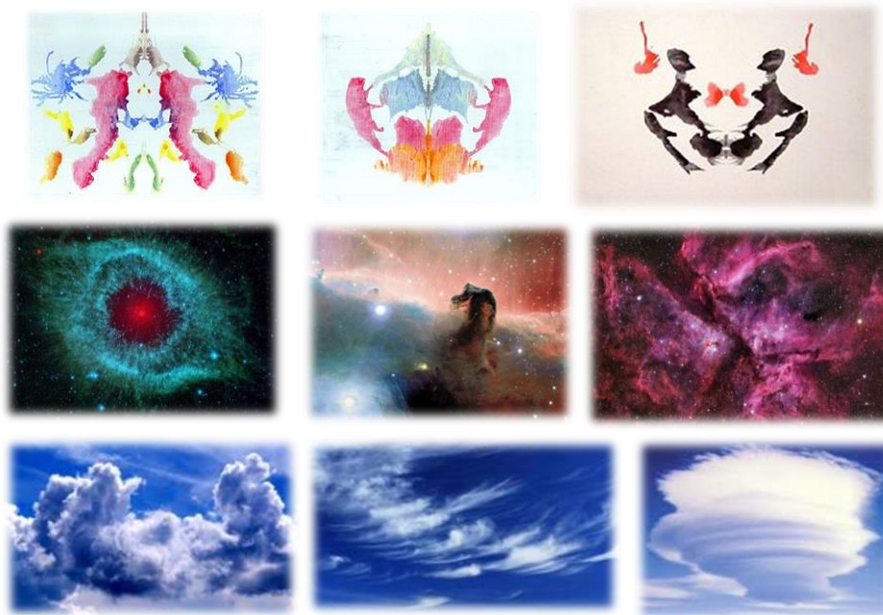


Figure 6.3. Natural (not man-designed) objects. Top: Man-assisted Rorschach inkblots. Middle: Celestial objects. Left to right: Helix, Horsehead, and Great Carina Nebulae (NASA photos). Bottom: Clouds.

The most common distinction of natural objects is that they lack the strict regularity of geometrical forms. For example, they do not have perfectly straight lines, curves along simple mathematical functions, and exact symmetry. Even the flowers described by botanists by "floral formulas" are unpredictable in their details and even snowflakes are never perfect. The Rorschach blots, although tainted by artificiality because they are symmetrical, are still hardly

predictable. As for clouds and nebulae, **Figure 6.3**, they are, appropriate to say, God's blots to test our personalities: are we capable of feeling beauty and awe of the world around us? I am feigning sentimentality.



Sigmar Polke [Untitled \(Rorschach\)](#), 1999.

The blots are man-made but not man-designed. Their shape, however restrained by symmetry, is to a significant degree random. They can be manipulated up to a point by preparing the original splash of ink before pressing both halves of the sheet together. Sigmar Polke, an adventurer and explorer (the party for which I will always vote in arts), did that in his experiments with Rorschach blots. What bars the nebulae and clouds from entry into an abstract art gallery is our knowledge of their non-human origin. However weird the shapes of most nebulae are, they cannot be arbitrary: order is present there, too.

The shapes of blots in our hands, nebulae in deep space, and clouds over the earth have some constraints. Constraints mean order. What is the source of order?

Words like natural, unplanned, and, especially, in this context, random invite a long and difficult discussion, but I, in a Zen-like manner, will simply show what I mean.

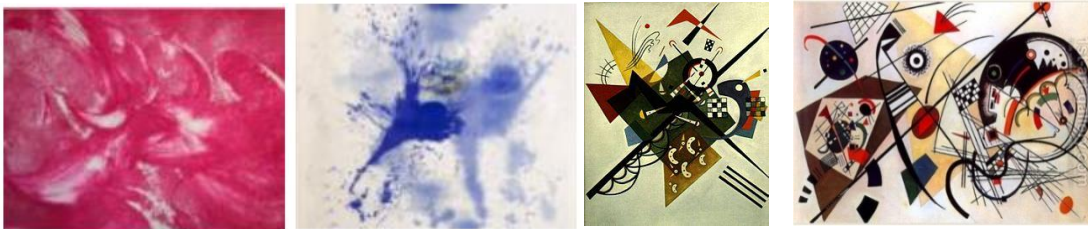


Figure 6.4. Quasi-nature and pseudo-Things

Left to right: [Jean Messagier](#) (1920-1999), *Apocalypse du printemps* ; [Hans Hoffman](#) (1880-1966) *Astral Nebula*; Wassily Kandinsky (1866-1944), *On White 2* and *Transverse Line*, both 1923.

In **Figure 6.4**, two left abstract nebulous pictures deliberately imitate nature, as their titles reveal. The two pictures of Wassily Kandinsky, on the right, although nebulously entitled, exemplify human artifice: straight line, smooth regular curves, and color fields within sharp borders. Somebody (myself, at least) can easily imagine the paintings as two-dimensional projections of arrays of strange but certainly man-made 3D objects piled up or spilled out on a flea market tarp. From this kind of painting a modern installation emerges, a curious hybrid of painting and sculpture, hauntingly realistic, sufficiently chaotic, and utterly irrational. With a live human as a component, sprinkled with theatre, it becomes performance art. But I have already written about that in ART AS MATTER.

I am coming back to **anchoring**. This happens when reality is unreal, too.

Figure 6.5 shows a brightened and sharpened up fragment of Andrea Mantegna's (1431-1506) *Agony in the Garden* side by side with the painting itself. I can recognize neither of them as realism. Is it because the content of the painting is mystical?

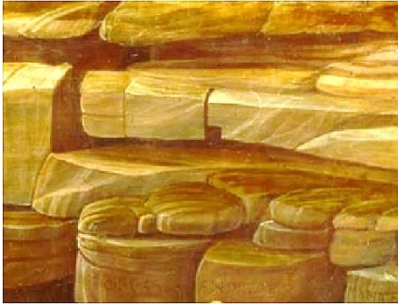


Figure 6.5. Is it realistic art? A brightened-up fragment (left) of *Agony in the Garden* (1453-1454) by Andrea Mantegna (right).

Mantegna's other paintings and frescoes often look like photos of sculpture or cardboard cutouts, which only elevates him among the old masters in the eyes of the modern ones. It looks like a modernist re-painting of a classical painting.

For a comparison, look at **Figure 6.6** that also represents the unreal.

The paintings in **Figure 6.6** depict scenes not only never observed but, from a rational point of view, as non-existent as Goya's monsters. Yet the images are realistic, even naturalistic, like a touched-up photo. In the painting of William-Adolph Bouguereau (1825-1905), the dead woman and the angels look like vigorous healthy humans. The wings of angels could be borrowed from a Victoria's Secret lingerie run. In Corrado Giaquinto's (1703 – 1765) painting of Heaven, Satan, wearing his little Halloween horns, is kneeling on a soft feather bed and looks as comfortable as everybody else in the company.



Figure 6.6. Super-realism or full-blooded nexistence?
Left to right: Corrado Giaquinto, *Satan before the Lord* (1750); William-Adolph Bouguereau, *Soul Carried to Heaven*, (1878); Bouguereau, *Dante and Virgil in Hell* (1850); Real fake wings and horns.

Bouguereau is so bound by reality that that he betrays Dante. He paints an episode from Dante's *Hell* ("one came to [Capocchio](#), and fixed his tusks in his neck," *Canti XXIX- XXX*) as a clutch of two healthy athletic bodies, but both sinners, Capocchio and Gianni Schicchi, the attacker, are supposed to be ill and covered by itching scabs "from head to foot."

The mythical imaginary world, never observable and scantily described in texts and legends, can be painted realistically, but it means abstraction from all its otherworldly properties that we believe in.

Only up to my knees deep in modern art, I began, surprisingly, to see less contrast between classical and modern, concrete and abstract, real and surreal. The perceptions of the same art by its contemporaries and later generation cannot be the same against different backgrounds of the past. This is why modernists discovered their predecessors in classics, as the trees of art in ART AS TREE will testify. After my further wandering in modern art, some classical artists, whom I always considered paragons of realism, suddenly began to reveal to me the blotches of coming avantgardosis. I was like a medical student who finds in himself symptoms of the disease he studies.

Is modernity modern? Is abstraction abstract? What is the difference between classical and modern art? I wonder if anybody has ever tried to analyze visual art from the position of structuralism, as it has been attempted in literature. Literature cannot be reduced to pixels, but image can. It means that art could be analyzed as it is, as an image without opinions, meanings, interpretations, background, mythology, and artspeak: just a matrix of pixels.

I know that literary styles could be computer-imitated. I do not know where it would bring us with art. I am just curious. [Here is a link](#), which is a look into the future of art. It is also the present of the art of modern CGI-boosted cinema.

Visual arts, beware computers: it is the second coming of photography. Will artists betray Kandinsky? Maybe. Warhol? Never.

Amazing...

7. ART AS TREE

Abstraction is the staple and the jewel of both art and mathematics. They are made for each other and they share the crown of imagination. Sometimes they even meet at an art gallery.



Figure 7.1. Left: [Fractal art of Jock Cooper](#), [image 1008111](#); right: Henri Rousseau, [The Equatorial Jungle](#) (1909)

Art is as concrete as matter can be even if it is abstract art. You can knock on it with your knuckles. What happens if we look at art in abstract way and try to paint the abstract picture of abstract or, for that matter, all art? Will it look as lackluster as the charts of Dow Jones or ARTNET, whatever Kandinsky wrote about the expressivity of a curved line⁷⁹?

⁷⁹ Investors seem to endorse Kandinsky's praise of the line. The stock chart can trigger emotions from gut fear to mad joy.

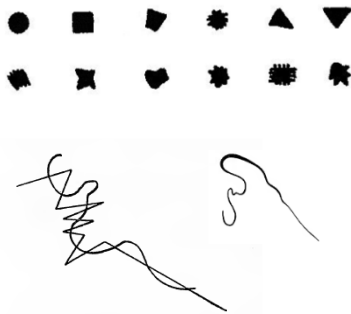
Abstraction is the job of mathematics, which turns everything, including products of pure imaginations, into clusters of abstract symbols and compositions of points, lines, planes, and breakneck surfaces that no skateboarder can brave.

The areas of mathematics that deal with lean abstract imagery of complex rich systems are graph theory, network topology, and, most importantly, Pattern Theory of Ulf Grenander. They, in a crude simplification, represent Everything as points connected with lines,⁸⁰ but here I will not repeat what can be found in original works of Ulf Grenander and on my website spirospero.net.

Instead, I will look again into *Point and Line to Plane*,⁸¹ a short book by Wassily Kandinsky He proclaimed “points” (dots, spots, and small pictorial elements) and lines (curves of variable thickness) as basic primitive components of painting. Abstract painting, therefore, is a combination of “points” and “lines” served hot and cold, fried and frozen, mixed and pure. That book was the art’s counterpart of Martin Luther’s *95 Theses*.

I find philosophy and language of Kandinsky religious, otherworldly, and anti-materialistic. What followed in art looked like the opposite. The spread of abstraction has been compared to flood (some artspeakers) and fire (other artspeakers), but nobody was hurt in the free world, to which Russia has not yet ever belonged. Moreover, art has become insurance against both flood and fire—in both metaphorical and legal ways (ART AS MONEY, of course).

If the reader has not yet guessed, I am not a big fan of abstract art. Yet I confess that the sweep, intensity, and variety of Kandinsky’s own paintings are irresistible. The same qualities make me defenseless against the multifaceted Picasso. But I see Andy Warhol (who also left his written Analects, if not Theses) and other modern art saints as anti-Kandinsky’s counter-reformation. The worship of ordinary universally recognizable objects, like soup can, flag, dollar sign, polka dot pattern, and animal in formaldehyde is the triumph of materialism against any vestiges of idealism in art.



Points (above) and lines from Kandinsky's book

Kandinsky’s points and lines are **independent** elements meaning compact “static” non-directional spots (points) and drawn-out dynamic strokes (lines) that, combined with points, imply time, movement, and process. His plane is the bounded area where the points and lines reside, sending various emotive and spatial messages. The process of interpretation is essentially the same as divination on intestines, sooth, coffee dregs, and cards, only with their pictures rather than real things. An at random taken Kandinsky is as good as cards to predict where your current love or business affair will bring you. Card and palm readers have not yet discovered that.

⁸⁰ See, for example, *History as Points and Lines* by Yuri Tarnopolsky and Ulf Grenander.

⁸¹ Available on the Web: https://openlibrary.org/books/OL6033439M/Point_and_line_to_plane and <https://archive.org/details/pointlinetoplane00kand>

What I mean by points and lines is something different.

I have a good, solid, newsworthy, not postmodern but—higher up—super-modern example of what I mean by points and lines: network.

Configurations (networks) of points (elementary components, “nodes”) and connecting lines (links, bonds) is exactly what the abovementioned mathematics is about. The points are neither geometrical points nor Kandinsky’s points but just anything that is or is not connected to another point: people, computers, words, species, institutions, bones, nations, and thoughts. Line is not a geometrical line but a pictorial symbol of connectedness, which can also be portrayed without lines: as a matrix. This is what mathematical abstraction means: no dichotomy between the object and representation. These features are fundamental part of Pattern Theory, but Ulf Grenander took further steps by attributing to abstract configurations such realistic properties as probability and energy. The theory is radical and not yet fully appreciated, probably, because sciences and humanities are still worlds apart in both paradigms and material rewards.

Ulf Grenander’s “points” (called *generators*) are somewhat close to chemical atoms but they have individuality and complexity, quite like real objects. The lines (called bond couples) are also similar to chemical bonds: they have energy: the measure of strength translatable into probability and back. There are stable configurations and improbable ones. My attempted contribution is another borrowing from chemistry: history and human relations are not just narratives and data but natural processes with beginning, transition state, and end. They redistribute the connections between points and so transform configurations. As chemistry can predict the most probable changes of structure, pattern chemistry might be a chance to foresee the future (as chemists and military commanders routinely do) without recurring to oracles and soothsayers. Do not expect market predictions, I wanted to say, but, on the second thought, who knows, maybe.

Network, the buzzword of our civilization, is a combination of points and lines connecting some or all of the points. Various patterns of connectivity (= topologies) are shown in **Figure 7.2** for computer networks in which computers are “points”.

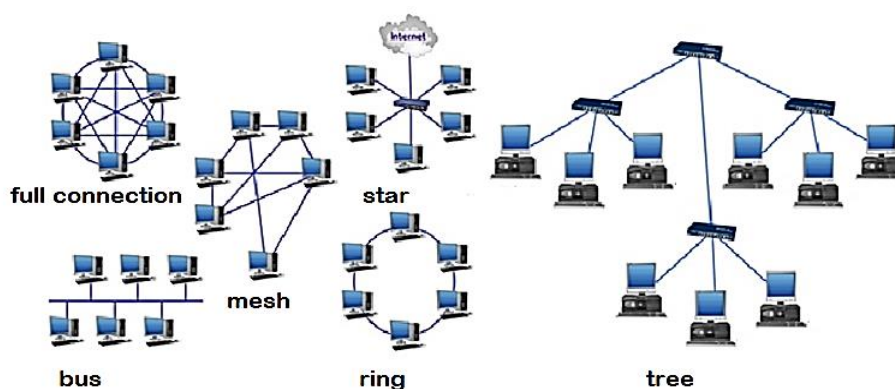


Figure 7.2. Network topologies for computers.

Culture, art, science, philosophy, politics has always been networks of communication, control, interaction, and influence. So are trade, manufacturing, and finances. Networking is a condition of personal social stability and advancement.

Art has a tree of its own. In 2012, the New York Museum of Modern Art (MoMA) hosted the exhibition *Inventing Abstraction, 1910-1925*.

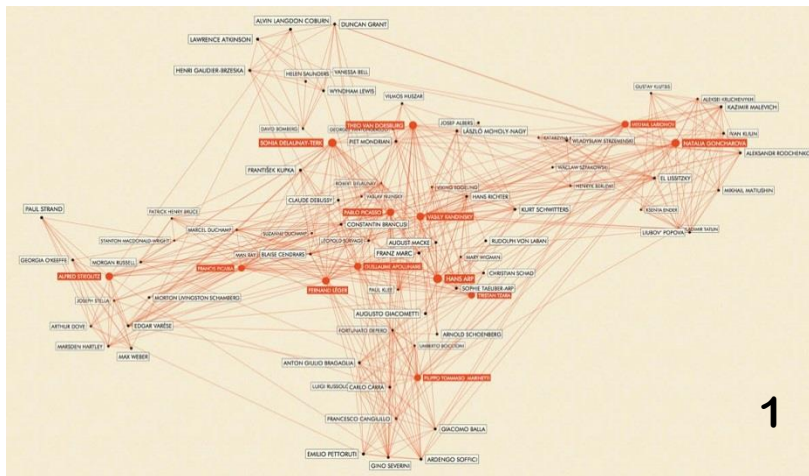
Map 1, **Figure 7.3A**, was created with the help of network specialists. It shows links of influence and personal contacts between the artists and cultural stars of that period. Thus, it includes the poet Apollinaire and dancer Nijinsky. The most important artists have the largest neighborhoods of “friends”. The amazing **interactive** (!) map places Wassily Kandinsky in the center of the entire abstractionist movement, which some enthusiasts called, testing the limits of artspeak, “our Renaissance.” The Web page shows also partial art maps, all looking like a chaotic tangle of labeled spots and, sometimes, labeled lines. They represent the personalities in the nodes of the network. The maps are complemented with biographies, comments, and graphic materials retrievable by clicking on the nodes. This is a real treasure. I list major links:

1. Art history charts
2. Main page
3. Interactive main network

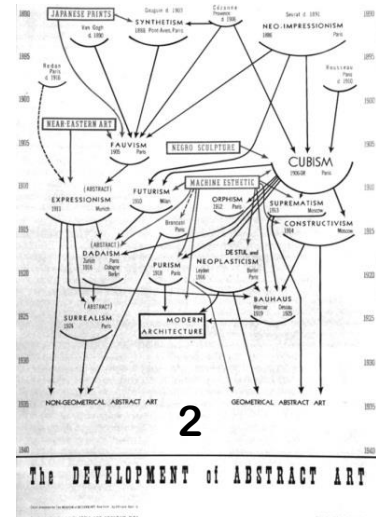
4. Interactive individual networks
5. Main network, pdf
6. Text



The main art network is shown in **Figure 7.3A**, but it can be fully appreciated only on the MoMA web site. It has the topology of a dense mesh of stars.



