Combinatorics of Creativity

Umberto Eco, 2004 - Translation by Piero Molino 2023

Nobel Foundation Conference in Florence on September 15th 2004.
Original (Italian) version: http://www.umbertoeco.it/CV/Combinatoria%20della%20creativita.pdf

As it has become customary, before beginning writing my speech, I searched on the Internet the word creativity, or "creatività". I found 1,560,000 websites dedicated to this concept and, after having explored a few, I decided I could drop the remaining ones.

I tell you immediately that the majority of them considers creativity to be an industrial and commercial skill to solve problems, identified with innovation, the disposition to conceive new ideas, and many websites dedicated to this art teach you how to become creative and, therefore, earn a lot of money. Here are two representative definitions of the many: "For many businesses the ultimate goal is for the idea to produce profit. In this case innovation must come from ideas that lead to sales." Alternatively: "Creativity is not limited to the art and design realm, however... Lawyers, accountants, people in sales, and others are often more highly valued if they are able to use a creative approach to their work."

Only few others of these websites hint at artistic creativity, usually as an example to clarify further what skills are required of a businessman, or to provide the taste of how artists, crazy by definition, consider creativity. As a beautiful example of artistic madness I found this Picasso quote: "Every act of creation is first of all an act of destruction".

I found the fact that the idea of creativity is also associated with madness in the definition of an activity that is practiced, both in business and in politics, to find new ideas, the brainstorming: "A sudden inspiration. A bright idea. A severe outburst of excitement, often as a result of a transitory disturbance of cerebral activity. A sudden mental aberration." Or furthermore: "An excitable state, exhilaration, elevation, intoxication, abandon, thrill, transport, ecstasy, fever, whirl, warmth, ferment, stew, turbulence, boisterousness, outburst, outbreak, explosion, commotion, hysterics, madness." From which one can understand how high command probably birthed the idea of ending terrorism by invading Iraq during a brainstorming.

As regards dictionary definitions, they are often tautological (for instance the Oxford defines creativity as "The ability to create). The Britannica specifies that it is the "ability to make or otherwise bring into existence something new, whether a new solution to a problem, a new method or device, or a new artistic object or form," and the Webster's reminds us that "Creativity is marked by the ability or power to create, to bring into existence, to invest with a new form, to produce through imaginative skill, to make or bring into existence something new. See Also: ability, cleverness, conception, design, excogitation, fecundity, flight, fruitfulness, genius, imagination, imaginativeness, ingeniousness, ingenuity, innovation, invention, inventiveness, power, vision, wizardry." In summary, according to dictionaries, creativity is creativity.

If one switches to various anthologies of definitions, one discovers that illustrious people could utter nonsense, like when they assert (I specify that this is my collage of various websites) that "Creativity is the emergence of a novel, relational product, as in *The airplane was a creative invention*, Creativity it is not far from freedom, To be creative is to know who we are, Creativity is Jazz without the music, Creativity is a flow of energy, Being creative is being courageous, Creativity is the river that runs through our human spirit."

Only one of these definitions appears to me as being grazed by the thrill of the infinite: "The word 'creativity' bears an implication of constructing a novelty without constituent components ex nihilo, as opposed to alternative theories of artistic inspiration which posit the generation of visions from divine sources such as the Muses." (WordNet Dictionary).

This definition reminds us that, before the advent of multinational corporations, there were in general two meanings of creativity. One is the biblical one, according to which God creates the universe from nothing. The second one is derived by analogy from the first one and acknowledges almost divine powers to the artist, who actually puts something into being that did not exist before. We will not indulge in the biblical notion of creation, as we have no way of understanding how it is possible to create something out of nothing, and we'll leave the matter to theologians. I will only note that neoplatonic philosophers tried to sidestep the issue of creation ex nihilo with the doctrine of emanation. God does not create something out of nothing, he creates from himself, he emanates himself, he diffuses across the universe bringing to life intermediate hypostases, up to ultimate matter. But then his creativity does not bring to light something new, it does not enrich the universe, as it actually impoverishes it by populating it with layers of things gradually less perfect. So much so that in order to explain the imperfections of the universe, Gnostics imagined that all we know is the effect of a mean unfit Demiurge , who took the divine substance in his own hands and brought it to more and more miserable degrees of imperfection. So much that the Gnostic is not supposed to create, but just to get back to the One he so poorly comes from through long ascesis. Therefore according to the neoplatonic and gnostic perspective there is no room for positive innovation, but only for returning to the Origin.