1



2

Figure 7.3A. Art maps, see [ARTNEWS](#), [MOMA makes a FACEBOOK for abstractionists](#), by Robin Cembalest, 10/02/12. 1: MOMA's map; 2: Alfred Barr, 1936

The MoMA Grand Map of 2012 in “*Inventing Abstraction*” is not the only points-and-lines representation of art history as a network. The time component for it was not crucial because of the shortness of the period of flood and fire, but there were quite a few attempts to include time into the picture, as the right sides of **Figures 7.3 A** and **B** show. More art history charts could be

found on the MoMA site and elsewhere, see **Figure 7.4**. Among them, the gracious tree of Lynn Elliot Letterman, who devoted a branch to feminist art, and the super-complex tree of Greg Neville stand out. They, together with the most popular tree of Miguel Covarrubias, reflect some important **topological** distinction of art from life.

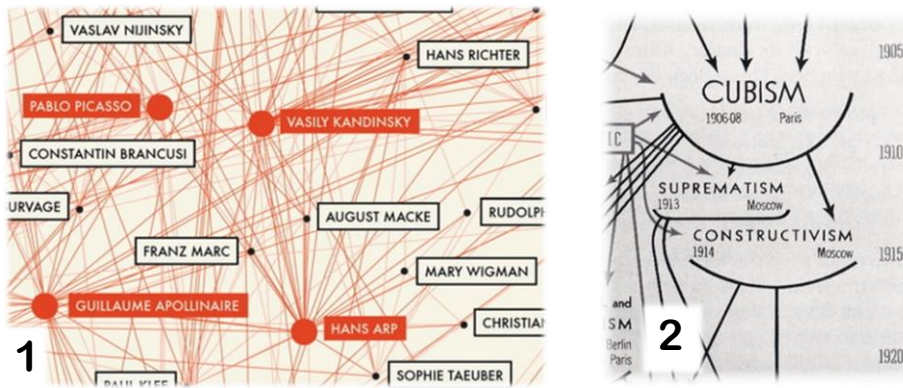


Figure 7.3B. Fragments of maps in Figure 7.3A.

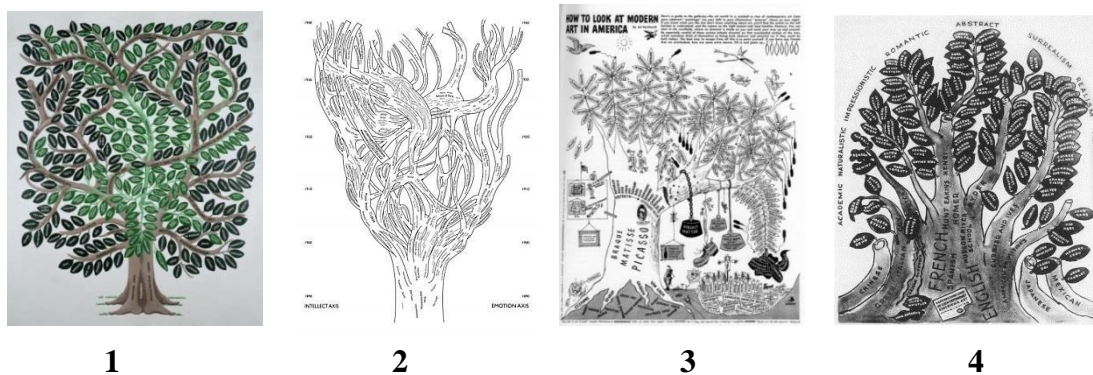


Figure 7.4. Modern art trees. Authors: 1. Lynn Elliot Letterman 2. Greg Neville, 3. Ad Reinhardt, 4. Richard Pousette-Dart. Sources: [1a](#), [1b](#), [2a](#), [2b](#), [3](#) and [4](#).

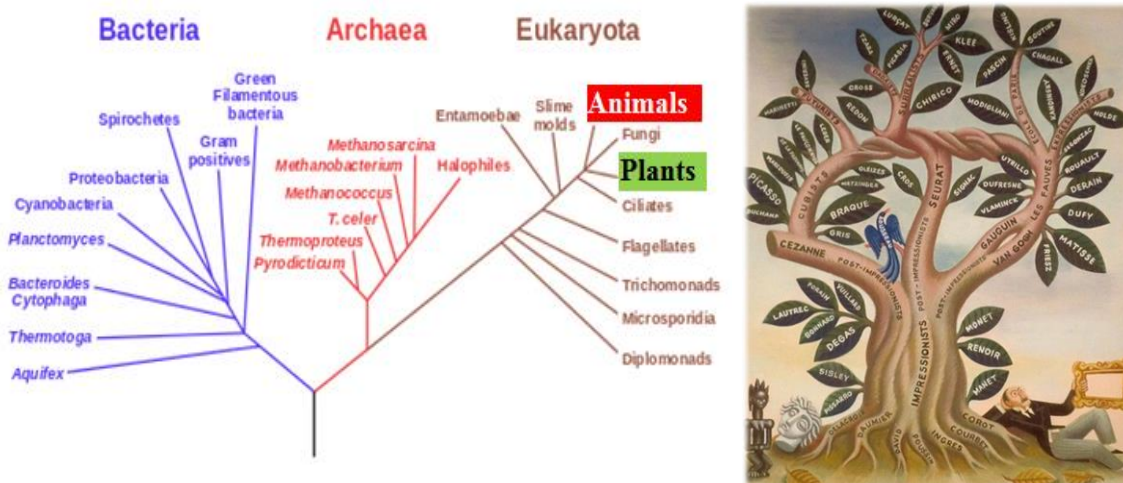


Figure 7.5. Left: Diverging tree of life; right: converging tree of modern art (by [Miguel Covarrubias](#), 1933)

Miguel Covarrubias put Henri Rousseau on the tree not as a leaf but as an exotic bird (**Figures 7.5 and 7.6**). I wholeheartedly agree with that. I think that Henri Rousseau (1844-1910), as a promise of fresh air, still belongs more to the future than to his contemporaries. The hyperrealism and fractal art (**Figure 7.1**) look, with hindsight, like his distant and unexpected progeny. It is hard to understand why the delicate Maurice Utrillo was placed among the stark fauvists, however. The consensus in attribution and interpretation of connections in art networks is hopelessly difficult to reach.

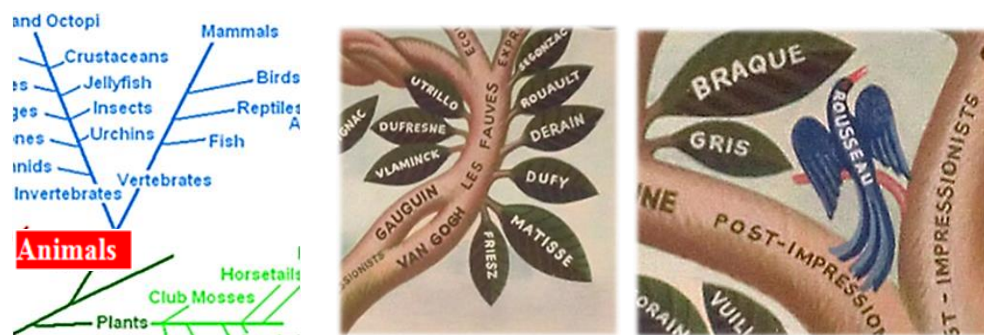


Figure 7.6. Fragments of pictures in Figure 7.5.

Tree is the standard representation of evolution of species and other systems with growing complexity. It is also used in linguistic analysis, genealogy, history of science, technology, institutions, philosophy, ideology, and any object with hierarchical structure, apart for drawing objects of botany. Artists, who are full-blooded humans, however abstract and skeletal in their creations, as well as biologists, who are at home in a tree-house, are charting their trees growing upward, trunk at the bottom. In linguistics, they are upside down.

It turns out that the evolutionary trees of art do not have the pure tree topology, which requires the absence of rings. Their tangled networks combine rings with strict branching of tree topology.



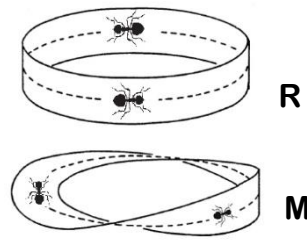
What does it tell us? Topology, unlike “network,” is not a buzzword today, maybe, for a good reason, but change in topology is one of the most profound changes that can happen in the world. It does not happen every century and not even every millennium.⁸² We are right in the middle of a topological revolution and I am going to allow myself a digression about the new topology of our good old round world, already with tentacles into the space.

I have been fascinated by topology since my school years.

⁸² I would say, it happened only once before with the emergence of human brain in which anything could be connected with anything else. Will the future world need of humans as dumb as neurons? Joseph Stalin praised humans as dumb as, I quote, “little screws” (винтики). Will art need only minimalists? They will be easy to recombine.

Topology is a property of space, whether discrete, like network, or continuous, like our earthly habitat or something we can only imagine. The most popular illustration is the Moebius strip which everybody can make from a strip of paper.

Two ants on the opposite—inner and outer—sides of a ring can never meet without crossing the border between them. On the Moebius strip, however, two ants are always on the same side and can communicate and procreate day and night. This is like Europe and America before the Age of Discovery: the two continents were on the opposite sides of the communication border. The Industrial revolution put all humans on the Moebius strip of knowledge and physical contact. Yet we were still separated by borders (never perfect) and distance (never impenetrable) from total **mutual** manipulation and control. The Digital Revolution has thrown us all into the borderless world because the increasing part of our personal existence has been taking the eerie dematerialized digital form.



Ring (R) and Moebius strip (M)

Dematerialization is an ugly word, but I expect it to buzz like a heavy metal band in near future. It is the main problem of the Digital Age. Its Google output today is only 347,000 results (0.57 seconds). For the times when it exceeds one million, I suggest the term “demat.” Remember me then.

Let us open the phonebook, like the one that is being delivered to my mailbox—newspapers are not anymore—but sits for a year unopened on top of the fridge. The phone company maintains its network of subscribers with **potentially** full connection topology. The subscribers listed on its White Pages consist of three kinds: (A) those who know about each other’s existence and have communicated at least once, (B) those who have never called each other but know about the other from the phonebook and would call in need, and (C), those who would never call one another except by mistake. This distribution changes with time: “never say never.” Of course, I neither know nor want to know who is who in the entire book, but the telephone company in principle can find out from their digital records. Although hardly used, this knowledge exists openly and is of acute interest in matters of national security.



I cannot resist an urge to quote Michel Houellebecq as evidence that topology begins to slowly trickle into literary fiction, although this particular piece of fiction is chillingly realistic.

Think of an X-Y graph, Rediger wrote, with individuals (points) linked according to their personal relationships: it is impossible to construct a graph in which each individual is linked to every other. The only solution is to create a higher plane, containing on point called God, to which all of the individuals can be linked—and linked to one another, through an intermediary.⁸³

Michel Houellebecq, *Submission*, Farrar, Straus and Giroux, NY 2015, p. 224.

It is the **existence of the directory**, whether on paper or in computer memory, that makes us all **potentially** connected, but there is no way to know the **actual** connectivity of any

⁸³ It is possible to construct such a graph of full connection, but impossible to realize it on a large scale. author suggests is the star connection.



I end here my digression with a clarification. I see the development of the current total connectivity as the unintended and uninterpretable in its time “prophesy” of modern art in the beginning of the 20th century. This is the central idea of this Essay.

By no means should this Essay be regarded as attack on modern art. I chuckle at *Untitled, 1962*, but modern art is a vast reservoir of freedom, even if canned and labeled “Campbell Soup.” It is the opposite of what I loathe most in life.

Next, I am going to consider a different kind of a configuration with tree topology, this time about the substance of art as art. As a template, in **Figure 7.7**, I supply the tree of life with its root system never seen on such trees simply because we do not know much about the origin of

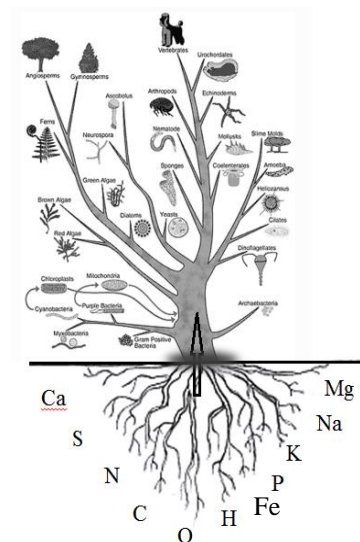


Figure 7.7. Tree of life with roots.

life. We know, however, that all living matter consists of a limited set of atoms and every molecule in organism is just a combination of atoms. The tree of life is a record of evolving complexity of such combinations. Then what is art as artwork and not as network of personal relations? What are its atoms and molecules? This question is what unites Kandinsky’s points and lines with points and lines of Pattern Theory.

Modern art, unlike classical art, is not constrained by the object even in photography. It freely combines elements of reality and imagination, as well as appropriated tricks of other artists. It makes new elements and combinations, transforming the old ones.

Next, I will show yet another type of art tree: the impersonal one: the tree of styles. I will arrange it along the axis not of time but of complexity. I want to show not only how different the tree of art is, but also the consequence of this difference.

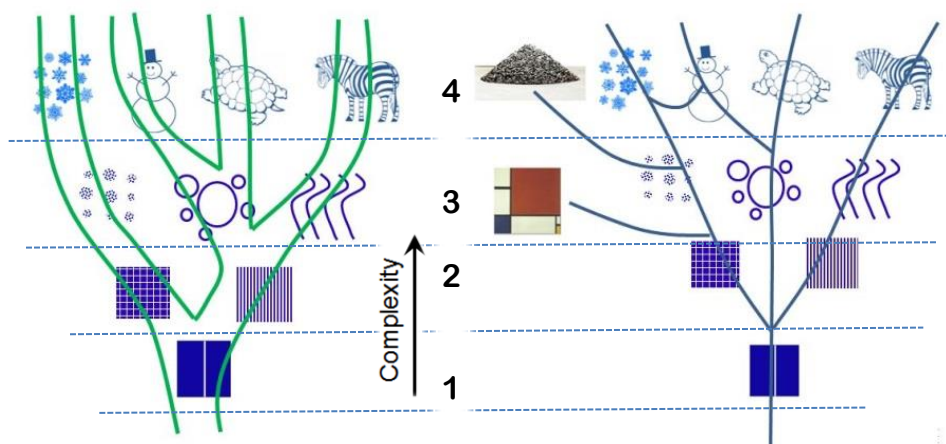


Figure 7.8. The tree of complexity

The left part of **Figure 7.8** has in its root (Level 1) Barnett Newman’s *Onement VI*, a picture of extreme simplicity. Consisting of a blue field and white “zip”, it opens a way to multiplication and recombination of white lines at Level 2. The lines begin to deform at Level 3, kept in shape

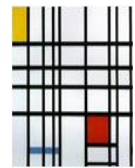
by external constraints of snowflakes, turtle, and waves. At Level 4, the primitive pictures acquire more complexity and realism. The closeness of the snowflakes to the pre-turtle makes possible, do not ask me how, the split of the turtle into the snowman and the definite turtle. The tree of complexity grows under the constraints of reality. The right part of the **Figure 7.8** adds new paths of evolution toward modern art. We see two iconic pieces: the pile and the grid of Piet Mondrian, each preserving some components of their neighbors: orthogonal grid at Level 2 and particulate consistency of snow. In the evolution of modern art, ideas are freely interbreeding with natural objects.

What I omit in the **Figure 7.8** is the long road from the primitive art through millennia and the hard toil of classical art toward becoming modern primitivism and minimalism.

The tree of complexity and sophistication is tangled. One could say that minimalism in art is similar to the minimalism of simple organisms, the germs that successfully coexist with humans. But the germs, fungi, and microscopic algae have been developing uninterrupted, while abstract art and the barrage of pop cans just fell from the skies after the ages of sophistication.



What does the prophetic art want to tell us? Is our civilization secretly exploring the ways toward the rectangular order of Mondrian-colored prison bars and windows? I will leave the question hanging in the air. I do not have either a consistent theory or sufficient material or just remaining time to think about it. Life is short.



To conclude this difficult monologue, I offer a visual parable of the current topology of art as a reformed tree, **Figure 7.9**. The topology of our art—and, I believe, of our civilization—is moving to **full connection**. Anything can be anything else and mixed with anything. Anything goes. Anything is there in the phone book/Google, just call/click on a whim. Anything but money is on a plate. Everybody and everything wears a mask and to trust the appearance and rely on promise is a risky game. It is the world of submission to order.

Art, science, technology, culture, and everything created by humans has been evolving like a tree by divergence and specialization, similarly to the evolution of living species. In our time, however, human creations and even living species are acquiring a new freedom of intercourse or repulsion between themselves. They fuse and grow cycles. The reservoir of freedom is bursting at the seams.

Everything influences and interacts with anything else. This creates a real mess in our age of artificiality in which humans, the pure product of natural evolution, have to mate with their own artifice.

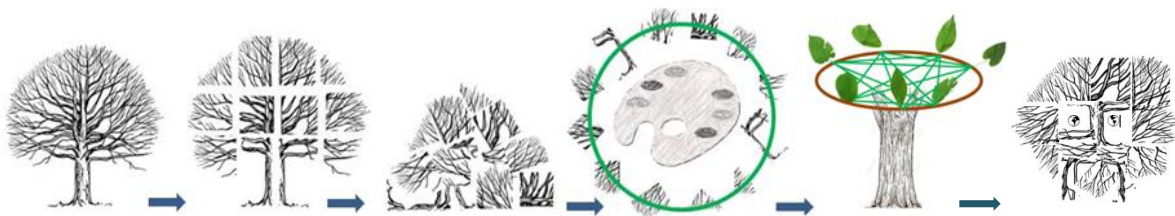


Figure 7.9. Reforming the tree of art

The watch is mating with computer, tomato with medusa, France blends with North Africa (creating huge tectonic tensions), and the Frankensteinian mix of theater, installation, artist, torture, nudity, and public in performance art is drawing crowds⁸⁵. The diverging tree of civilization begins to converge, as if the branches of an oak started to fuse with each other. Ideas and social structures mix, too. We are witnessing the ultimate barbarity of bygone millennia coexisting today with the refinement of elites, glamor of Paris, entrenchment of liberalism, and the oxymoronic **anarcho-conservatism** of the Republican Party in US.

I have to stop and change topic before I begin to question the prospects of a reformation of life along the pattern of the Reformation of art with its artspeak and eerie art market.

⁸⁵ Marina Abramovic at MOMA, 2010

8. ART AS SHADOW

My primary assumption in this Essay is that art is an *exsystem*: evolving complex system. So are life on earth, society, its culture, institutions, and knowledge. Larger exsystems can have smaller sub-exsystems and modern art is a sub-exsystem of culture and economy where both overlap, keeping politics at safe distance.