Things become easier with human creativity. Even though artists defined themselves as creators, at times in an attempt of claiming divine powers, their creation never happens ex nihilo, but manipulating pre-existent matter. Not only that, the most honest artists (those who do not assert to have mystical exchanges with the Muses) always warned us that in this matter (being it stone, a language, the series of sounds produced by an instrument) always contained some hints in itself, some trendlines, some resistance that oriented the creative work. As Michelangelo reminds us in one of his sonnets:

Non ha l'ottimo artista alcun concetto
Che un marmo solo in sé non circoscriva
Col suo soverchio, e solo à quello artista
La mano che ubbidisce all'intelletto

The great artist does not have any idea
That a slab of marble does not circumscribes itself

With its excess, and that artist only has
A hand that obeys the intellect.

Biographers say, in fact, that Michelangelo "sent one of his men to search for his statues among the stones", meaning he believed the artist to be the one who caught a glimpse and brought to light if not a shape at least a principle of shape inherent to the slab of marble that for him was already filled with possibilities.

Therefore the artist creates because he finds or reveals something that existed already at least as a possibility inherent in nature. This simple observation allows us to review a *vexata quaestio* (an unresolved question): if the notion of creativity could be extended to sciences and technical domains too, where undoubtedly one does not create something that did not yet exist, but possibilities already present in nature are discovered, despite the fact that they were not evident to us yet, being it the discovery of general relativity or the invention of the airplane.

This idea seems to contrast ingrained convictions of a humanistic and anti-scientific culture, of which Italian idealism gave very evident and very ruinous examples. Unsurprisingly, even in contemporary publications, we talk about creative writing (or even "writers") to identify poetry and fiction, distinguishing them from the forms of writing that evidently are not creative. Except that if we accept this distinction, then Plato, Aristotle, Galileo or Einstein, despite having written, would not be writers, and even less creatives, and consequently we get to the conclusion that Volta or Heisenberg were less creative than some poetaster their contemporary who published his doggerels at his own expense, or than a sidewalk painter.

However, it seems repugnant to an educated sensibility that a minor poet of the 17th century like Achillini, who invented the excessive metaphor "*sudate o fochi a preparar metalli*" ("fires sweat when preparing metals") would be a creator while Kepler who discovered the ellipticity of the planetary orbits would be just someone who finds, left in a corner, what nature already decided. I believe the example of Kepler to be interesting because it brings us back to that form of scientific discovery that Charles Sanders Peirce called abduction. And precisely about the keplerian discovery Pierce (Collected Papers 2. 96) wrote: "For example Kepler, during a phase of his scientific pondering, which remains eternally exemplary, found that Mars observed longitudes, which he tried in vain for a long time to adapt to an orbit, were (within the possible margins of error of observations) the same as they would be if Mars would have moved along an ellipse. Therefore observed facts, as such, are similar to hypothetical facts compatible with the movement along an elliptical orbit. Keplero did not derive from that similarity that the orbit was truly an ellipsis, but that similarity prepared him so much to that idea that he decided to search if virtual forecasts about latitudes and parallaxes based on this hypothesis would happen or not. This assumption to test the hypothesis was an Abduction. An Abduction is Original because it is the only kind of argument that generates a new idea".

Now let me get back to some definitions of creativity that I found on the Internet. One says: "Creativity is seeing a tree and imagining a forest" (Steve Cooper). The tree is there, the forest may not be there, so we would have an example of writing that everyone would consider creative, but that I would rather define fictional, meaning capable of constructing possible worlds, although not yet implemented. But behind the

tree there could truly be a forest, and then we would have the creativity of the navigator, that from a coast or a pike imagines the existence of a continent and decides to attempt a landing.

Another definition, by a poet such as Wallace Stevens, is contained in one of his poems, Thirteen ways of looking at a blackbird. A blackbird, which exists independently of who watches it, can be described and rediscovered from thirteen different points of view. A third definition is by such Roger von Oech reads as follows: "Creative thinking involves imagining familiar things in a new light, digging below the surface to find previously undetected patterns, and finding connections among unrelated phenomena." Which reminds me of Proust's definition: "The only true journey towards discovery does not consist in searching for new landscapes, but in having new eyes."