Exsystem is a realm of individuality, while physics is, traditionally, a realm of generality. Chemistry, for which each of countless chemical structures is unlike all the others, feels at home with human individuality and needs only the generality of physics to bridge human matters with the rest of the universe, inhabited or not.

I want to look at art from a very general point of view in order to understand what happened when classical art had entered its modern stage, which is now already historically old. At the same time, I expect art to reveal to me something I do not know about the larger exsystem that incorporates it. I believe that all exsystems have some important properties in common, which is to say that they share some patterns. This idea is not quite new. Thus, evolution of technology and evolution of life are topologically similar processes. They are represented by the same tree-like maps. This is a big and complex area, however, and I will not go there in this Essay. There is more about it on my [COMPLEXITY](#) site.

Next, I am going to explore, three-quarter-seriously, the origin of imagination by exerting my own imagination. I want to imagine myself a troglodyte, a cave dweller, one foot in the cave, the other in today. I see nexistence as the product of imagination that somehow is capable of evolving into a mass belief that moves individuals, couples, dozens, hundreds, and millions of people with hardly predictable but explainable *post factum* results. I separate dozens and hundreds from millions because the millions are usually put into action by small groups ignited by individuals. Modern art, unlike other spheres of human activity, does not enthrall many millions of people (pop arts do), but it keeps an avid eye on millions, anyway, as any industry does.

Since E. B. Tylor (1832 – 1917), anthropologists noted the possible role of dreams in the origin of religious ideas.

Dreams are not a good object to choose as a counterpart of reality. They have realistic visual details of “this world”, are uncontrollable, inconsistent, overall senseless, poorly remembered, and occurring only for a short time in specific circumstances of our life. Their content is limited. They are shredded, spliced, and distorted visions of day life, composed of convincing fragments and sometimes stories (have I just formulated the essence of all postmodernity?). Dreams are passive and spontaneous, imagination is active and controlled.

I cannot argue with the power of dreams in human life, especially in past centuries. Instead, I want to draw attention to something more common and universal: the dichotomy between real and imaginary that goes through the history of art. One can say that Jackson Pollock's drip technique is fully spontaneous and has nothing to do with imagination, but Pollock definitely controlled the gradually developing picture, selection of paint, and the endpoint.

Taking to account the *unimaginable* craziness of modern art, there could have already been an artist who painted with his eyes closed. If not, there will be one.

And now let us jump not just centuries but 20,000 years (the age of the Lascaux cave pictures) back in time.

I am a Stone Age human with some emerging capacity of speech. My cave name is Ogg.

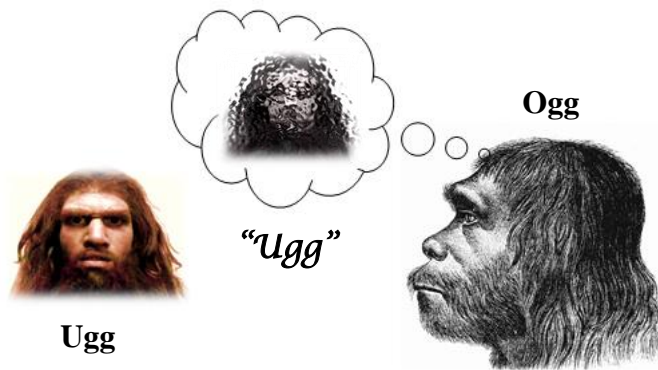


Figure 8.1. The two worlds of the first humans.

In **Figure 8.1**, I show my selfie and the shot of my good-looking pack mate and rival Ugg.⁸⁶ I look neat enough in my picture, but Ugg is really unkempt. If I look like a daydreamer, it is because I am. I will still be a daydreamer 20,000 years later.

There is a second image of Ugg, of a much poorer quality. Because it is always with me, I conclude that it is in my head, but I am not certain. I cannot look into my head. There is nothing but

brains in cracked heads of other people.

The process of becoming human brought about a great complication in the work of the mammalian brain. The rest of human evolution until very recently has been spent in adaptation—ultimately, successful—to the duality of human existence tossed and torn between the real and imaginary. Man-made ideas and idea-made men created the third loop of the Knot: man-made Things.

I perceive all existing Things and life forms in two different modes. One is the mode of direct perception, WYSIWYG (*What You See Is What You Get*), or, better, WIGIWIS, *What I Get Is What I See*, i.e., I see Ugg. He is right there, I can touch him, and his presence creates his image.

The other mode is WISIWIT, *What I See Is What I Think*: I see Ugg in my imagination, with closed eyes, in other words, **I think about him**. **My mind**, not Ugg's actual presence, creates his image. Although it is **my** mind, I have some limited control over it, which I share with instincts. They are more powerful. I still do not have any power competing with my animal instincts except for the similar instincts of others like myself. Quite often, we get physical. By way of understatement, this is called healthy competition.

⁸⁶ I have no idea why all artists portray early people as wildly disheveled, untidy, and menacing brutes. Even animals take care of themselves and groom each other.

My daytime eyes-shut mental image of Ugg is not the same as the eyes-open one. It is more like a *shadow*. It has few, if any, details, none of them exact. Although I can see the *shadow* of the wart on Ugg's nose if I want, I never pay attention to the color of his eyes because we all have the same color. I can see Ugg from behind, running, or lying on his back, yelling or growling, eating or hunting. I can even see him dead, although he is enviably healthy. I *know* that it is Ugg. The *shadows*⁸⁷ of other pack members are different, but have similar properties.

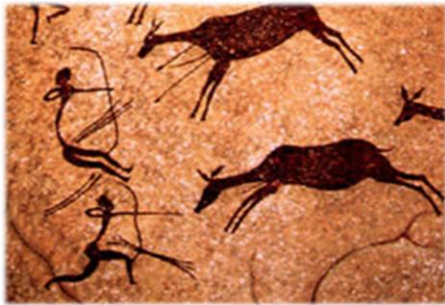


Figure 8.2. Ugg (below) and I at the tomorrow's hunt.

There is something else in my head when I close my eyes: words. I can hear them ears-open or ears-shut, quite like the *shadows*. I hear them and I can play with them a little even before I speak. I can say Ugg's name and call him when he is out of my view, behind a bush or a rock. I can also imagine (i.e., see its *shadow*) an antelope and even paint its *shadow* on the wall of the cave, appropriately arranged with other *shadows*. I can imagine an antelope killed by Ugg, although I do not see the act of hunt and the jubilant Ugg himself laying a new arrow on his bow. If Ugg was indeed dead, I would see his *shadow* same way as I see the *shadow* of Ughh, his younger brother who has been already two moons dead after being hugged by a bear.

Now I am switching back to my real self (one foot still in the cave because I want you to meet somebody else there). To my surprise, my thought experiment has shown me that the most dramatic difference between Ogg and me is a larger vocabulary and ability to read, which is not that much.

Here or there, I find myself in two distinct worlds—something Emile Durkheim (his wild look is deceiving) is considered the beginning of any religion. My and Ogg's two worlds are (1) reality—the close and explored environment of my clan—and (2) the *shadows* of reality in my head.



This is Aggie remixed by Picasso

I, Ogg, begin to perceive **reality** as consisting of combinatory elements such as head or leg of the antelope, rain or shine from the skies, and my hunting mate Ugg or my sex mate Aggie, here she is, dear.



The combinations are not chaotic and I begin to understand what keeps them in shape: the constraints of the patterns. The leg cannot grow from the head, rain never goes up toward the skies, and Aggie's portrait by Picasso is a sick offensive slander. The origin of Picasso's art is even darker than the origin of religion and you really need to believe in something out of this corporeal world to consider it art. I need a mediator—an art critic, an art investment advisor, a priest in the temple of Muses—to reconcile me with it. I am intentionally confused, playing Hamlet.

⁸⁷ The term *image* is already taken by Pattern Theory as well as other sciences and arts.

The real world requires knowledge and, ultimately, science. I do not have any power over the laws of nature, but I can use them. I trust my senses. I can connect the cause and effect. The lightning causes thunder. Gravity and wind direct rain. I observe and take a note of regularity. I dive into the world of *shadows* to fish for hypotheses and generalizations. I begin to distinguish between opinion and fact. The root of knowledge is bitter, the road to understanding is long, and life is short. My descendants' power over nature and man-made Things will possibly grow for the next 20100 years, but human power over humans will always be limited and shaky (written during the US Government shutdown by the tribe of cave Republicans in 2013).

In the world of *shadows*, I have a different kind of power (I can, for example, make Democrats win in 2016).

I begin to perceive the **shadows** as consisting of combinatory elements such as head or leg of the antelope, rain or shine from the skies, and my hunting mate Ugg, and my sex mate Aggie (who has some fabulous non-combinatory elements of her own). In my *shadows*, a leg can grow from the head. Why not?

The combinations are sometimes chaotic, but the *shadows* differ from *reality*. They have much less constraints, more freedom to divide, splice, and recombine. The **laws** of *shadows* are much looser than the laws of nature. I have a lot of power over them. Thus, although Aggie is mine, I can see *shadows* of Ugg mating with Aggie, and that does something to me, and I see the *shadow* of Ugg killed with the *shadow* of my arrow, and I feel good, although Ugg is still alive and well, (and this is the beginning of literary fiction).

Moreover, I see the *shadow* of triumphant Ugg over the *shadow* of my dead body. This is what it means: **I see the world not only as it is, but also as it can be or even cannot be.** And if all humans have two eyes, it is no problem for me to imagine and paint somebody with one eye in the forehead, or with goat's legs, or fused with a horse. And I begin to think that I am too hard on Picasso and his Aggie is a masterpiece, anyway. Along the road of *shadows* we can create images eyes-shut and we have to look out into the sunshine to see what is real. But how do we know what is **not** real?

My **ideas** (let us finally, 20,000 years later, use this word instead of *shadows*) consist of elements that can be combined and recombined along rules, but not necessarily the rules of the nature. Moreover, my first sounds can be combined and recombined into words and statements, not necessarily having anything in common with reality or making sense at all. To dream is as human as to err and to err is the usual price of dreaming.

There is the third world: instincts inherited from animals. Let us call it human nature. I put it side by side with nature because they rule over all animals, although its laws are not as powerful as the laws of inanimate nature. There is a long way from instincts to "a system of rules and guidelines which are enforced through social institutions to govern behavior" ([Law](#) in Wikipedia). This system can be etched in stone or stacked in paper, but humans like to violate it in any form if it makes them feel good.

The mental images—configurations produced by imagination—harbor everything “non-natural.” There is a small semantic distance between non-natural, i.e., not observable in nature, and such potent religious notions as supernatural and unnatural. This is the area of a logical twilight where all cats are gray. If the supernatural exists, even invisibly, it is natural, and if we see something unnatural, it is natural, too. Otherwise, we would not see it. The supernatural is worshipped while unnatural is persecuted. The lack of logical basis under both notions leaves an ample leeway for the evolution of moral standards.

Back in the present, I am coming to the summary of my cave experience.

Humans imagine **new** ideas and test them against the **facts of nature**, which is the environment of the tribe. The ideas that do not contradict reality will survive. This process will produce science—the search for truth, constancy, and causality. Thus, if the earth looks flat, it is flat until proven curved.⁸⁸ The change that makes knowledge **stable enough** (not necessarily much more stable) will survive. Science is concerned with nature and consensus. Inanimate nature moves toward equilibrium. Animate nature is in a perpetual dance.

Humans imagine **new** ideas and test them against other humans, i.e., the **facts of human nature**. Some survive and stay as the laws of the tribe for as long as the tribe is stable. This route leads to culture. Change that makes the culture **stable enough** will survive. The culture that makes society **stable enough** (not necessarily **more** stable) will survive, until mortally wounded or naturally exhausted in fight with another culture. Culture is concerned with human matters and social order. Society is full of internal contradictions. In the knot of conflicting and contradicting strands of comparable power, the ideas, Things, and humans compete within and across the borders of these three domains. The more freedom, the less separating distance, the more chance of conflict, as the beginning of the third millennium testifies, as if the previous century was not enough.

Human produce **new** ideas and test them against **old ideas**. This is art: the creativity without utility (except luring a mate or a buyer). The most supernatural thing about art is that new piece just adds to the collection of old pieces and, paradoxically, its monetary value increases with age.

Modern art is based on the belief that it is art: a thing of value without utility and consensual meaning, assigned to its own marketplace and place of rest. And if it is created, displayed, and sold as art, it is art. Just believe me.

⁸⁸ I do not know what to make of the fact that, although President Obama’s American citizenship is proven, it is still denied by many. My guess is that (1) denial is a form of belief and (2) the roots of beliefs are as much in the instincts as the roots of the teeth are in the jawbones. That’s a pity because reason dwells just a little above the jaws. See the X-ray of a tooth in ART AS BELIEF.

9. ART AS BELIEF

In our times, the word “revolution” is slapped right and left on any new product, technology, treatment, and self-help with cries “Disruptive!” or “It will change your life!” This is what revolution is about. Revolution often changes one set of restrictions for another, however.

I suppose that the revolutionaries are those who are capable of coming to terms with the brutality of the world, and of responding to it with increased brutality.”⁸⁹ (Michel Houellebecq, *The Possibility of an Island*, Vintage International, 2007, p. 109).

This is why I prefer the word “Reformation” for the beginnings of modern art. Reformation can relax or reject the constraints and I use the term in this sense. But the term inadvertently evokes religion.

Reform Judaism is an attractive example of relaxation, but religion is a complicated and sensitive subject. If I may put sexual revolution in the same paragraph with religion, it is another example. It has already morphed into the initially non-intended relaxation of marriage and treatment of sexual minorities, although a one-way bombardment by anarcho-conservatives is still going on.



**Marc Quinn,
Self. Artist's
frozen blood.
(1991-...)**

Like the European religious and modern wars that had ended, recently, with peace, coexistence, and increased diversity in Europe, the Reformation in art did the same without a shot, although not without some blood spilled... Relax!

Blood in art is only medium or component. Check out: [Body fluids in art](#) (Wikipedia) and look up [Marc Quinn's Self](#), which he refreshes up every five years.

As Sarah Sze's [Triple Point \(2013\)](#)⁹⁰ shattered my outdated vision of modern art, the public seemed to be roused, too. I ran into the following theory of [Paddy Johnson](#), an insightful and, on that occasion, skeptical art writer:

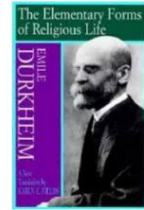
My theory is this: The show is both a production-site and graveyard for the relics of an unnamed religion. Members of this cult worship reproduction technology and mass-produced items of any form ([Paddy Johnson](#) ; she also finds that it “looks a lot like contemporary life.” *Brava!*).

⁸⁹ Houellebecq keeps modern art in the focus of his “*The Map and the Territory*,” (2012), which, as well as his *Submission* (2015), I find groundbreaking.

⁹⁰ See also: [A](#), [B](#), and [C](#). Photo shots from multiple points at Flickr ([C](#)) give the best representation of 3D objects.

That was the moment when I decided to retrieve Emile Durkheim's *The Elementary Forms of Religious Life*⁹¹ from the back stacks of my bookshelves.

I had bought Durkheim's book long ago for \$3.99 at a book sale but was never able to read more than two first chapters. Only when I, jolted by *Triple Point*, had made another, more successful, effort, I understood that it should be read backwards, starting with *Conclusion* and, maybe, stopping after that.



Nexistential promises and threats.

I think that what **modern** art, **modern** ideology, and **modern** religion have in common, apart from being **organized**, is *nexistence*. I am not going as far as to generalize over *contemporary life*, however, despite of strong temptation, because we have two divergent subspecies in the postmodern *Homo sapiens* with contrasting existence, as well as nexistence. Paradise, hell, salvation, Nirvana, immortality, “chicken in every pot,”⁹² million bucks overnight, Communism, Putinism, Trumpinism, world domination, debt, insurance, market games,

security, and the combusive tea of the zealots—all that consists of promises and threats, all of them about the future.

Nexistence—the content of a socially powerful statement without evidence and proof, **nothing treated as something**—trails behind an artwork in the form of comments, analysis, comparison, evaluation, explanation, and interpretation. Unlike the nutritional value of a new sandwich or the magic abilities of the next iPhone, it is impossible to check whether the comments make any sense. There is no universally recognized connection between what we see and what we read and hear.

Nexistence is a necessary source of order for human society because nature has no laws for such unruly objects as humans. They are capable of creating novelty, which disobeys algorithms, laws, and the body of knowledge. Throughout the universe, nature prefers to bar the lawless novelty from entry into the world by keeping the immutable laws of nature on the book—unsuccessfully, as I submit, in case of humans. The only law that nature can offer humans is death and we are not happy about that, fighting nature with arts and other long lasting stuff—a kind of pillow fight because nothing lasts long in our time, especially if digitalized.



All human matters—at home, at work, in temple, or on Wall Street—involve belief, which, alloyed with doubt, trust, and desire, is a driver of human behavior.

Belief is what pulls people together in crowds and pits them against each other in fights.

⁹¹ Originally published in 1912. Translation by Karen E. Fields, The Free Press, 1995

⁹² “A chicken in every pot” was promised by Henry IV of France, Catherine the Great of Russia, and Herbert Hoover of the USA.

Reason needs to believe in itself in order to overpower a false belief. Two incompatible beliefs can play seesaw.⁹³



We can believe in tomorrow's rain and believe that global warming is nonsense. While attending temple, performing rituals, and choosing martyrdom are verifiable **facts** of behavior, an individual **belief** is not verifiable because of the non-yet-existing future as its constituent. Moreover, a declaration of belief can be simply an expression of the current mood, state of mind, calculation, and intent. Trusting a promise, or dreading a punishment can mean a different, belief, deeper hidden, with roots in personal history.

The breakup of a link between the image (fact) and its meaning (idea) is the essence of the Reformation of art. The modern artwork and its "understanding" or "meaning" are in different universes. Image is shared but its perception is individual, quite like political statement, and this is why politics is a genre of performance art.



Figure 9.1. Going in circles. Kazimir Malevich, *Black Circle*, 1913; Ellsworth Kelly, *Circle line*, 1951; Ives Klein, *Disque bleu*, 1957; Jiro Yoshihara, *Work*, 1967; Richard Pousette-Dart, *Black Circle, Time*, 1980; Richard Serra, *Coltrain*, 1999, and *Billie Holiday*, 1999.