All these definitions bring me back to a fundamental passage by Pascal: "*Qu'on ne dise pas que je n'ai rien dit de nouveau: la disposition des matières est nouvelle*. Let it not be said that I have not said anything new: the arrangement of materials is novel. When playing a ball game both players play the same ball, but one throws it better."

Continuing on this line, one can think of creativity as a novel combination of pre-existing elements, either *ab aeterno* (from eternity, from the beginning of time) or at least since a long time. Undoubtedly this definition seems to fit really well to scientific creativity and can also fit problem solving sessions through brainstorming: one can spin the wheel of possible combinations and the solution to the problem is found, almost by chance or by miracle. But someone did already connect the idea of brainstorming, because it is lightning fast, with artistic creation. Scott Adams (The Dilbert Principle) says: "Creativity is allowing yourself to make mistakes. Art is knowing which ones to keep."

We will discuss afterwards what it means to decide which solution to keep as good among the thousands possible. For now I care for entertaining the fact that creativity, which brings to light what was potentially contained in pre-existing matter, proceeds by trial and error, and puts into practice, as Pascal suggested, the *art combinatoria* (the art of combination).

Around the 17th century we started to consider invention as something that implements what is potentially contained in a pre-existing grammar. To be precise, the harbingers of this consideration were already present in the combinatorics of Ramon Llull, and even earlier in the games of the temurah, of the notarikon and of the gematria of the Kabbalists. But in this last case, it was about reading in the Torah what was already concealed inside it and to rewrite it in the most mystically adequate way, already preordained by God, it was not about inventing a new one.

I confine myself to highlight the beginning of a later consideration about creativity as combinatorics, like the one by H.P. Harsdörffer in *Matematische und philosophische Erquickstunden* (1651) where he puts 264 units (prefixes, suffixes, letters and syllables) on five wheels to generate through their combination 97,209,600 german words, including non-existing ones, that could have been used for creative/poetic goals.

The problem of combinatorics was taken from Cristoforo Clavio's commentary *In Spheram Ioannis de Sacro Bosco* (1607), where – starting from possible combinations among the four primary qualities (Hot, Cold, Dry and Humid), the number of *dictiones* was considered, meaning how many words could be produced using the 23 characters of the alphabet (at that time there was no distinction between u and v), combining them two by two, three by three and so on, up to words of twenty three characters. Clavio provided the various mathematical formulae for this calculation, and stopped at a certain point in front of the immensity of possible results, in particular when including repetitions.

In 1622 Pierre Guldin wrote *Problema arithmeticum de rerum combinationibus*, in which he calculated all the spellings that it is possible to generate with 23 letters, independently if they were meaningful and pronounceable, but without considering repetitions, and he calculated that the number of words was more than seventy thousands billion billions (he would have needed more than a million billion billions letters to write them down). In order to picture this number, imagine writing all these words on thousand page notebooks, with 100 lines per page and 60 characters per line: one would need 257 million billions registers of this kind; and if one were to place them in a library, and Guldin studied in practice the arrangement, if buildings in the space of a cube of 432 feet per side, each capable of keep 32 million volumes, 8,052,122,350 of such libraries would be needed. Considering the entire surface of the planet we could house only 7,575,213,799!

In 1636, father Marin Mersenne, in his *Harmonie universelle*, faced the same issue, considering on top of the *dictiones* that it is possible to generate the "songs" (musical sequences) too. Mersenne attempts at generating only the words that are pronounceable in French, Greek, Hebrew, Arab, Chinese and any other language, but even with this limitation one could feel the shiver of infinity. Similarly, in order to annotate all the songs that can be generated on an extension of three octaves, twentytwo sounds, without repetitions (this is the first hint of the dodecaphony!), one would need more reams of paper than what would be needed to cover the distance between hearth and the sky, even if each paper contained 720 songs of 22 notes each and each ream were so compressed to be less thick than an inch: the songs that can be generated with 22 notes are a number with 22 digits, more than a thousand billion billions, and dividing them by the 362,880 songs that can fit into a ream, the number will still have 16 digits, while the inches that separate the center of the earth from the stars is a number with only 14 digits, about twenty nine thousands (*Harmonie*, p. 108). And if one would want to write those songs, a thousand a day, it would take 22,608,896,103 years and 12 days.

This seems like an anticipation, and *ad abundantiam* (abundantly so), of the vertigo of Borges' Library of Babel. This vertigo, however, contains not only the awareness of the infinity perfectibility of knowledge and invention, but also the conviction that in a very limited sequence of letters and sounds there are contained, potentially, not only all the literary texts ever produced by humankind, from Hesiod to Joyce, and all musical sequences ever heard so far, from Pitagora to Luciano Berio, but also all the texts and compositions that will be produced in the next hundred million years (if earth does not self-destruct earlier).

Here is then a proposal that puts on the same level both scientific and artistic creativity. Just as all future scientific discoveries should in some way be contained in the algorithms that support natural events, all

artistic creations should already be contained potentially in the fundamental elements, sounds, letters, intervals, tints, lines and geometric shapes our species has available.
The creative person is not then the one who pulls something new *ex nihilo* (out for nothing), but the one who identifies it, by intuition, by trial and error, by chance – or by the infinite patience that Flaubert described as a sign of genius – separating it from the gangue that enveloped it and hid it from view.

There is no question that this process is an historical one, as it interacts with situations, occasions, accumulation of knowledge and experience, oscillations in tastes. According to the calculation of Marin Mersenne it would have been possible to write *Le sacre du primtemps* since the times of Monteverdi – and maybe someone did it, and throw it away because the time was not ripe. But this is a secondary issue. Since ancient times it would have been possible to produce a perfect fifth, but in the 9th century it was not recognized among the perfect consonances, and it would start to be recognized as such only in the 12th century.

Rather, the issue is how much combinatorics allows for ever new ways of describing and reconstructing the world, and how much these ways can be considered acceptable.

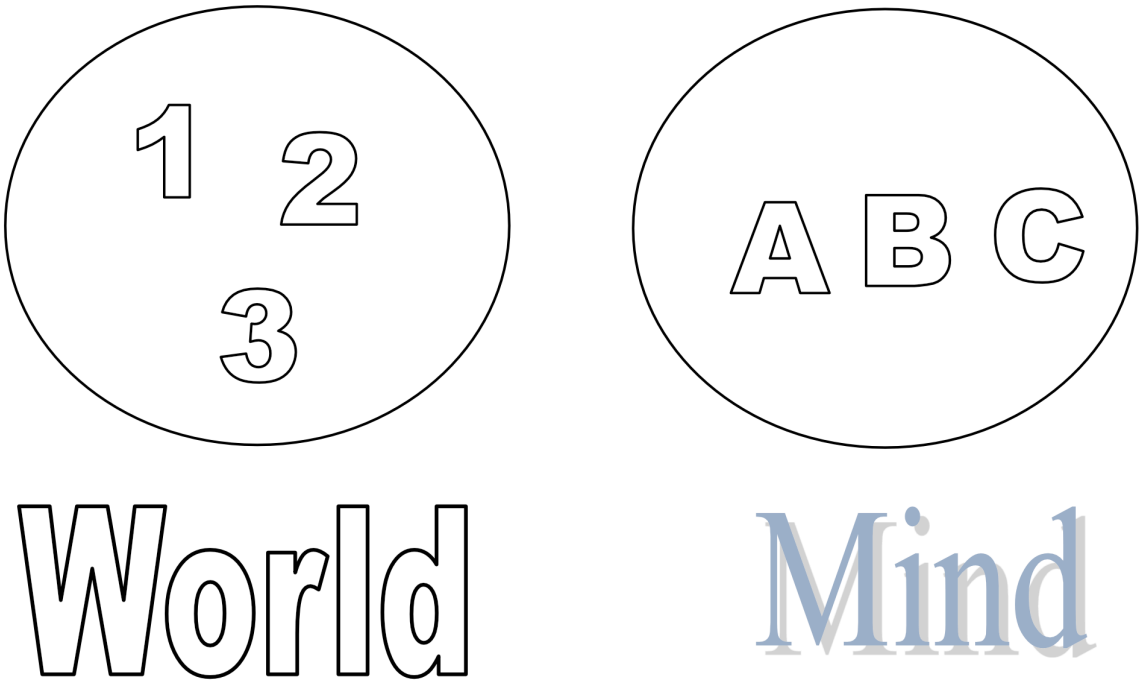
Let's try a mental experiment. Let's construct an elemental model that contains a World and a Mind that knows and names things. The World is a set made of elements (let's call them atoms for convenience, without any link to the scientific meaning of the term, but rather to the meaning of *stoicheia*, the Greek word for elements) structured according to reciprocal relationships. As regard the Mind, we don't need to conceive it as a human one, or as any *res cogitans* (mental substance, like in Descartes): it's just a device to organize sequences of elements that have the value of descriptions of the real world or of hypothetical worlds. We could call these elements neurons or bytes, or *stoicheia* too, but for simplicity we would call them *symbols*.