An abstract painting is a canvas with a distribution of "lines and points," some of them recognizable, but its interpretation in plain language or artspeak has no logical or semantic connection with the material reality. You can only believe in something **beyond the appearance** of a simplest circle. Your belief is personal, subjective, and it may not agree with beliefs of the artist and others. Seven circles in **Figure 9.1** (a small part of all [painted circles](#)) are another illustration to the problem of degeneracy of form as well as disintegration and dispersion of meaning. Of course, there is nothing in the tenets of modern art that requires meaning, but artspeak needs something for a subject; not the weather, really.

THE SHOW IS OVER
ER THE AUDIE
NCE GET UPTOL
EAVE THE IRSE
ATS TIME TO C
OLLECT THEIR
COATS AND GOH
OME THEY TUR
N AROUND NOM
ORE COATS AN
DNOMORE HOME

Christopher Wool
(b.1955), Untitled,
1990.

In postmodern art, you do not need either to believe in anything, to feel something, or just to believe that you feel. To say that you *believe that you feel* is more than enough. I see in this only a cause for celebration because you, the viewer, are entitled to the same degree of freedom as the artist: the freedom of irrelevance. But I hear the gong calling for my mantra: art is what is called, displayed, feigned, played, celebrated, praised, extolled, enjoyed, loved, criticized, ridiculed, hated, and sold as art.

⁹³ Tamar Szabó Gendler developed a concept of *alief*, a counteracting instinctive satellite of belief, but I mean cognitive dissonance.

The difference between image and meaning is erased in the genre of “word art,” an astronomically distant relative of Chinese calligraphy, exemplified by Christopher Wool’s *Untitled*, 1990.

THE SHOW IS OVER highlights what for Wool were the relevant questions for a young painter at the edge of postmodernism: could there still be meaning in the act of painting? The answer is at first ‘No’ and then perhaps ‘Yes’; the work inspires a continual debate within itself. In this iconic work, Wool questions as he celebrates the tension between act and image, high art and the simulacrum of the real. ([Auction comments](#)).

Abstract art as *nexistence* echoes another *nexistence*: the future, which is, being the heart of any religion and ideology, is a matter of belief but not a matter of fact.

Belief-doubt-trust is the rock-paper-scissors game of modern culture.

Exactly because modern art is elitist, like anything in the shadow of wealth, it has the highest potential to stay away from the pressure of the crowds and carry a sincere, though cryptic, message about something concerning our civilization.

The succinct *Conclusion* of Durkheim’s large volume is rather independent from the entire second-hand and often arbitrary or erroneous bulk of his book about tribal rites of Australian aborigines whom he had never faced. While reading the *Conclusion*, it occurred to me that it is applicable to a much larger area of human matters not necessarily associated with religion: collective—shared by hundreds or millions—beliefs.

Humans need beliefs as a map in wilderness, and it does not matter of what kind, as long as it makes them happy or scared. We sniff each other over for beliefs. An alien smell is discomfiting for most, while the familiar one soothes the anxiety. Collective beliefs maintained by institutions are both glue and solvent of society: they unite and separate the human molecules and so keep social chemistry—or, if somebody prefers, machine—going.

NOTE: I believe that belief, when proof and science are non-existing or unavailable, **is** science. Religion, therefore, was the first form of natural science. It had no alternative. Then why people sinned? Because they saw that their experiments with sin were inconclusive. They still are.

Durkheim does not use anything like *nexistence* in his terminology. He divides everything that humans deal with into two different domains: sacred and profane. Spirits, gods or God, Greek *eidola*⁹⁴, dead ancestors, demons, soul, taboos, and anything where an individual has no choice belong to the realm of the sacred. Are objects of political correction sacred or profane? Decide for yourself.

Durkheim’s idea was that the sacred **beliefs** acquire their powerful organizing and uniting status because of the unconditionally believable **facts**: man-made visible and touchable paraphernalia, totems, images, narratives, art, rituals, taboos, and other tangent and transferable things existing

⁹⁴ In ancient Greek literature, an **eidolon** (plural: **eidola**) (Greek εἶδωλον: "image, idol, double, apparition, phantom, ghost") is a spirit-image of a living or dead person; a shade or phantom look-alike of the human form. ([Wikipedia](#))

in time and space. As abstract art is instinctively anchored in reality, religious beliefs seem to be anchored in **art** of religious rituals.

The passionate belief is usually expressed in the flamboyant, forceful, and effervescent speech which itself is a form of art. You can get elated, but to take it seriously, you need to believe in what it says.

The so super-abstract that it becomes concrete *Untitled #7* (1984) of Agnes Martin,⁹⁵ consisting of 70 gentle horizontal pencil lines placed at equal intervals on white canvas (which looks pale pink on photos) has a real-life prototype: a super-concrete lined notebook sheet. I am unable to reproduce more than a fragment of the painting here because the lines are almost invisible. Her paintings of an earlier period are grids, like graph paper. Yet in the context of art:



**Agnes Martin,
Untitled #7
(1984). Fragment.**

As critic Nicholas Fox Weber points out, "Where there is reduction the paring down gives the object a life of its own. The work, consistently, is profoundly human, as emotive as ancient ruins, ineffably rich behind the apparent leanness." (N. Fox Weber, *The Hannelore B. and Rudolph B. Schulhof Collection*, New York, 2011, p. 11). This sense of humanity is clearly present in the horizontal bands of *Untitled #7* whose human scale and meticulously executed painterly surface exude a serene calmness that is contained within the very best examples of the artist's work. Source: [Catalogue Essay](#).

A number of people have left evidence of their admiration of Agnes Martin's art. I cannot dispute their sincerity and have no reason to distrust their judgement. Yet I am sure no one can find ineffable richness on the front of the painting and there is only the lean signature and date "amartin 84" on the back.

Here is my major problem with belief.



**Coliseum :
a model of soul.**

"Do you really believe that you believe when you believe?"⁹⁶ This triple-decker question, which I want to ask each time when I hear "I believe," I also ask myself, but my "I believe" means only "I guess," whether rightly or wrongly, with or without some rational arguments.

I know that my behavior is shaped by my beliefs, but how I act is always a result of the triple wrestling match between my belief, doubt, and trust, with logic as an absentminded referee. I suppose, this is what happens in everybody's *soul*—a kind of the Roman multilevel Coliseum where gladiators and convicts fought animals and each other. Like the Coliseum, human soul has its visible from afar arcades and a hidden [underground](#) seen today in the ruins, where people and animals were waiting for their entrance onto the arena.

⁹⁵ Estimated at \$2,500,000 - 3,500,000, it was auctioned for \$4,197,000 in 2015.

⁹⁶ Is "I don't believe" also a belief? [Norman Lewis](#): "I don't believe in belief"

Speaking about animals, a fleeting *shadow* has passed through my mind. In the animal shelter of an art gallery, the *souls* of the confined artists look from the canvasses at the passersby in hope to find a master who would believe in them and take them home. (Myspeak! See how easy is that?).



To accept the “never believe a belief” is too cynical. Beliefs in the right and wrong are usually real. They could be too weak to guide our actions, however.

Collective beliefs envelop an invisible, intangible, and undetectable body, like in inverted *Emperor's New Clothes*: emperor's new body. In the midnight of reason, you can be killed for wrong colors of your necktie.

Every belief, individual or collective, is ultimately about the future. Every ideology and every religion I know—with economics balancing between ideology and science—is a promise of a future reward or loss, punishment or prize. So are every political promise, spiritual movement, self-help guideline, nutritional fad, cult, current medical craze, and all advertisements, many of them truthful. The hallucinatory future throws the equity market, on which the wellbeing of many people now depends, into its tremors and bipolar swings.



The past can also be a matter of belief, but it cannot be changed, unless in the future, as the ideology of German past and Russian present illustrates.

There is a future, but the future **does not yet exist**. The invisible **future** fills up the visible clothes of our civilization with promise and threat. In a more than metaphoric way, the global economy, including the abattoirs and meat grinders of the African and Middle East wars, makes and packs the future like frozen hamburgers. But what does it have to do with art?

Modern visual art is a mysterious domain of human matters. It cannot quite fit the Knot of [Essay 59](#). It is a peculiar and utterly human strand of the Knot, in which ideas and Things are inseparably interwoven. There is something in art that becomes visible in modern times not as presence but as absence, like a cavity in X-rays. It is not an empty space, however: there is a filling made of something that I call *nexistence*.



Filling in
X-rays

Nexistence is a very strange thing. Does nexistence exist? Obviously, touching religion, I am asking for tooth pain.

Without the fetters of matter—something shared, visible, audible, wearable, or touchable—spirit can escape, evaporate, and join the clouds in the sky because airy thoughts dissipate, mutate, and recombine at the speed of fruit flies, if not molecules. Clay, papyrus, and parchment were the first sticky papers for catching thoughts, later to be bound between the covers of books.

Artwork does not promise any particular future, except some resale value, nor has it anything to do with social order and political structure of power. Still, there is a subtle and amusing similarity between modern art and religion as Durkheim saw it. It can be seen in modern secular

creeds such as movements for freedom, justice, and equality. The problem is that when you deal with **nonexistence**, your enthusiasm, imagination, and creativity can focus on **existence** with a limitless intensity. This is what modern art demonstrates: anything is possible, anything goes, and anything sells (but not “everything goes” and “everything sells”). Modern art, lodged between flea market and stock market, is full of effervescent and exuberant extravagance. Becoming a professional revolutionary, you have to show more and more brutality in your art, pierce your canvas with a knife, burn it, or bleach the canvas to kill all germs of visual appeal.

Here is one of Durkheim’s most important reflections and an example of what ritual pattern—or pattern in general—means. I quote:

Nowhere can a collective feeling become consciousness of itself without fixing upon a tangible object; but by that very fact, it participates in the nature of that object, and vice versa. Thus, it is social requirements that have fused together ideas that at first glance seem distinct, and through the great mental **effervescence** that it brings about, social life has promoted that fusion (page 238; see? I have read more than the Conclusion).

We have seen, in fact, that if collective life awakens religious thought when it rises to a certain intensity, that is so because it brings about a state of **effervescence** that alters the conditions of psychic activity. The vital energies become hyper-excited, the passions more intense, the sensations more powerful; there are indeed some that are produced only at this moment. Man does not recognize himself; he feels somehow transformed and in consequence transforms his surroundings.

To account for the very particular impressions he receives, he imputes to the things with which he is most directly in contact properties that they do not have, exceptional powers and virtues that the objects of ordinary experience do not possess (page 424).

Figure 9.2 illustrates a new global ritual often observed during street riots. Its pattern roots go back to human heads on spears, the ritual which, slightly modified, is still practiced by Islamic terrorists.



Figure 9.2. An effervescent riot ritual: overturning a bus.

Left to right: UK, 1981; China, 2005; Senegal, 2012; Egypt, 2013; Ukraine, 2014.

Modern art is the riot that has become norm.⁹⁷

In the context of time, the *Black Circle*, *Black Square*, and similar paintings of Kasimir Malevich (1878-1935) in which the title is an exact and full description of content, look like a peaceful exercise in overturning a bus. The pattern of overturning covers the emergence of abstract art, which at the age of maturity takes the form of painting and framing the titles alone.

⁹⁷ This my formula is inspired by the best explanation of the historical pattern of Russian history that I know, first formulated by Marquis De Custine (1790 – 1857): martial law that has become norm.

For a pattern hunter like myself, any similarity is a fair game.



“This is how we punish the traitors,” French etching, 1789

What I have unexpectedly discovered looking at modern art is that beliefs are plastic as much as rigid, stubborn as much as adaptive, dull as much as chameleonic, and conservative as much as forward-looking. They can outlast the climatic waves of fashion like grass rising after the waves of frost and drought, and they can vanish like the morning dew. They are deeply and imperiously entrenched in existence, giving it shape and structure, but taken out like a sea snail from its richly adorned conch, they display a slimy body shrinking under the sun.

Art as (almost) religion is a recurrent theme. Albert Einstein considered both branches of the same tree. Here is my most recent catch:

Art is almost like a religion. It is what I believe in. It is what gives my life dimension beyond the material world we live in. [Hannelore B. Schulhof](#).

It is usually “almost” or “like.” There is a reason why art is not religion: there is no Art but Art. There is only one Art while there are many irreconcilable religions and sects.⁹⁸ More importantly, art neither promises nor delivers you any guaranteed reward or punishment.

Art in the free world is gentle, peaceful, and harmless even if it looks ugly, offensive, and threatening. Art is not supposed to hurt you, bring good luck, or have any magic powers. Francis Bacon will never jump out of any of his self-portraits the way it happened in the [story by Nikolai Gogol](#).⁹⁹



Francis Bacon (1909-1992) Self Portrait, 1971

Like gift is recognized by wrapping, art is recognized by its settings. Even then, you need to believe that what looks like modern art is indeed art. If you do not, you may not recognize a urinal, vacuum cleaner, sleeping woman, and a pile of candies as a piece of art even on the premises of an art museum.

Although the belief, which I share, that art is what is called, exhibited, and sold as art is wide spread in the West, it is not universal because the form and content can contradict the viewer’s beliefs and experience (this looks like *alief*, see footnote 38). Modern art is profoundly nonconsensual and divisive, but as forgivable as a child’s prank.

All that playful evasiveness and volatility of art may cause some mistrust and need of certainty. You need some direct procedure to recognize art as art. There is an old principle “you know when you see it.” When an artwork has been sold, its quality and authenticity is already of no importance and out of the question: it has been sold! *Ergo*: art. You know it when it sells.

⁹⁸ Abstract art has a commodity potential. There are web sites that sell different styles abstract paintings on order.

⁹⁹ [English translation](#) (alternative title: “The Mysterious Portrait”). Gogol (1809 – 1852) was the most quintessential Russian writer. He left a still illuminating encyclopedia of patterns of Russian life, written in all registers of beautiful language.

I suggest a version of the Turing test for art: an object should be presented to a person in an environment drastically different from that of a museum: best of all, in a dump. A painting should be without frame, on a canvass of irregular outline, moderately dirty. A sculpture has better be slightly damaged, an installation somewhat ruffled. Squeamish folks can run the test in their imagination or from a photo “discovered” in a wastebasket.

To recognize a photo as that of art, you need to identify art when it is **not yet called, exhibited, sold, or bought as art**, or at least you do not know anything about it. Can you try that on your friends? Ask them to try it on you? Please.

I need to remind here that neither anybody nor I have any reason whatsoever to launch an invective against art because art, like history or any natural accumulation of things and data, is as innocent as family photos and as blameless as the rocks we stumble upon.

Let us take an example of art known to be especially divisive and even offering some quantitative measure of division.

Figure 9.2 shows two paintings separated by 440 years but somehow linked in artspeak.

Although there is a lot of material about Cy Twombly (1928-2011) online, it is not easy to find a good reproduction of his painting *Achilles Mourning the Death of Patroclus* (1962). It can be [seen under magnification](#), also [here](#). Unfortunately, the Web does not reproduce the important for Twombly (as well as for Barnett Newman and others) effect of its large size, 259 x 302 cm (8'6" x 10').



Figure 9.2. Cy Twombly, *Achilles Mourning the Death of Patroclus*, 1962, and its enlarged fragment; bottom right: Hans Holbein the Younger, *Dead Christ in the Tomb*, ca. 1522

The painting consists of two spots looking like dry blood tainted with black soil. It also has some pencil scribbles, the largest of which repeats the title. There is a short but typical [story](#) related to the impact of the painting. There are testimonies about the strong effect of the work on the viewers. Art is always ready to lend a frame for the picture of your emotional state.

The following two testimonies of two professionals seem as incompatible and irreconcilable as Christianity and Hinduism or Buddhism and Islam. This is what makes art look **like** religion.

Testimony 1.

His [Achilles'] body is brought back to the Greek camp, where Achilles openly expresses his grief: it is this terrible scene, a magnificent example of male bonding, that Twombly translates into *Achilles Mourning the Death of Patroclus* with an extreme economy of means. Only two red shapes—two spots of this sublime and bloody pictorial mess typical for Twombly—as if thrown on the canvas and spread with hands, dominate the impressive pictorial field. Below, the crossed out pencil inscription "Achilles Mourning the Death of Patroclus" seems to suggest, by its underscored horizontality, an elusive and fleeting presence of a body—in the tradition of *Dead Christ by Holbein the Younger* [emphasis mine, Y.T]. Both exemplary and unique, with a violence as much restrained as extreme, this work has no equal in Twombly's painting.

From catalogue *Collection art contemporain - La collection du Centre Pompidou*, source: [Jonas Storsve, original in French](#). Translation is mine.

Testimony 2.

Small children make marks on paper and then explain that this is a horse or an airplane or Mommy, and we willingly concede this; but ought we to do the same with artists' intentions? In 2005 I saw in the Pompidou Center a Cy Twombly painting titled *Achilles Mourning the Death of Patroclus*, the main features of which were a red and a black swirl of paint, the first labelled "Achilles" and the second "Patroclus": on the wall next to the painting were quotations from Twombly to the effect that this painting expressed how much he had been moved by the *Iliad*. The way they presented Twombly's remarks suggested that the curators of the exhibition were as willing to find, and as willing for the public to find, all the pathos of Achilles' grief in these swirls of paint as a parent is to see Mommy in the child's squiggle. And of course once one's imagination is set in motion, one can "discover" all sorts of "mesh" between the work and its presumed meaning – for example, between the color red and Achilles' anger, the color black and death.

Henry Staten, *Art as Techne, or, The Intencional Fallacy and the Unfinished Project of Formalism*. In: *A Companion to the Philosophy of Literature*, Garry L. Hagberg, Walter Jost, editors, John Wiley, 2015, p. 424 ([available on Google Books](#))

What is there to believe?

There is some asymmetry in two accounts. Testimony 1 is a completely subjective and self-contradicting exploitation of artspeak: "sublime and bloody pictorial mess," "as if ... spread with hands," "impressive pictorial field," "seems to suggest," "elusive and fleeting presence," "both exemplary and **unique**, with a violence as much restrained as extreme," "this work has no equal in Twombly's painting," "mess **typical** for Twombly." [Unique **and** typical? A typical artspeak]

Does the author really believe his words? I wish I could see in *Achilles* anything sublime, restrained, and looking like Holbein, whose Christ is anything but elusive.

Henry Staten relies on common sense and his personal experience. He denies any interpretation except what is supported by the senses of observers and is beyond belief. But he, too, speculates:

“...remarks suggested that the curators of the exhibition were as willing to find, and as willing for the public to find...” This is belief. Or doubt.