With World we mean the universe in its "maximal" version: it contains both what we believe to be the current universe and the infinity of possible universes - we don't know if they are not materialized, or they are materialized beyond the extreme boundaries of the known galaxies, in Bruno's space of infinite worlds, maybe all existing at the same time in different dimensions - the set containing both physical entities and ideal laws, from the Pythagorean theorem to Odin to Tom Thumb. Our universe can, therefore, also include God, or any other original principle.

In principle, it shouldn't be necessary to take a dualist position, like if on one side there was a thinking substance and on the other the universe of thinkable things. Both atoms and symbols can be conceived as ontologically homologous entities, *stoicheia* made of the same matter. The Mind should be considered only a device that is part of the World, that is the World as something capable of interpreting itself, that delegates part of itself to this end, so that its infinite or indefinite atoms some would count as symbols that represent all other atoms, exactly in the sense that we, human beings, when talking about phonology or phonetics, delegate some sounds (that we make as implemented phonations) to speak about all implementable phonations. The Mind should then be represented not as placed in front of the World, but as contained in the World, and to have a structure such that it can speak not only about the World (that is opposite to it) but

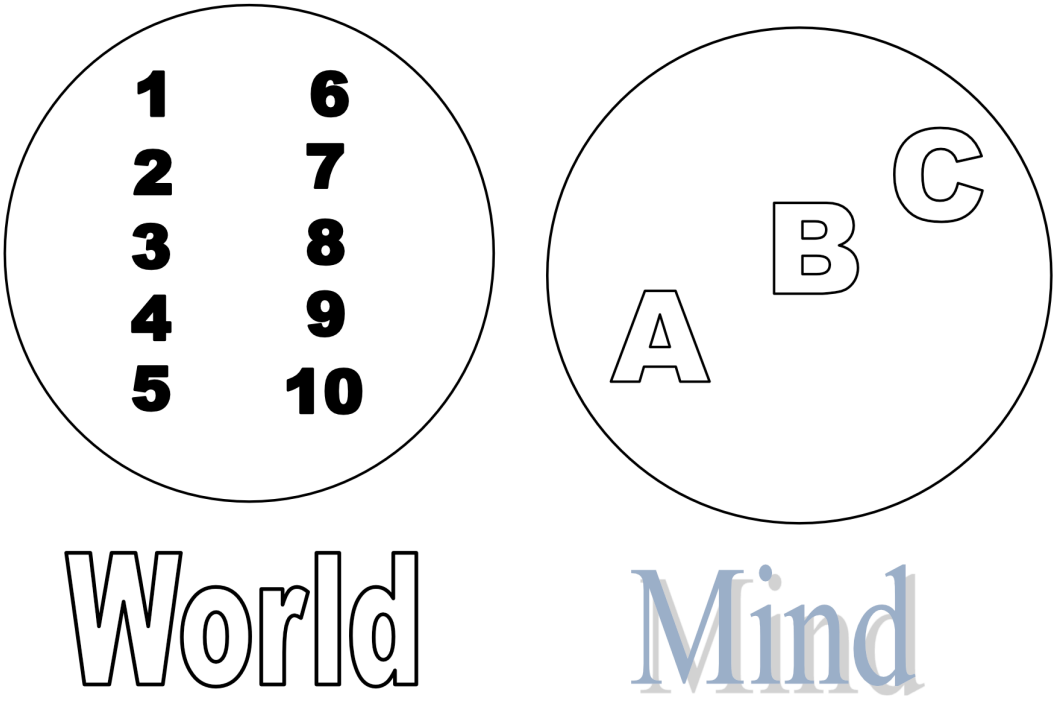
also about itself as part of the World, and about the same process according to which it, while being interpreted, can work as interpreter. At this point though, we would not have a model anymore, but actually what the model attempts ineptly to describe. And if we had this knowledge, we would be God, or we would have constructed it in the manner of Fichte. Anyway, even if we managed to create such a model, it would be didactically less effective than the one (still dualistic) that I'm proposing. Let's accept to consider on one side the World and on the other a Mind that can describe it and interpret it, or that can enrich it with new possible configurations.