Why do I feel the same way as other Twombly unbelievers, even though I agree that it is a bloody mess, only not sublime? Why am I so suspicious and distrustful? It is impossible to argue pro or contra and artwork without belief. What are the facts? Do I need to go to Paris to decide?

The undeniable fact is that *Untitled*, 1970 (**Figure 9.3**), an archetypal squiggle by appearance and mode of production was [sold for undeniable \\$69,605,000](#). This is modern art and there is nothing to guess and doubt.¹⁰⁰ In spite of all controversies, Cy Twombly’s paintings, including blunt scribbles on a blackboard (canvas blackened with house paint), were bought and sold for millions of dollars.

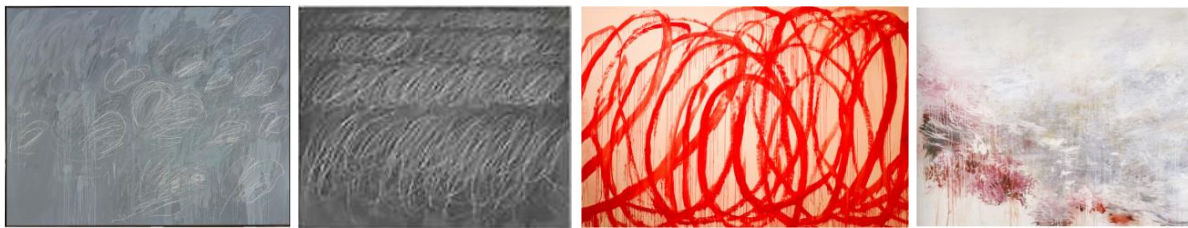


Figure 9.3. Cy Twombly (1928-2011). Left to right: *Untitled*, 1967; *Untitled*, 1970; *Untitled VIII [Bacchus]*, 2005; *Hero and Leander (IV)*, 1984). See [extensive gallery](#).

It is undeniable that many Web denizens who visited Centre Georges Pompidou in Paris, where *Achilles* is exhibited, express their unambiguous fondness of the large painting. For example (Glen Dasilva): “Some people describe Twombly’s work as scribbles. I enjoy this painting.” *Bacchus* and other effusively sparse paintings of Cy Twombly also have fans in the unaffiliated public.

Twombly’s [obituary in The New York Times](#) in 2011 had 186 reader comments. Out of 134 clearly expressed opinions, 70% were positive to the degree of adoration. I noted a religious overtone: “This type of painting is a form of advanced prayer.” There was no reason for the readers to be insincere.

The diverse comments clearly clustered around two focal points. The positive comments extolled the fact of **human** achievement, a kind of *he made it*, while the negative ones looked at **artistic** achievement and found something like *he made nothing*. A few knowledgeable fans refer to Roland Barthes who wrote about Cy Twombly. Here is the orchestral *tutti fortissimo* conclusion of Barthes’ article on Twombly’s “scribbles:”

TW’s art—this is its morality, and also its greatest historical singularity—*does not want to take anything*; it hangs together, it floats, it drifts between desire, which subtly animates the hand, and politeness, which diminishes it; if we required some reference for this art, we could go looking

¹⁰⁰ [Nouriel Roubini](#), the famous economist, the Cassandra of 2008, and art collector, finds a lot to doubt. Also, Google: “modern art” + “tax evasion” + “money laundering.”

for it only very far away, outside painting, outside the West, outside the historical period, **at the very limit of meaning**, [emphasis mine, *Y.T.*] and, say, with the Tao Tê Ching:

He produces without taking for himself,
He acts without expectation,
His work done, he is not attached to it,
And since he is not attached to it,
His work will remain.

Quoted from: Roland Barthes, *Cy Twombly: Works on Paper*, in: *The Responsibility of Forms*, New York: Hill and Wang, 1985, pp. 175-176. [Available on Scribd](#).

As for the affiliated authors of lot comments at Twombly sales, they display breathtaking artspeak fireworks of truly imperial grandeur and I cannot help emitting in this sentence an art-squeak of my own.

Sebastian Smee (*The Boston Globe*) [sounds ambivalent](#):

Like so much of Twombly's work, it's right **on the edge of being nothing** [emphasis mine, *Y.T.*]: a desultory blackboard scrawl. Mere graffiti. An insult. A provocation. And yet, even in the context of RISD's crowded and star-studded modern and contemporary displays, it has a tendency to still roving eyes.

Sebastian Smee's casual impression of "scribbles" does not sound like artspeak to me. It is an observation, a fact. It can be explained and debated, while artspeak is sacred and not debatable. Sebastian Smee's intelligent and elegant [obituary of Twombly](#) is no typical artspeak either. When he points to "exquisitely perverse sense of composition," I see in *Achilles* what he means. Roland Barth can be, at best, noted and taken to account.

"To still roving eyes..." The live impression is strongly influenced by the current moment, mood, atmosphere, ambience, companions, and preceding events that could go back decades. However skeptical, given a favorable ambience and mood, I could have my eyes stilled by the two black-red spots and imagine on the remaining white field a chapter of my own life—or the whole of *Iliad*. **Two** means a lot: the foundation of human nature and all literature about it. Human nature displays between minimum two humans.

I consider Cy Twombly an outstanding—far beyond the scribbles—figure of modern art, much more diverse, impressive, intriguing, arresting, and much more interesting than his postmodern co-stars who have survived him. This is why I include his colorful, hypnotic *Hero and Leander* in the otherwise "desultory" **Figure 9.3**. I neither like nor dislike him. Details of his rich personal life are of no importance to me. He is part of history, not of my attractions.

I dislike minimalism because of my origin and background. I was brought up in a scarce world where it was believed that human labor could potentially make the world richer. I love complexity and both the process of its **creation** and the process of simplification known as **understanding**.

Here is my personal problem with “blackboard scribbles:” their complexity is so negligible, so “on the edge of being nothing,” so “at the very limit of meaning,” that any opinion cannot be either supported or refuted. Anything goes. This is *nexistence*: something, almost nothing, but with real emotional and monetary effects. The best embodiment of *nexistence* in art, its true hyper-realistic portrait, is the blank white canvas. To sell such picture today [for \\$4.3 million](#) you need to make six vertical knife slashes on it, as Lucio Fontana (1899-1968) did long ago in his *Concetto Spaziale, Attese* (*Spatial Concept, Waiting*; 1967). The slashes of Fontana or burns of Kasper Sonne look like a further way to decrease existence and flip it to negative values.



A **B**

A: Lucio Fontana, *Concetto Spaziale, Attese* ; B: Kasper Sonne, *Borderline (new territory) No. 11* (1912).

The route from the object to its description in artspeak is strictly one-way. It is impossible to imagine and reconstruct the object from its artspeak representation. This applies to minimalism in general and most of modern art. The viewer is completely free to feel anything. There is nothing to simplify (= understand). At least, there is something to celebrate: freedom. Do I need to repeat my mantra “Art is what...” etc.?

“On the edge of being nothing” is an excellent expression for what I call *nexistence*. It also applies to the category of **future**, which is where *nexistence* reins uncontested. Future is always on the edge of being nothing and turning to the presence. The past, however, is never *nothing* for as long as it is remembered, even if the memory is false.

Art, like most of human matters, is based on belief, but even science starts with a belief (hypothesis) or disbelief (discovery). The difference of classical art from modern one is that belief in the former is supported by the context, visual and informative, as well as human experience, knowledge, and memory.



Figure 9.4. Fact and belief. Left to right: Rembrandt: *Prodigal Son*; *Head of Christ*; Picasso, *Guitariste* (1910-11); Mondrian, *Flowering Trees* (1912); [project sketch](#) of Y-Block, Oslo (fragment).

The context in Rembrandt’s *Return of the Prodigal Son* (**Figure 9.4**) is obvious for anybody familiar with the Gospel of Luke, but his *Head of Christ* (one of several sketches of the same model) asks for less literal beliefs, unless both pictures are regarded simply as illustrations to a text. For some of Rembrandt’s contemporaries, his heads of Christ were offensively modernist. There is nothing obvious in them to associate with Christ, as there is nothing to associate the painting *Guitariste* (Picasso, 1910-1911) with either a woman or any musical instrument, unless we believe the title, the commentaries, or exert our imagination. Piet Mondrian’s *Flowering Trees* can be called, anachronistically, *Y-block, Oslo*. Cy Twombly used to turn our blindfolded imagination in the right direction with a dollop of **existence** in the form of scribbles on his paintings.

Everything in religious or ideological belief is belief. The behavior, which is the only possible evidence of a belief, could be opportunism, conformism, delusion, transient mood, or conscious deceit. In an authoritarian society, it could be sufficient to declare publicly the required statement of faith to be left in peace. In a totalitarian society, however, like it was in the Communist Russia, Mao's China, and is in the Korea of the Kims, one had to confirm it by daily behavior and participation in rituals.

Consensus over perception could be shaky, but it is possible. If nine randomly selected people say that this is a red dot circle (spot, disk, circle) → ●, it exists, even if the tenth witness disagrees. The presence of the red dot on this page can be proved beyond the shadow of a doubt. This is true about the dot, but may not be true about a "guilty" verdict, medical diagnosis, scientific hypothesis, and any majority vote on arts and human matters in general.

Everything in human matters is debatable. The tenth witness could be right and the nine others wrong. What was right yesterday could be right today. What is right today may horrify you tomorrow. Religious fundamentalists can split hair on what was consensual for millennia: who is alive, who is born, and who is dead. Belief is a ticket with its admission stub torn off.



If a young modern artist relies on "Practice!" to get to the Carnegie Hall of art, it is better be practice in overturning the bus.

After 85 pages of this Essay, can I say some fundamental truth that would be not just my own belief but something at least pretending to be provable or at least reasonably hypothetical?

Alas, I cannot. I can see in art nothing but myself. Art is a mirror.

10. ART AS MIRROR

I see a painting. It is a thing made of wood, canvas, and paint. I can describe it as a picture of a young woman with long hair in a strange big hat (**Figure 10.1B**) because whatever it is, I can list all its recognizable components, even if they are small dots and flecks. My description will not be enough to reconstruct the picture, least of all from the “young woman in a hat” title alone. The short description “six rows of dense white spiral squiggles on black background, 68 x 90 in” (**Figure 10.1C**) is a more informative and better reproducible one. There is a chance that a reconstruction will be close to the original.

The “squiggles” of Leonardo da Vinci¹⁰¹ (to whom Cy Twombly’s was once compared in ecstatic artspeak) show the entire distance between Renaissance and Art Reformation (**Figure 10A**). I measure the distance neither in centuries nor in content, but in complexity.

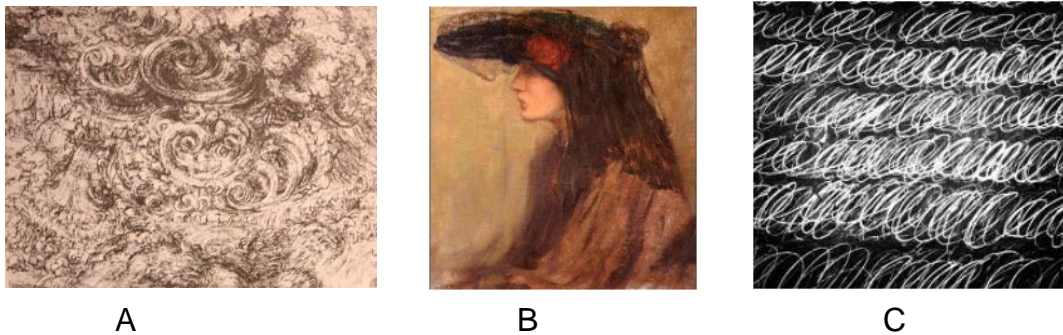


Figure 10.1. Art space and art time.

A: Leonardo da Vinci, [Drawing of a flood](#) (c.1500) ; **B:**František Šimon (1877-1942), [Young Woman in a Hat](#), ca. 1900; **C:** Cy Twombly, *Untitled* (New York City), 1968. 68x90" (172.7 x 228.6 cm). Sale: \$70.5 million in 2015. [Catalogue note](#). [Video](#).

Barnett Newman’s paintings are so simple that they can be probably reconstructed (*forged* is a better term) from measurements of geometry, color, and the well-known technique of his *zip*.

¹⁰¹ In his later years, Leonardo da Vinci was preoccupied with water, flood, forces of destruction, and the end of the world. See also his [A Deluge](#). We are in his steps today.

In visual arts, everything is *concrete* in the sense of the *perceptual*, especially “abstraction,” and nothing is *abstract* in the sense of the *conceptual*, except the frills of the artspeak wrapping. “Abstraction” in art means, paradoxically, something so *concrete* that it can be described well enough for credible reconstruction, materialization, and multiplying in many variations. It is a dish with a simple recipe, like French toast. This comparison means that (1) it uses a technology and (2) it can be enjoyed or disliked. In addition to artistic techniques, modern art appropriated the main contribution of its native century: technology.

The objective properties of art, whether simple or complex, connect all art into a single **art space** in which there are pathways of transformation, short or long, from any “recipe” (more respectfully, individual style) to any other. Thus, in the art of cooking, if you have a recipe of Italian Wedding Soup, you can turn it into the recipe of Lasagna by changing the ingredients, sequence of stages, and parameters. We can do it one change at a time, so that each step of transformation will be between close neighbors. Naturally, many intermediate dishes between soup and lasagna can be inedible because some ingredients do not go together, but maybe we should still try them before rejection. Meals, therefore, make an abstract space in which you can travel from one point to another.

As for squiggles, we can move by a series of changes from Leonardo da Vinci to Cy Twombly and, unbelievably, back, which by no means justifies taking any rapturous catalogue notes literally.

In my culinary analogy I use the idea of the book *How to Bake a Pi : An Edible Exploration of Mathematics* by Eugenia Cheng (Basic Books, 2015). It is about category theory, a branch of mathematic so abstract that some mathematicians consider it mathematically inedible. It is a matter of individual taste, of course. Category theory is not described in the book, however, only what can you do with it. It is an invitation to the party of abstract mathematics without letting you in.

Pattern Theory of Ulf Grenander, which is my personal obsession and foundation of spirospero.net, has a high level of abstraction. Nevertheless, it is applicable to anything concrete, including human matters, individual and global, for which hard science loses its edge. Pattern Theory is a kind of a mathematical chemistry (if not physics) of Everything and its transformations. Its secret is an element of personal “taste” (selection of generators and a template) together with quantitative measure (probability or energy).

Creation is a process, and time means physics. Chemistry is physics of molecules, i.e., **individual structures**, each being the only one in the world¹⁰², and their change into each other. Should I say *creatures* instead of *structures*? Close enough. *Creations*? That’s exactly my point, but I have yet a counterpoint to make.

An artwork, for example, any of the three pictures in **Figure 10.1** (I will come back to the woman in a hat later), belongs not only to the art space open to all, but also to a different parallel

¹⁰² While chemical structures are individual, molecules of the same structure are multiple like clones. Structure is abstraction (property, idea), and this is why two equal structures is just one, while there could be millions of equal screws and other Things.

universe: the **perception** of art by any individual in the public, of which I **am the only one** I can observe in full, inside out.

My impression of any artwork consists not only of what I see, but also of what I feel and think in front of it as well as between our meetings face to face. This is what I mean by art as mirror that shows me only myself. “Mirror” is just a metaphor and it should not be taken too seriously, or we would drown in philosophy of subject-object relation.

What I want to say is that my perception of the painting is as unique as the painting itself. In a sense, the painting and I are of the same blood of uniqueness, which does not prevent us from various similarities with other humans and paintings. We, individuals, also inhabit a space where we are split into species, families, orders, etc., quite like plants and animals; so do artworks and artists (ART AS TREE).

The perceptions by other people are unknown simply because we cannot read other people’s **minds**. Someday, a successor of Apple or Google or Amazon will develop a system to crack human mind—we are already skilled in manipulating it—but I, retrograde as I am, hate to think about the future in which the difference between humans and robots disappears. But I am ahead of ART AS FUTURE. Instead, I am going to my own **past** stored in the vaults of my own mind.

Next, I am coming to my first electrical contact with modern, by mid-20th century standards, art of painting: Josef Sima.

It was in late 1960’s, in a dark, bleak, brutally polluted Siberian city with empty shelves in the stores. May I still allow myself a little *myspeak*, a cousin of artspeak? Thanks.

Siberia had scarce indigenous population. It was colonized by Russia in the 16th century and developed by generations of former escaped serfs, prisoners, exiles of Russian czars and Stalin, and WW2 refugees who did not return home. Surrounded by hills, the city of Krasnoyarsk¹⁰³ straddles the powerful majestic Yenissei River with its perpetual nervous shivers along the spine, as if foreboding the Arctic Ocean, its final destination.

Living alone between two marriages and a few impenetrable to nails concrete walls of a small standard Soviet apartment, I was a frequent visitor of the old and rich local library. Scores of pre-Soviet Russian books in its “special” storage were forbidden to give to common Russian public. Young librarians secretly supplied me with famous, quoted, referred to, but unreachable books, which I needed in my search for the Czarist roots of the Soviet empire. The roots have survived to this day and the current tree of Putinism has grown high and wide on them.

Who could imagine in the pre-1914 word that the empire of the czars would fall soon? A few could imagine in the post-1945 world that the Nuclear Empire of the Communists would rise. Even less could foresee its fall by the end of the millennium. But that was already the time to foresee the current

¹⁰³ Krasnoyarsk, founded in 1628, a center of a giant region, has been by now transformed, beautified, packed with universities, theaters, and concert halls, and grown to 1 million residents. It is still the [third most air-polluted](#) city in Russia.

restauration of the Czarism by Putin. This experience makes me worried about the future of America. History is not just about the past. It is about the **unthinkable** future.

As for my personal history, I was about to meet my future wife in the library—a future that somehow has escaped turning into past.

By that time, already deeply immersed in classical music, I discovered the music of the 20th century. Dmitry Shostakovich was aggravating my depression with his bubbles of optimism in the dark brew, while Bela Bartok was hitting me out of anguish by his bitter dissonances, skepticism, and refusal to surrender to both barbarity and beauty. Buying all vinyl LP records I

could find, I ran into a Czechoslovak record, I do not remember which, with a reproduction of a painting on the jacket. It was *The Return of Theseus* by Josef Šima (Šíma; sounds Shima).



Josef Šima (1891-1971), *Návrat Theseův*, (Return of Theseus), 1933. [Source](#).

Theseus, a mythical Greek hero, had promised his father Aegeus to put up white sails as sign of his victory over Minotaur, but he had forgotten his promise and left the black sails on the mast. His grieving father committed suicide, plunging in the sea of his name.

I had glued the picture to the nail-resistant wall and it became a part of my personal mythology. It was

unlike any artwork I had seen before and it was stirring some very vague forebodings in my soul under Cold War tension, totalitarian idiocy, and the recent (1968) Russian invasion of Czechoslovakia .

Here in America, I often searched for Josef Šima on the Web in vain until our happy reunion about ten years ago. Recently, I have cast a net into the Net again and found much more materials about the artist. It turned out that Šima was still alive when his Theseus and I had met each other for the first time. As for the picture, it is on my American cardboard-plaster wall again.

At the first glance, I had been struck by the clouds in the sky. Hovering over the grassy sea, they were unmistakably made of stone.

It is hard to say whether the sail is really black or just looks so in the dense shadow of a cloud. Šima is often presented as surrealist, but I see him as a symbolist—the style which, like surrealism, is unthinkable without content. I saw the picture as a metaphor, here a visual one, which is the essence of poetry. I thought the *Return* was about the future caught in the moment of its catastrophic turning into the past. Cornelia Parker's squashed and silenced but still

glimmering brass instruments, stopped in their fall on the floor, like Sima's clouds, flicker in my prone to associations mind.

Now, in 2015, numerous works of Josef Sima are scattered all over the Web ([example](#)), with comments in English, Spanish, French, and, of course, [Czech](#) . **Figure 10.2** shows some of his other works, but I am more than ever certain that the *Return* is unique.

Wandering over any new domain of reality, we accumulate a stock of distinctions between local goods and habits. We begin to judge it not by differences from other domains, but by internal standards and practices. We lose most of the reasons for hostility and outright rejection. This happened to me when I started this Essay. In a modern art gallery, you can pat Minotaur all day long. Wading under the dripping stone clouds through the littered grassy seas of modern art, I lost my initial prejudice against its aggressive, provocative, deceitful, vulgar, and exploiting denizens and found there something to feel at home and to be comforted with, for a while, before returning home.

Modern art without any human or other living presence on the canvas leaves me mostly indifferent. Symbolism and surrealism are my most comfortable artistic movements. Like poetry, which uses human language in the way we never speak in everyday life, surrealism paints the world that we never see around but still easily recognize, like the headless but still human torso in **Figure 10.2.1**.



Figure 10.2. Selected works of Josef Šíma.

1. Untitled; 2. Scenery; 3. Portrait of a Dancer; 4. A Whore of Barcelona (1940); 5. Europa (1927); 6. Composition; 7. Return of Odysseus, (1943); 8. Untitled; 9. Sea (1960) 10. Untitled (1967). Sources: 1, 6, 9: [A](#); 2: [B](#); 3: [C](#) ; 4: [D](#); 5: [E](#); 7: [F](#); 8: [G](#); 10: [K](#). Credit for 3 and 10: [Ras Marley](#) (a treasure of a site).

The minimalist Soviet reality was as boring as a straight line. The curved with passions human body of it was not. Human nature is the most stable and conservative factor on Earth, more than our rivers, woods, and mountains, but it has the same inexhaustible variability.

Looking into the art mirror, I begin to understand why I dislike minimalism anywhere in arts, except literature. In my youth, I was obsessed with Ernest Hemingway. I love understatement and everything that stimulates my mind with incompleteness. I enjoy surprise, novelty, unpredictability, probably, because in my insulated Soviet childhood in a small apartment of a bleak provincial Ukrainian city (much brighter, it seems, now) it could be found only in books, music, and movies. Another reason could be the respect for human labor and contempt for laziness, both deeply implanted into my childhood values.

Art as mirror means that the live perception of an artwork is an encrypted—subconscious—look at yourself, your own space of childhood, school, upbringing, family, youth, love affairs, politics, and the rest of life, up to the current weather, a recent phone call, and latest troubling headlines. The perception can turn around in an instant, lose the charm halo, or, on the contrary, envelop itself in sweet haze. Recently, having finished a small brilliant book (*Jenny Offill's Dept. of Speculation*), I was so excited by human talent that I would probably be able to praise Damien Hirst's polka dots in artspeak. If you love something, you love everything around.

There are reasons for everything. Why is Rembrandt holding a special place among classical painters for me? Even before I saw my first Rembrandt at the Pushkin Museum in Moscow, I had heard, as a child, a radio play (it was the pre-TV era) about his life. It deeply moved me. The sorrowful sigh “O, Rembrandt, Rembrandt!” still sounds in my ears. I am looking at the *Return of Theseus* 45 years after the first impact and I feel the hot waves of memory.

How do I feel them? This question opens for me the third space of art: **physiology**.

It is well known and described as goosebumps, shivers down the spine, and even “musical orgasm” (Google it). I feel it as a sudden hot wave in my chest and a constriction in my throat. In visual arts, only Velazquez and Rembrandt used to give me that peculiar sensation, if I was in the mood, but with my Odyssey through modern art, it happens more often. In science, it is the moment of invention, discovery, understanding, and solving a difficult problem. It has a tinge of recognition and something of reliving a dramatic past event, like passionate love, shameful failure, painful loss, or escaping a terrible disaster.

I formulate it as a combination of the seemingly incompatible **recognition** and **surprise**. This is what I am looking for in literature, poetry, music, and movies.

“We feel nostalgia for a place simply because we’ve lived there; whether we lived well or badly scarcely matters.” (Michel Houellebecq, *Submission*, Farrar, Straus and Giroux, 2015, p. 217).

My image of this sensation is the sudden fizzling of carbonated water, quiet in bottle but effervescent when poured into a glass. I also find it similar to a mild electric shock. It does not come automatically as response to the same pieces of art, but depends on the environment, mood of the moment, the overall level of wellbeing (preferably, low), and preceding or pending events. I certainly reject the terms like “awesome feelings,” “ineffable essence of existence,” or “state of being.”

Here is a fresh example. I was looking on Google for Josef Sima. At the Flickr site of Ras Marley, full of rare art, I ran into a [picture of a woman](#) in a strange hat and felt the familiar shivers down my spine. It was *Young Woman in a Hat* of Simon Frantisek (1877-1942), an interesting artist and compatriot of Josef Sima. I had never heard about him before.



I see no clear reason why I was *electrified* by this picture. I have a weak guess, however. It was a **familiar** generic profile of a young woman in a **surprising** hat that made her look like a rat (**Figure 10.3**).

Figure 10.3. Recognition and surprise. A rat in the hat.

My favorite poet is Reiner Maria Rilke (1875-1926). The poets I love, including Rilke, sound like nothing one can hear in the street, in a company, or, actually, anywhere. Logically, genuine poetry, quite like modern art, does not make much sense, unless you are tuned up to it. You have to believe in it or just love instinctively or because you see something of yourself in it. Poets are not mad, however. They just do not want to say plainly what they feel, like abstract artists who do not want to paint plainly what they see (this is yet another reason why it is wrong to see this Essay as an attack on modern art).

"...I essentially am not in madness, But mad in craft." (*Hamlet*, III. iv. 187-8.).

I used to read poetry, waiting for my uncontrollable response with **extremely rare** physical sensations and emotions. I expect the same from music, cinema, and other arts. I got the same feeling right after having solved a difficult scientific or technical problem. It is the rarity of this feeling that makes it so treasured.

The mirror of art is hazy and buckled, but at least it can be trusted: it cannot **show** what does not exist. It does not show a big world where the eye can be lost: it shows the viewer, as mirrors do. What do I see there about myself?

Artwork exists in several real dimensions: materials, size, age, amount of artistic labor, price. Labor, originality, imagination, complexity, and intensity cannot be quantified, but they can be loosely compared for any two works side by side. There are also countless transcendent dimensions, like sublimity, simplicity, intimacy, intensity, emotiveness, ambivalence, efflorescence, nobility, brutality, etc. They are expressed in artspeak, which is the inflated language of lot essays and comments at auctions, reviews, and art books. Together they cover the issues of meaning (ostensibly) and price range (furtively). There is also content: a formal dispassionate description of the image as seen by disinterested people. Most viewers can agree, for example, on "this is a stylized drawing of a horse," or "that is a series of alternating 6 horizontal pale pink and 7 pale blue stripes" (Agnes Martin, *Happy Holiday*, 1999) or "a high relief of a winged human-bull chimera." The content can be referred to outside sources, as in classical paintings on biblical themes.



Meaning is the cloud where nexistence rests. It is a guess of artist's intent, personal impression of an art reporter, interpretation of the symbolism of the flowers in a vase, and so on. In modern times, artist's own narrative of intent at an interview is explicit but impossible to verify. The meaning can be a mix of reason, emotion, and distraction.

While I am writing these lines, there is a small group of picketers [protesting display of August Renoir's paintings](#) in Boston Museum of Fine Arts. The reason: Renoir was a bad painter. "Renoir sucks."



Modern art as a whole is a kind of performance art in which an immediate instinctive reaction of public is expected and manipulated. Art is the wind in the neighborhood, to which different chimes respond with different sounds of the same timbre.

Do we love or hate a particular person, artwork, company, gadget, or in fact some principle that the objects represent, or, even deeper, some pattern, event, awkward situation of our past related to the principle? To reach the heart of the matter, do we love or hate something in ourselves? Do we love something because it flatters us or strums our pleasure strings? Nexistence does not exist, but some of us see and praise it and, maybe, even believe in it. What can they see in it but themselves?

A confessed narrow-minded minimalism-hater, I could not understand how anybody can like and praise the scribbles of Cy Twombly when I first discovered them. In my heart, I still do not, but I see in them my regrettable intolerance to something that has no relation whatsoever to myself. Still, paeans to Barnett Newman make me feel fretful and uncomfortable. What do his paintings tell me about myself that I did not know? I am diving into my memory (and Google) and... warmer... deeper... I am 18 years old... and here is what I am finding, to my surprise.

A year of weekly class of formal logic was part of my high school curriculum. We had a wonderful flamboyant and utterly non-Soviet-looking teacher of logic and psychology, who, unfortunately, often missed his classes. In my life, he was the first ever person who emanated active spontaneous intelligence—something impossible to see in Soviet life. Moreover, Semyon Moiseevich Vul was the only living example of what was called in books poetic appearance. After almost 60 years, I am still feeling his imprint: my interest in logical **abstraction** (!), which underlines my skepticism regarding artistic **abstraction**. After long search, I have recently found some details of his biography and creativity, together with a much later photo. Two more teachers imprinted me with interest in abstract mathematics and history, and I remember them gratefully.



Semyon Vul
(1970?)

Logic was difficult for everybody, but I was fascinated by its abstractness, power, and rigor. One of the four laws of logic, according to our textbook, was the law of sufficient reason: everything must have a cause. This law, I now believe, had shaped my attitude to doctrines for the rest of my life: I do not easily trust anything I am told—outside poetry—without rational explanation. That was also a reason why I began to doubt the doctrine of Soviet Communism: it was not only self-contradicting but also lacking sufficient reasons, a dogma to believe and, actually, the very first religion I knew. Buddhism was next. Christianity and, much later, Judaism followed.

Only while working on this Essay I learned that the law of sufficient reason was not a law of logic. It was a not universally recognized principle of philosophy associated with the name of Leibniz, although practiced already by Plato. Anyway, it was too late to reform a fervent rationalist, distrustful of dictates, imperatives, beliefs, and self-evident principles, but it taught me to look for the reasons of each of two irreconcilable positions even if both, as in politics, lacked sufficient reason.

Here are two samples of superb artspeak in which I emphasize, in bold print, a contradiction, as I see it.

(1) Dr. Roann Barris, Radford University, in [Barnett Newman and the Sublime: The Terror of the Unknowable](#).

If we can reduce Newman's goals to only three, they would be a call for an art which would embody **the essence of myth**, embody the sublime, and an art which would be the pure idea. This last belief is central to Newman's goals: that a shape is alive and contains the awesome feelings which a person has in front of **the terror of the unknowable**, or the sublime. But sublime terror is not the same as horror: horror is what you feel in the aftermath of tragedy, when it is too late to do anything. Terror is what you feel in the face of the sublime: humans can overcome terror through acts of creation and this is the value of art. Yet, this act of creation implies an act of starting over, and for Newman, this is the fundamental issue facing the twentieth century artist: the search for what to paint without making any references to previous artistic tradition.

(2) [Sothebys Auction Lot Note, May 2013](#) (Anonymous phone bidder paid \$43,845,000 for the painting) :

Along with other heroic artists of the Twentieth Century, Newman wanted to regenerate art and society through the invention of new forms of expression that could capture **the ineffable essence of existence**. *Onement VI* and its fellow paintings are not representational – they convey a **state of being and communion**.

In *Onement VI*, the single zip resonates within the canvas and with the viewer; it is described both by sharp tactile edges that retain a crisp memory of the delineating tape and by the gentle laps of marine blue that seep into the void of the cool light blue. Soft ghostly traces toward the bottom of the zip disperse as if into air, while deeper bleeds at eye level seek to bridge the gap of the zip from edge to edge, creating a spatial tension. The act of the pigment bleed is the locus of the temporal element in Newman's work that finds corresponding resonance with the temporal experience of viewing *Onement VI* at our **leisure and contemplatively**.

I do not see any sufficient reason for any of both statements basing on the appearance and history of *Onement VI*, but I see **a reason** for the dissonant duo. Art is nexistence and this is why you can say anything about it. It is you who exists and has some personal reason or subconscious urge to make a statement.

Of course, we cannot judge the auction lot notes by the same standards as academic research. The notes are utilitarian poetry and advertisement, as befits this particular genre.

Back to logic, it turns out, after having consulted Wikipedia, that the law of sufficient reason is not a law but a principle, and not of logic, but of philosophy, and it is controversial (as everything in philosophy, which I learned to like as a branch of dreary but imaginative poetry). Imprinted by rationalism, I had settled in science and remained, like an amphibian, at home in arts.

To criticize poetry and arts in general on rational terms is hopeless. Art is never objectively good or bad. If *Onement VI* was sold for \$43,845,000, however, there must be a reason for that, rational or not, but definitely simple and clear in advance.

Market is as hard on artists as professional boxing and football on sportsmen. It wears artists down. Success, like gluttony, deposits plaque in their creative arteries. Self-imitation (not to mix up with variations) reminds me of a revolutionary liberator gradually turning into a tyrant.

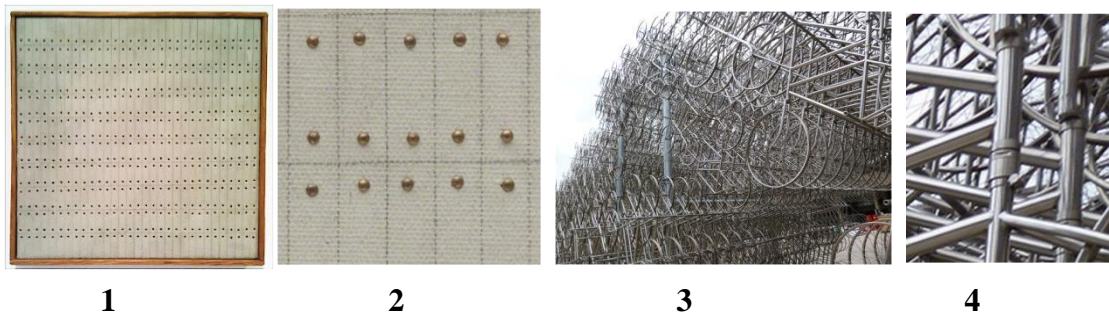


Figure 10.4. Monotony. Fatigue. Self-replication.

1, 2. Agnes Martin, *Untitled*, 1962 (with brass nails) ; 3, 4. Ai Weiwei, *Forever Bicycles*, Toronto, 2013 (not real bicycles). Photos (Flickr): 1. [Sam Beebe](#), 3. [Cameron Norman](#)

Self-imitation becomes self-multiplication, quite like the division of bacteria.

Figure 10.4 shows examples of what I do not like in arts: the bacterial self-propagation—the essence of boredom and the symptom of fatigue. At the same time, it reflects how I, imprinted in my schoolyears with formal logic, see the world as a pyramid built from single facts (terms) to more and more abstract ideas. It is also the vision materialized in information technology. This is why I see relations between objects, events, and phenomena that have nothing in common for most normal people. The grids, stripes, and nails of Agnes Martin,¹⁰⁴ 600 stools, 3144 imitations of bicycles, 100,000,000 (150 tons) of porcelain sunflower seeds, and 38 tons of steel reinforcing bars of Ai Weiwei—all that, from the point of view of my personal esthetics, is just one **pattern** of artistic monotony, if not a mania.

Self-multiplication is different from the respectable in music but rare in poetry genre of variations on a theme.

A cycle of variations on the theme of “line” could include power lines, clotheslines, genealogical lineage, and human lineups, branching into food lines, lines of POWs to be executed, children getting into a school bus, etc. Variations change the subject but preserve an abstract pattern,

¹⁰⁴ Agnes Martin’s *Untitled* (1962) with nails belongs to San Diego Museum of Contemporary Art. The almost identical *Little Sister* (1962) is in Guggenheim Museum, New York.

sometimes to hardly recognizable similarity. Artistic style is in most cases a theme with variations. A great artist (composer, writer, poet, performer) is the one who is able to change the **theme**, not just the style of variation. Examples: Beethoven, Tolstoy, Picasso, Rilke.

If art is a mirror, what else do I see in it? It is not the pile of gravel, paper boulders, and hovering stones that attract me. It is the **invisible** human presence of the authors. It is the creators: inventive and stubborn human beings who stand out against the crowd of cross-imitators. For me the presence of life in any form is a condition of artistry, from an uninhabited landscape to human body and all life forms between the two.

With years, my interest in all arts, including movies and literature, has shifted to **how** it is made. I highly grade creativity, complexity of means, uniqueness, audacity, and the mix of surprise and recognition. In other words, I value performance more than content, somewhat contradicting myself, but I set my own bloodthirsty standards for performance.

Now I am rather indifferent to “what” but hypersensitive to “how.” The “how” tells me about the artist, which is incomparably more interesting for me in modern art than what I see in an artwork, even in movies. I am a seeker of human warmth and sparkle. Is there a sufficient reason? Because it is rare.

The low stony clouds almost cutting the water—it is about me because I give in to the illusion that the artist at some moment of his life felt like me. In 1933, in the shadow of Germany, it could be very much so.

I cannot argue with the mirror. One could conclude from my relation to visual arts that I am extremely self-focused. Should I accept it? I have already done that in this paragraph.

For comparison, here are my relations with other arts.