First hypothesis. Let's imagine that the World is made of three atoms (1, 2, 3) and that the Mind has three available symbols A, B and C. The atoms of the World could arrange themselves in six different ways, but if we limit ourselves in considering the World in its current state (including its history), we can suppose it has a stable structure provided by the sequence 123.



If knowledge was specular, and truth *adaequatio rei et intellectus* (Truth is the correspondence between reality and the mind), there would be no problem. The Mind would assign (in a non-arbitrary way) the symbol A to atom 1, the symbol B to atom 2, the symbol C to the atom 3, and it would represent the structure of the World with the ordered symbols triplet ABC. Beware that in this case we would not need to assert that the Mind "interprets" the World: it would represent it specularly.
The issues come out if the assignment of symbols to atoms is arbitrary. the Mind could assign A, B and C to any of the atoms, at will, and by means of combinatorics it would have six ways to faithfully represent the same structure 123. We could say that the six descriptions would be six specular representations in six different languages, but the metaphor of six mirrored images of the same object hints at the fact that either the object or the mirror move every time providing six different angles or interpretations.

Second hypothesis. The symbols used by the Mind are in a smaller number than the atoms of the World. The symbols adopted by the Mind are still three, but the atoms of the World are ten (1, 2, 3, ..., 10).

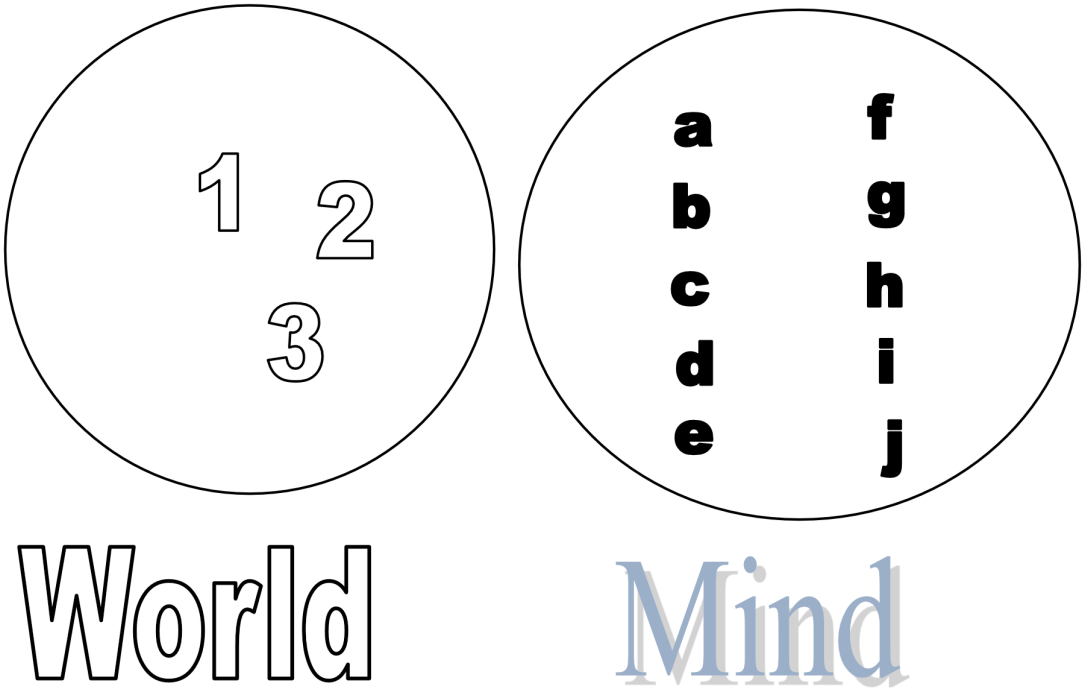