In spite of my wide range of interests, my tastes are very narrow. Oh my God! It turns out that I am a minimalist, too. There are waste spaces of popular entertainment that I completely ignore. My music preferences run from Bela Bartok to Portuguese *fados* and Latino *alegria*, from Franz Schubert to American Blues, and from Sviatoslav Richter and Sarah Chang to Bulgarian folk chorus, but the distance between the landmarks is very sparsely inhabited. Same with literature: my three last reading feasts were John Edward Williams, Michel Houellebecq, and Marcel Proust; the latter was a long and often exhausting climb to an unforgettable view from the top. Sometimes, I take a praised book, start reading, see the author behind it, feel the thin “how,” weigh on my hand 400 to 500 pages of “what” (the side effect of writing with computer) and return it to the library after few chapters.

I am deaf to early classical music, baroque, and, with few strong exceptions, most (but not all!!!) of Bach and Mozart, the common musical diet for people of my age. Although repelled by minimalism in art, I chase simplicity and scout simple reasons in human matters, tangled but as simple as a jumbled packing string when straighten. Art, the realm of *what* and not *why*, is not for understanding but for tension and thrill, but I get my strongest kick from *how*.

I dislike anything aggressive and vulgar, as well as predictable, controlled, and mellifluous. I love novelty, even if gritty, but appreciation of novelty can only develop from wide knowledge, which I do not have in visual arts. Fortunately, the Web is a giant, comprehensive, and always open art gallery. [Flickr](#), [Instagram](#), and [Pinterest](#) have splendid collections of less known artists. They are coral reefs full of beauty and mystery, not a tank with a rotting shark.

After my first accidental but fateful encounters with modern art, I began to web-educate myself further, which turned out an exciting but finite endeavor. Modern art is an orgy of effervescence, exuberance, and extravagance—complemented by their corresponding opposites. It is also an ebullient local and affordable marketplace. There are young and old obscure artists who could be reflected behind our backs in the mirror of art before they are captured by headlines and lead to the marketplace in chains made of zeros and clasped with a dollar sign.

This chapter has been a mess. When somebody is analyzing himself, with mirror or not, it is always a mess. I came to the art marketplace not for art, not for my reflection in it, however, but for the message of art about the future of all of us, except myself. I am taking nexistence by the horns.

11. ART AS FUTURE

The future has been the most powerful stimulus for the evolution of human imagination, intelligence, and language. Indeed, everybody can see the present, and if not, it can be pointed to with a gesture or a warning cry. The present is so ephemeral, however, that it turns into past right before one's eyes and loses all its relevance, unless we immediately extrapolate it into the future. We remember and store the past because we need it in the future. But the future, although crucially important for survival, does not exist! How can you discuss it, paint its alternative pictures in the mind, and share it with another mind if you do not keep it in the present by **thinking** about it day and night? I begin to consider the cave pictures as being about the tomorrow's hunt, not the yesterday's one. They were attempts to see nexistence and, probably, retain it in spite of a scarce vocabulary.

With our modern sumptuous vocabulary, it is practically impossible to talk about the epitome of nexistence without falling into some kind of *futurespeak*, similar to *artspeak*. If I veer off the well-tempered soundtrack, I apologize in advance for my shrieks and moans.

In my search for a magic mirror showing not myself but the future, in which I have no stake at my age, I recall the Reflecting Pool, the uncommon spacious landmark of Boston, **Figure 11.1**.

The photos in the **Figure 11.1** illustrate my vision of modern art as a fenced-off, passive, and enigmatic zone of our civilization. Like water and sunflower seeds, art can fill any shape. It reflects the surroundings. As a small part of economy, it must have the properties of the whole. The active role of visual art in society is minimal, but in advertisement, design, and decoration—and as status symbol—it is by no means art for art's sake. It is because of its detachment that I believe in the prophetic ability of art. Art reflects, foresees, and prophesizes, not intentionally but in a kind of somnambular or drug-induced trance to which, however, hardly anybody pays attention.



**Part of Janice Kerbel's series
permuting the same words (2014).**

Unlike the oracle of Delphi, visual art is silent (maybe, not for long). It addresses our most informative sense of vision and its Pythias speak in puzzling tongs of sign language. Text and speech can be misunderstood, but art has no verbal
← mediator even if it is just word art on paper.

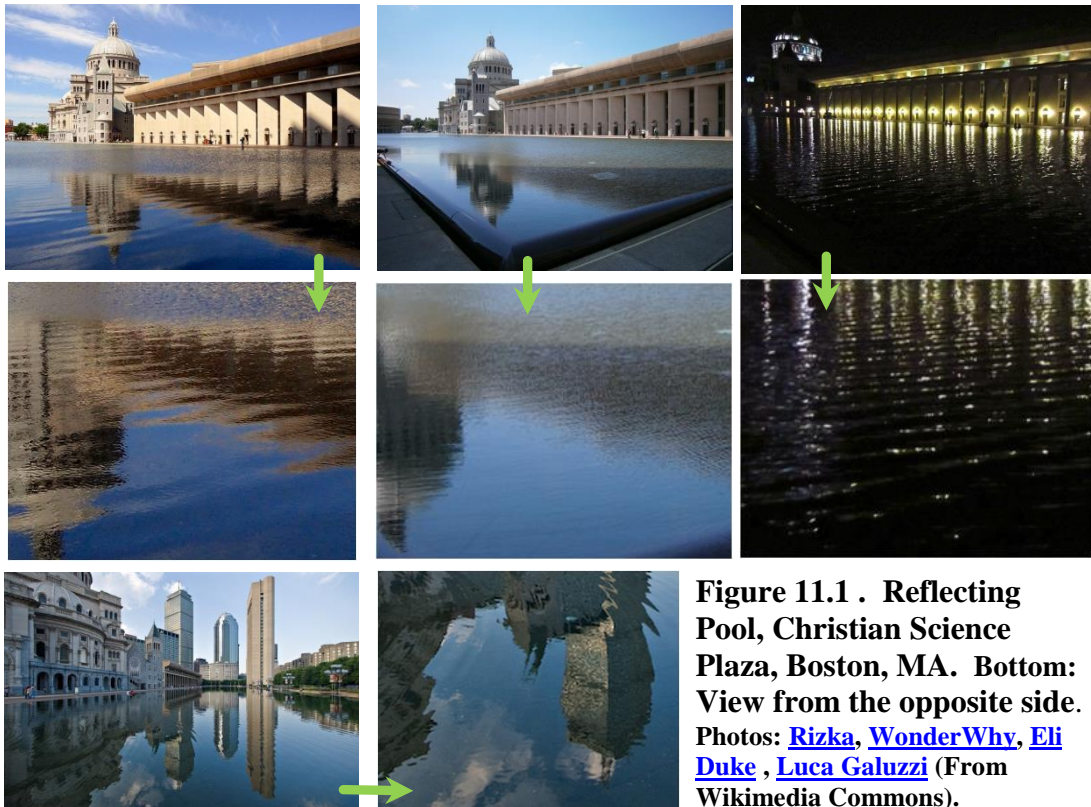


Figure 11.1 . Reflecting Pool, Christian Science Plaza, Boston, MA. Bottom: View from the opposite side.
 Photos: [Rizka](#), [WonderWhy](#), [Eli Duke](#) , [Luca Galuzzi](#) (From Wikimedia Commons).

Art can be explored as an emergent or recurrent pattern, the same way the satellite photos of the Earth can be trusted as prophesy of climate change. That can be said about any other facet of our civilization, but the advantage of art is twofold: it is available for observation in its entirety not only in physical space, but also in time, i.e., as preserved history. Even bygone biological species do not have such full continuity of their observable past as pictures and sculptures. Art has been systematically dated, signed, collected, stored, and sometimes deliberately destroyed. Art has nothing to hide and requires nothing arcane to learn. Just do not ask too many questions. You will be told more than you ask for, anyway.

History is potentially the closest approximation of science in humanities —something no scientist will believe but historians are struggling to prove.

As for modern art, we are reminded at each our step through the galleries that there is nothing to understand and everything to experience, as if watching a cake in a glass showcase is experience.

Like the Reflecting Pool—or a bed in a room—art is traditionally elevated above the ground level of daily routine and toil. The Pool shows an upside down image of its quiet ambiance. The capricious and wobbly wind-driven picture on the water depends on your place and time of viewing. On a quiet day, it shows two complexes of worship: one of money, piercing the skies, and the other of faith, kneeling on the ground. You can see one or the other from the two opposite ends of the Pool, which is, in a way, how it works in life, but there is a kinship of belief between both.

Art proudly and defiantly guards its independence, but in our times, all borders, interfaces, and defenses are getting more and more permeable. Even the national borders are mostly symbolic. Art, too, is connected with outer world in numerous ways, some invisible and others, like with money, conspicuous. The very difference between reality and fiction in digital era is vanishing because we are looking at the world through somebody else's cameras feeding the pages of somebody else's websites. Even the money, which in times of classical art could be rubbed between fingers, dropped to jingle on a beggar's plate, and probed by biting down, is immune to the physical conservation laws. It can be erased or created in an instance without your moving a finger—by somebody else's finger.



Tracey Emin, *My Bed*.

Photo: [Leo Reynolds](#) (cropped).

Art is what cannot be expressed in plane words and logical discourse. All arts, even the movies, are articulated, played, and made in ways we do not speak, paint, draw, and act in everyday life. Art is supposed to be something as divided from the ordinary life as the sacred from the profane—for as long as this difference persists. *My Bed* by Tracey Emin, with its condoms and body fluids, forcefully violates the difference, but it is art because it was (1) exhibited **as art** (2) not in a bedroom but at Tate Gallery, and (3) [was sold as art](#) at Christie's in 2014 for \$4,351,969.

The water in the Pool plays with the surrounding solid structures in thousands of ways, depending on the weather and hour. Art plays with life in the same way and often there is no similarity whatsoever between life and its reflection. There can be a reflection without life. Still, art directly addresses human senses, even when a computer squeezes in.¹⁰⁵

Art is made of physical matter. It is organized as human activity and branch of economy. It occupies designated buildings, occasionally spilling into open spaces. It involves hundreds of thousands of people. This is why art submits to the truly universal dictate of any evolving complex system (*exsystem*; see [complexity](#) or [Introduction to Pattern Chemistry](#)): consume energy, maximize its dissipation, grow, and evolve to stay alive among other competing exsystems. Art is similar to economy, ideology, science, culture, education, institutions, organized crime, terrorism, ecosystems, and life on earth. But art is much smaller, simpler, and often as messy as *My Bed*. There could be something we do not see under the pillows and linen. Is it under the bed?¹⁰⁶

I see the world as a laboratory of pattern chemistry.

I am not going to expand here on what pattern chemistry is. All that, including the concept of exsystem, which can emerge spontaneously in a minimalist fashion, but needs complexity to be

¹⁰⁵ “Much of the trouble in the visual arts today comes from our increasing dependence on the Internet, where all the richness and complexity of an artist's painterly surfaces is reduced to pixels.” Jed Perl, *The Perils of Painting Now*, *NY Review of Books*, Sept. 24, 2015, p. 57.

¹⁰⁶ The famous economist and prophet Nouriel Roubini, himself an art collector, [believes](#) that there is a dark side of art market. There is. See: Sam Knight, *The Bouvier Affair*, *The New Yorker*, Feb. 8&15, 2016. Google: Bouvier + Rybolovlev.

capable of evolution, can be found on my website www.spirospero.net. It comes from the mathematics of patterns developed by Ulf Grenander and generalization of main ideas of chemistry. Sorry for my repetitions.

In a nutshell, the main idea of pattern chemistry is that the daily configurations of the world are countless and they never repeat. The world is large. Its history is long. Its memory loses details with time. The abstract world of patterns, however, is small. It is countable, recordable, and searchable. A big novelty, which happens not every year and not even every century, can be noticed and entered in the roster. Patterns have a very long life. They can stubbornly repeat itself, of which the latest striking examples are Putin's Russia, brought, in various aspects, 80 to 1000 years back, and the Islamic State setting the calendar 1400 years back—both obsessed with self-proclaimed greatness. The red tide of anti-intellectualism in America makes me nostalgic for the times of Benjamin Franklin. Although, in spite of my age, I have never met him, let me count the description of his lightning rod from my school textbook as a story about my uncle.

Patterns are long lasting regularities of existence. They are abstract counterparts of the laws of physical nature in the lawless individuality-ridden and chaotic human matters. New patterns of human matters can be discovered like new phenomena and laws in science. At the highest level of abstraction, there are few very general patterns that bridge human matters with physics and chemistry.¹⁰⁷ It means that there are few basic choices for history to change, until something radically new, like the mass **displacement** of humans by robots, appears. The **displacement** of millions from Syria is a distant configuration of the **displacement** pattern so common in the earlier human history. I will add the **displacement** of horses by cars to the same pattern to emphasize the generality of patterns that rivals that of mathematical equations.

I remember times when drivers could tinker with the engines of their cars. If I am not mistaken, the driverless car, along Elon Musk, already rides on the back of the manhorse (do not mix up with horseman) who is **discouraged** or **forbidden to touch the steering wheel**. This is not an absolute novelty, but a big pattern novelty it is. Modern art is also a historical novelty, but there must be its **pattern mates** in all spheres of life where people are driven by nexistence, religion and political ideology among them.

Michel Houellebecq, a new obscenely audacious prophet of postmodernity, perfectly expressed, by chance, the concept of pattern chemistry in his "*Elementary Particles*" when he remarked that humans usually "have a small number of choices, of which an even smaller number is taken." Obviously, it is easier to find the way in a small system than in a confusingly large one. Big data are intended only for computers with their own agenda, quirks, and giant heat-spewing servers banished out of sight to the cold latitudes where the Frankenstein's creation is still wandering over the remnants of the melting Arctic ice, jumping from ice floe to floe, scaring emaciated polar bears. I begin to master Proustspeak.

Art, as I have emphasized more than once, has the advantage of being seen directly in its entirety, as naked as Manet's *Olympia*, without rationalization and without a professional broker. Unlike the wonders of information, art is as material as a bone of a dinosaur or Tracey Emin's *My Bed*. There is nothing hidden, nothing to be ashamed of, and nothing to threaten us. It has

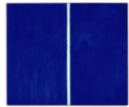
¹⁰⁷ A lot of related material has been accumulated by "[Human Thermodynamics](#)." [See also](#).

no complicated theories behind. It is made to be seen, looked underneath, and (furtively) touched. It can be enjoyed (ha ha) if you are in the right mood, or hated (yuck) if you start picking on and asking questions. Whatever is said about modern art is equally true or false and is not provable or testable anyway.

A pattern historian, therefore, will look for the future in the rolodex of the past.



Patterns cannot illuminate the full length of either past or future. They are not a source of too much historical optimism, but the life of a generation is, in human terms, long enough to quietly accept the idea of historical mortality. “Evolution” sounds not as depressing as death in wars, revolutions, and riots. It sounds cheerful if we call it *progress*, with no real reason.



Here is what I see behind the curtain of Barnett Newman’s *Onement VI*.

The main novelty I notice in the panorama of modern art is its topology.

Modern art uses an unlimited combinatory palette to select and mix in any possible way not only colors but forms, objects, things, symbols, materials, chemicals, organisms, body excretions, ideas, words, life, death, nature, history, trivia, and, o yes, nothing—all that without constraints of meaning. I am saying “without constraints,” but there must be some.

The search for constraints and regularities in arts is a subject of *formalism*. It is a branch of *structuralism*, one of the not too old precursors of Pattern Theory. Structure itself is a topological idea. Formalism studies a work of art, literature, music, etc., as an abstract structure, like the medical student who explores a skeleton without philosophizing about life and death and references to *Hamlet*. I am not sufficiently familiar with research in that area, however, in which *art topology* might have already found its place. I can imagine that “so what?” is the question often returned in response to a grant application in this area.

Art has the double-decker topology of a phone directory. At the basic level, the **potential** connectivity has the topology of full connection: in a work of art, anything can be connected or placed side by side with anything (or nothing) in plane or in 3D space, provided the laws of physical nature do not prevent it. If they do, the connections can be rigged up, as in Cornelia Parker’s (and [many other’s](#)¹⁰⁸) suspended bricks. The “phone directory” itself changes over time: things and forms pop in and out. The **actual artwork** is like a conference call between several subscribers in the phonebook: a bundle of lines, a bag of dots, along Kandinsky, or a whole republic of small junk, along Sarah Sze. The connections can be calculated or random.

Ai Weiwei has set a totalitarian connectivity record with his zillions of sunflower seeds. Each of them, supposedly, is made unique, but all are trampled the same way by the visitors and their uniqueness and their craftsmen are of no consequence whatsoever.

¹⁰⁸ Exceptionally inventive [Ken Unsworth](#) did it in the 1970’s.

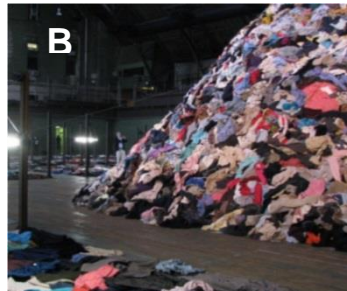
Each piece is a part of the whole, a commentary on the relationship between the individual and the masses. The work continues to pose challenging questions: What does it mean to be an individual in today's society? Are we insignificant or powerless unless we act together? What do our increasing desires, materialism and number mean for society, the environment and the future? ([Tate Gallery comments on the seeds](#))

Does Ai Weiwei criticize or exercise the pattern of totalitarian mistreatment of individuality? I see it as an example of the inherent ambiguity of modern art. This ambiguity is not some kind of moral shortcoming but a necessary component of freedom. It is order and control that requires clarity and precision, while freedom blurs the borders and erases them. We are free to like and to dislike, less free with political correctness, more chaotic without it. Freedom itself is among the most ambiguous terms that I know.

There is a much earlier *pattern mate* of Ai Weiwei in European art: Christian Boltanski (France).

While creating *Reserve* (exhibition at Basel, *Museum Gegenwartskunst*, 1989), Boltanski filled rooms and corridors with worn clothing items as a way of inciting profound sensation of human tragedy at concentration camps. As in his previous works, objects “serve as relentless reminders of human experience and suffering” ([Wikipedia](#)).

His similar installation entitled *No Man's Land* was centered on a 25-foot-high pile of **30 tons** of old smelly clothes brought from a textile recycling plant. It was intended to remind about human mortality and the Holocaust in particular. There were also an arrangement of smaller piles, a wall of 3000 stacked old cookie tins, and a collection of heartbeat records, to which a visitor could add his or her own.



Christian Boltanski, *No Man's Land*, Park Avenue Armory, New York, 2010. Photos: [C-Monster](#), [Flickr](#), [A](#) and [B](#).