Assuming the world would still be structured as triplets of atoms, by means of factorial calculation it would group its ten atoms in 720 different ternary structures. The Mind would have six triplets of symbols like in the first hypothesis (ABC, BCA, CAB, ACB, BAC, CBA) to represent 720 triplets of atoms. Different worldly events, from different perspectives, would be interpreted by the same symbols. This means that, as an example, we would have to use the same triplet of symbols ABC to represent either 123, or 345, or 547. This could determine an embarrassing abundance of homonyms, but it could also allow to (creatively) discover that among, say, the worldly triplet 123 and the worldly triplet 345 there are analogies and elements in common, so much so that they can be represented by the same triplet of symbols. Therefore the limitation of the Mind does not negate the possibility of ever novel discoveries.

The problem would not change - despite becoming even more complex - if the World was not ordered in a stable way, but it was chaotic (and capricious, evolving, prone to restructure itself over time). As the structure of the triplets continuously changes, so the language of the Mind should continuously adapt to the different situations.

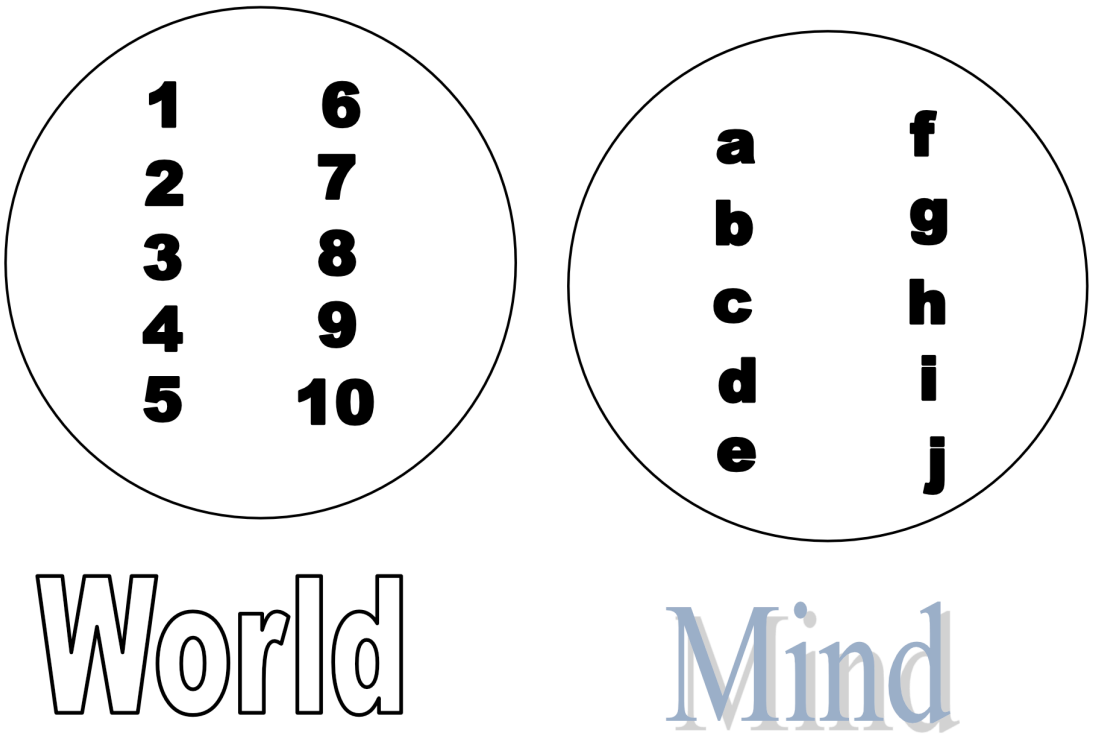
What if the World were hyper structured, meaning if it were organized according to a single structure given by a specific sequence of ten atoms? By combinatorics, the World could be organized in 3,628,800 combinations of decuplets. The Mind would still have just six triplets of symbols to describe it. It would attempt to describe it only a piece at a time, like if it was looking at the world from a keyhole and it would never have the chance to describe it in its entirety. But it would be exactly the choice of these partial solutions that would allow for innovative and unseen views.