Dorothy Spears' review in New York Times, 5/09/2010, [*Exploring Mortality With Clothes and a Claw*](#) was not sympathetic:

“...it's hard not to see it as a version of that childhood game, and as an embodiment of a similar, albeit more intense, kind of perplexity and heartbreak;

...large-scale exercise in futility...;

His engagement with both death and survival has drawn glowing comparisons to the poetry of John Keats, and also been denounced — particularly when his fascination with the Holocaust is most evident — as pornographic and exploitive.”

The piles of clothes of different size have been repeated by Boltansky many times, even amid the luxury of old European buildings, like *Monnaie de Paris*.

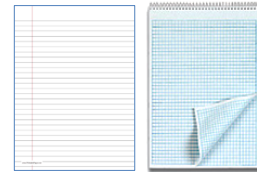


Van Gogh, *A Pair of Shoes*, 1886

As a contemporary of the Holocaust, I am itching to say something, but I cannot judge modern art: it has the shortest statute of limitation, if any at all.

It may seem that modern art is least of all interested in real life, but isn't art as curious about a can of cheap soup as Van Gogh was interested in a pair of worn shoes? Isn't *My Bed* the Van Gogh's *Shoes* today? Then it is worth of \$4,351,969, considering its size and stuff.

I have already shared (ART AS BELIEF) my observation of *anchoring*: an subconscious yearning of abstract artists to send some signals of real life, like a word or two, a title, usually with no connection to the image, or a political or historical allusion. It could be some subconscious but recognizable content, like the grid or lined paper notebook in Agnes Martin's paintings. I go too far here, I know, but I can't stop.



To an educated eye, any abstract element of a composition evokes scientific and technological associations. Abstraction in sciences, natural or not, is what **cannot be seen**, but can be thought of. Triangle for me is a geometrical reality. Abstract art can hardly **surprise** me. It surreptitiously exploits the natural human desire of **recognizing** a comforting familiar image: cool safety of a dark cave, freshly painted wall of a room in a new home, motley fabric of a woman's summer dress, and dramatic colors of the sunset.



Art can be a bare wall but it still must have something to hang a hat on.

The future that art prophesizes is permeated with ambiguity. Dealing with believers, you never know what to believe and whom to trust. Each of your own beliefs has a shadow of a doubt. The professional knowledge is too arcane, so that you need an expert or mediator. Can you trust anybody in the world where you never certain who sends you an email: man or woman, friend or foe, computer or human, where inventions and technology are becoming double-edged sword and a universal key to all vaults because everybody is potentially connected to everybody and everything? A drone, which I have recently seen behind my window, the camera of my computer (I tape it over when not needed, following a professional advise which I do not believe), your smart time-gobbling phone (I do not have one), they want your soul, secrets, shames, and occasionally your very life. You are at the entrance into a prehistoric cave



Jasper Johns,
Figure 2, 1963

where the daily and nightly live of everybody is opened to all. You are where nothing is what it looks and nothing means what it says. You are the Naked Emperor who trusts the tailors. You are taking nexistence too seriously for your own good. A hard-boiled liberal, you worship your own pantheon (libertheon?) of nexistence. This is the topology revolution, started in art long before the digital revolution.

The choices of most fundamental historical patterns in the world and, coincidentally, the main American political choice, are as minimal as they can be: there are exactly **two (2)** of them: the **Red** and the **Blue** for America, rare **democracy** and prevailing **autocracy** for the world history.

I am being carried away on the wings of futurespeak, bye-bye....

“I want to connect the world” ([Mark Zuckerberg](#), 2014) sounds to me like one of the most ominous mantras ever vocalized with the tacit “connect to me” rider.¹⁰⁹ It has been the ultimate goal of intensely material caliphates, empires, kingdoms, religions, Communism, Islamism, Putinism, and, on similarly ambitious scale, Amazon, Alibaba, Facebook, Google, and other benevolent behemoths, which we love to be petted by. I cannot deny that “connect” has been a mantra of liberalism, too, only with non-existent *we* instead of the full-blooded I.

I cannot imagine freedom in a super-connected world, all the more, the world where humans are connected with Things like a captive with his handcuffs, the keys in the jailer’s pocket.

Why am I so negative? I seem to be pulled into politics. Away from it! Back to the quiet of the museums and galleries! Back to my banished under the desk old (a few years) computer!

What has it to do with peaceful, self-absorbed, innocent, playful modern art? My hypothesis is that art has been prophetic and freewheeling ahead of the rest of economy because of its **freedom**: from politics, ideology, manufacturing, communication, banking, war, world conflicts, entrenched establishment, and, most importantly, from doctrines and propaganda. Where else can you find it?

So much for nexistence, but what is existence, by the way? Existence is everything from proven possibility to certainty. Anything that has **already happened** has a proven possibility, which is the same as to say that it is not new. The future, obviously, stays behind that line.



Existence: the deer down the road exists even if only a possibility.

When I hear the imperial edict “connect the world,” which is not a dream but realistic intent, I easily imagine the connection as a tight Knot in which everybody and everything is as close to everybody and everything as in the cave of a prehistoric tribe.

Today, in 2015, it is clear that Things and humans are not separated by infinite distance in Jeff Bezos’ Amazonia (which I am using with guilty satisfaction): they are looking at each other through the class-proof glass like two close species¹¹⁰ that can already communicate by speech, all the more, gestures.



The future exerts immense power in a mystical and eerie way. It acts like the gravitation of celestial bodies, creating orderly orbits, and it works like heat, storms, and earthquakes, creating disturbance and chaos. The future plays with the fluid substance of human soul like the moon that keeps the fringe of the land wet under the push and pull of the tide. The future—sometimes taking form of the past—inflames human mind with tempting visions and chilling nightmares. It shapes individual fate and creates global history. Physical bodies, however, are completely indifferent

¹⁰⁹ Especially in the wake of terrorist acts in Paris, November, 2015. On liberalism, see *Essay 16, On Somebody Else*.

¹¹⁰ See Charles Murray, *Coming Apart: The State of White America, 1960–2010* (2012).

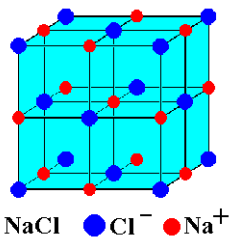
to it because physical laws, believe it or not, are immutable by our definition of them and by the shortness of human presence in the solar system.

Future, mind, soul, deity, art, belief, ideology—those are the strangest things that I know. I hesitate to call them irrational or transcendental because they are part of human nature, which is much more resistant and resilient than the ocean, land, and atmosphere of our planet under all the heavy material Things that crisscross, slash, and pierce it.

As for the future of art, its paradigm swing may come sooner than we think. The direction of a possible change is toward novelty, uniqueness, originality, humanity, constraints, and complexity as measures of value.

Modern art was the first human creation capable of connecting and reconnecting the world in a dreamy, reflective, and non-competitive way. The topological revolution that has been sweeping professions, occupations, institutions, borders, limits, beliefs, and the entire world order grounded in geography, meaning, and moral dichotomies, is what can be seen with a hindsight in the prophesy of modern art.

I see the future of the world as a continued topological tightening with the shrinking of distance between humans, Things, and ideas, good and bad, true and false, friend and enemy, help and harm, existence and nexistence. I see no universal brotherly love in that, neither do I miss it, except in a real family.



Please no association of colors with US parties.

We are in the World War 3 between democracy and autocracy with democracy in the state of a civil war and autocracies in their own global fights. Changing my position from artistic to scientific, no matter who wins, we will keep crystallizing in a lattice of humans and Things. In a crystal of salt, any ion—big negative chlorine or small positive sodium—has both kinds of neighbors in its close vicinity. Similarly, we will have all sorts of connections with benign and hostile species of civilization, mostly Things and humans, in a tight structure no more under human control. We will be always told that the fetters of connectivity look cool, make us look younger, and are good for us, yet some will never believe. We will be told in big red letters that the patriarchal past with topology of *pyramid* is “good for you,” but the future still offers us at least a binary choice.

But at least *my home is my castle*, isn't it? I was stung by the realization that the drones were the latest step in cracking open our castles and huts when a hummer had sailed right behind my window. Was it looking for *my bed*?

Almost 100 years ago, art had croaked “*Dixi*” in its kinky sign language.

12. DOES NEXISTENCE EXIST?

I have not studied the entire history of nexistence, except as a prominent feature of Russian history in the 20th century. It is quite probable that somebody, apart from Plato, Hans Christian Andersen, and Andy Warhol, has already heavily contributed to the subject. In modern times, neither Sartre's *Being and Nothingness* nor Heidegger's *Being and Time* has anything to do with what I call nexistence, unless you take the exasperating obscurity of both books as a kind of artspeak. Yet, while editing the already finished *Essay 60*, I have found some reports of three most recent (2015-2016) sightings of nexistence.

1. Peter Schjeldahl, the art critic of *The New Yorker* magazine, concluding his review of the recent exhibition of Robert Ryman [an abstract artist who used only white color for most of his life], writes:

The emperor—roughly, high-modernist faith in art's world-changing mission—could retain fealty only if stripped of fancy styles and sentimental excuses. That was Ryman's formative moment. It was succeeded by a suspicion, now amounting to a resigned conviction, that contemporary art is an industry producing just **clothes, with no ruling authority inside them**. (*The New Yorker*, [December 21, 2015](#))

2. In the concluding chapter of his heart-breaking, gut-wrenching, and mind-boggling novel *The Sympatizer* (Grove Press, 2015), Viet Thanh Nguyen writes:

How could I forget that every truth meant at least two things, that slogans were empty **suits draped on the corpse of an idea?** (p. 355).

About the commandant of a re-education prison camp established by the North Vietnamese in the South Vietnam after their victory:

He saw only one meaning in nothing—the negative, the absence, as in *there's nothing there*. The *positive* meaning eluded him, the **paradoxical fact that nothing is, indeed, something**. (p. 356).

3. The third sighting is a complicated subject, see Ben Lerner, *The Custodians* in *The New Yorker*, Jan. 11, 2016, on how the difference between existence and nexistence in art is blurred, but, anyway, both clinched fighters are being carried into “forever.” This is how I see the problem, at least in part.

Modern art, made of or with chemically and physically unstable junk, can have a short life span. What to do with it? This is the problem the new Whitney Museum of American Art has to deal with. The answer is restauration: to **replicate**, enhance, rebuild, redesign, or remake the original in other ways.

The full title of the artwork by Josh Kline is “*Cost of Living (Aleyda)*”. Aleyda is a real woman, a housekeeper of a hotel. Parts of her digitally dismembered body—the head, made as realistic as wax figures of Madame Tussauds, hand, and foot—are put on a standard janitorial cart together with cleaning and scrubbing tools of the janitorial trade, all that 3D-printed. [It can be seen on the Web](#). The 3D scans could be stored indefinitely and used for the replication.

Josh Kline, *Cost of Living (Aleyda)*, 2014.
Source: Paddy Johnson, ArtFCity.

It has been missed that even the scans must be somehow rejuvenated because digital equipment also progresses and the old files could become unreadable. Definitely, never say “indefinitely.”

A similar problem arises with the unstable paint of Mark Rothko. For some of his large paintings, **replication** was considered, but the final decision was to project correcting multicolor lights on the painting.

What is the artwork which has been **replicated**, artificially enhanced, cloned, or recreated without the participation of the artist and, probably, after his death? Would it still exist?

Should the physical existence of a dead artwork be cared for like the bodies of Lenin and Mao Zedong in their mausoleums (if they are not already 3D-printed)? Do we need to prolong the existence of nexistence? Does the original work still exist in its replica? Does the artist remain the author of its replicated work? Is the cost of living of “*Cost of Living (Aleyda)*” worth keeping it alive? As Ben Lerner uses the term “veneration” regarding the attitude to the restoration of art objects, is modern art edging further toward an entirely Durkheimian religion? With tying art to political categories, are we using helium balloons as anchors?

I began to dig deeper for the roots of the “*Cost of Living (Aleyda)*.” There must be some explicitly named nexistence, I thought. There it was, a really big nothing that was big something: capitalism.

Severed human heads, the precursors of “*Aleyda*,” entitled “*Living Wages/Big Nothing*,” were exhibited by Josh Kline as early as in 2004 at *The Big Nothing* exhibition of Institute of Contemporary Art (ICA), University of Pennsylvania. I quote from the [source](#).

Ostensibly about nothing, this group exhibition spanned several decades of production by over 50 international artists who explored **nothingness as the subject of artistic rumination** and negation as a creative and political strategy. The exhibition pondered the vacuity of contemporary consumer culture on the one hand with works by Andy Warhol and Richard Prince, for example, and on the other, sought to understand the **importance of the void in spiritual fulfillment** as famously exemplified by Yves Klein. [Yves Klein (1928 – 1962), French artist, see **Figure 4.2.** –Y.T.]

.....
 In recent years, Kline has developed a body of work about the body and labor in the twenty-first century. Speculating on capitalism as perhaps the **ultimate big nothing in our society**, Kline has created a new two-part project for *ICA@50* that looks at a FedEx delivery worker and his identity as a laborer in our economy.

On a view at ICA is a series of sculptural portraits produced by 3D biometric scans of FedEx delivery person—an expression of Kline’s ongoing interest in human capital and its role in our society.

It is difficult to sort out. Neither could it be brushed off, which is never recommended to do with nexistence, especially as elephantine as capitalism. Was the [Davos Forum of 2016](#), in fact, about finding the Abominable Snowman in the Swiss Alps and not about capitalism and the Fourth Industrial Revolution?

My *Essays à la Montaigne* are finished. But previously invisible nexistence, once captured and illuminated, now seems to be around every corner.

4. Here is yet another example. The almost 3000 years old ancient Chinese book *I Ching* (*The Book of Change*) is still fresh and in everyday use in the culture of China and South-East Asia. It is also a long-time teaser of the Western world. I quote the recent review by Eliot Weinberger of two of its modern translations into English (*What is the I Ching?* *The New York Review of Books*, February 25, 2016, p. 20):

It [*I Ching*] is the center of a vast whirlwind of writings and practices, **but is itself a void**, or, perhaps, a continuously shifting cloud, for most of the crucial words of the *I Ching* have no fixed meaning (p.20).

One could say that the *I Ching* is a **mirror** of one's own concerns or expectations (p.24) .

5. Finally, another attempt of ending this overstaying Essay.

In my youth I was taking my life lessons—as well as, much later, the inspiration for these Essays—from Montaigne's *Essays*. I was impatiently waiting for the next book of Sarah Bakewell whose *How to Live: A Life of Montaigne* (Other Press, 2010) I admired. Sarah Bakewell is unlike anybody else in the genre of biography, but it would take another Essay to explain why. Anyway, literary critics and readers have well appreciated her brilliance. Her most recent *At the Existentialist Café: Freedom, Being, and Apricot Cocktails* (Other Press, 2016) is now in front of me, finished, and even more impressive. For two days I was glued to it, reading about Edmund Husserl, Martin Heidegger, Jean-Paul Sartre, Simone de Beauvoir, Maurice Merleau-Ponty, and others, always feeling the presence of the author in the list of her characters (and even in the illustrations). Just one example: "Rereading him [Heidegger] today, half of me says 'What nonsense! While the other half is re-enchanting.'" (p.186).

The high tide of existentialism receded into history decades ago. This pervasive but elusive subject kept bothering me since I had first encountered it long ago and until Sarah Bakewell's book. I referred to Heidegger, Sartre, and existentialism many times in my Essays, especially, 18, *On Everything*, 27, *The Existential Sisyphus*, 29, *On Gail and Evod*, and 45. *The Place of Philosophy in Science*. For the first time, after many attempts, having unsuccessfully wrestled with *Being and Nothingness*, *Being and Time*, and even Wikipedia (!), I feel like I understand, thanks to Sarah Bakewell, what phenomenology and existentialism are, how the latter came from the former, how both were incubated in the same culture that hatched all modern arts, and how much the thin intellectual substance of that philosophy was fortified with the intense, tangible, sometimes even carnal human stuff of the personal stories of its notables bruised, one way or another, by the experience of WW2. I also understand why I could not understand it earlier.

Existentialism generated long shelves of non-fiction books (rarely comprehensible), subculture (usually insular), buzzwords (typically overblown), fiction (often pretentious), and theater (frequently absurd), but I quote Sarah Bakewell (p. 33):

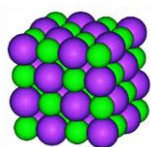
What is existentialism anyway? Some books about existentialism never try to answer this question, as it is hard to define. The key thinkers disagreed so much that, whatever you say, you are bound to misrepresent or exclude someone. Moreover, it is unclear who was an existentialist and who was not.

This sounds like at least 100 proof of nonexistence. In the first chapter (p. 34) Sarah Bakewell gives a crisp translucent nine-point explication of what existentialism is about, which, in my view, without a slightest criticism of her, but with a great skepticism regarding her subject, is a collection of ultimate trivialities. The concluding chapter, almost painfully brilliant, conveys the measure of her own skepticism. But there is much more in her book than philosophy: a less known aspect of cultural history of the same period that witnessed the Cambrian Explosion of modern art. Philosophy, however, is a strikingly less pecuniary business than art. Money appears in her book only as strewn around by Sartre's generosity or needed to pay urgent bills.

In short, my idea of Jean-Paul Sartre's version of existentialism is: whatever you ask a philosopher's advice about yourself, the answer is the matter of your personal decision and responsibilities. Do not bug the sage. Look into the mirror at your own concerns or expectations. You are free to decide. You anguish, but do not brood for too long: decide and act.

With this scant personal extract, I welcome existentialism as philosophy to the realm of nonexistence. Nonexistentialism of *I Ching*, modern art, supremacism, nationalism, exclusivist ideology, and stern unforgiving religions create real powerful full-bodied **structures of something around nothing**, some of them bloodthirsty. But *I Ching*, modern art, and existentialism do not pit people against each other. Even the pumped up with brazen nonexistence US Presidential Campaign of 2016 will end, hopefully, with exhaling all its hot air. The white Union horse, its coat a patchwork of blue and red spots, clanking with firearms, will chug along, in spite of gloom predictions, toward the next gasp, along the pitted and cracked national roadways.

6. Wait! Roadways? Roadways... Now, what about driverless cars? It seems like the case of **nonexistence at the wheel**. This is a juicy morsel for a new philosophy of human/Thing condition.



Ideas—patterns of existence—never die. If I were a philosopher, I would return to the oldest problem of my profession: what is really real, reality or ideas? But I am, happily, a chemist.



ESSAYS *à la* MONTAIGNE

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