Third hypothesis. The mind has more elements than the World. The Mind has ten symbols (A, B, C, D, E, F, G, H, I, J) and the World has only three atoms (1, 2, 3).



Moreover, the Mind can combine these ten symbols in pairs, triplets, quadruplets, and so on. This is like saying that the cerebral structure would have more neurons and more ways of combining them than the number of atoms of the World and their combinations. It is evident how this hypothesis should be immediately discarded, because it goes against the initial assumption that the Mind is also part of the World. In order to allow this hypothesis, the Mind would need to exit from the World: it would be a kind of heavy-thinking divinity, that would have to reason about an impoverished world, that, moreover, it does not know, because it would have been patched up by a Demiurge deprived of imagination. On the other hand, we could consider a Mind that in some way secretes more *res cogitans* (mental substance) than *res extensa* (corporeal substance), meaning it produced a very small number of thinkable structures, using few atoms, and keeping more in reserve to use them as symbols of the Mind. The consequence would be that the Mind would have an astronomical number of combinations of symbols to represent a worldly structure 123 (or at most its six possible combinations), every time from a different viewpoint. The Mind would be able, as an example, to represent 123 through 3,628,800 decuplets, each of them representing not only 123, but also the time and the day in which it is represented, the internal state of the Mind itself in that moment, the intentions and goals of the Mind for representing it. There will be an excess of thought with respect to the simplicity of the World, and the reserve of possible representations would exceed the number of possible existing structures. And maybe this is how it all happens, considering that we can lie and build fantasy worlds, imagine and predict alternative states. Such a Mind could write the Divine Comedy even if the infundibular structure of Hell did not exist in the World, or it could build imaginary geometries.

Fourth hypothesis. The Mind has ten symbols, as many as the atoms of the World, and both the Mind and the World can combine their elements, like in the third hypothesis, in pairs, triplets, quadruplets... decuplets.



The Mind would then have an astronomical number of statements available to describe an astronomical number of worldly structures. Moreover, it could also (thanks to the abundance of worldly combinations not yet realized) design changes to the World, as much as it could be continually surprised by worldly combinations that it had not yet predicted; even more, it would have plenty to do in explaining in different ways its own workings.
There would not be an excess of thought against the simplicity of the world like in the third hypothesis, but a sort of never ending duel among challengers that fight on a potentially level playing field, but, in practice, swapping weapons at each attack, embarrassing the opponent. The Mind would face the World with an excess of perspectives, the World would evade the traps of the Mind continuously swapping the cards on the table (including the Mind's ones).

I have no intention to come up with cosmological or metaphysical hypotheses and decide which of the four hypotheses is the right one (while suspecting that for some mysterious reasons all four may be valid, depending on the circumstances). What I suggest is simply that, even when proposing a purely combinatorial concept of creativity, the reserves of creative possibilities that open up in front of us are abysmally and galactically infinite, or at the very least undefined. A combinatorial concept of creativity does not limit its possibility nor its dignity.

However, I have to conclude by exposing some unresolved problems that today I cannot resolve.

1. If the creation of something new happens when the combinatorial wheel turns at its full speed, there should be no differences between nature's creativity and human creativity. Nature, over billions of years, tries everything, and settles on solutions that we would not necessarily define "optimal", but that represent a temporary stop in a state in which it allowed itself a short period of rest (little more than a few geological ages), because such state guarantees some stability, which does not precludes further evolutionary attempts. If these natural processes were determined by a divine mind, we could say that it has chosen all the solutions made possible by combinatorics, the best of the possible worlds. But then, why did not the divine design stop at, say, the dinosaurs, and has attempted further edits to that stable state that was highly satisfactory? Alternatively, the divine mind does not exist, nature (the eternal world) goes around in circles, stops on some solutions that in some way allow for some stability, and that appear as "good" or "optimal" or "providential" to us only because they are all the ones that were offered to us, and to which we adapted to?

2. Human creativity is different though. Why did we accept the copernican hypothesis not as the most creative, but also as the most creatively adequate to define how things are, among several interpretations of the solar system that the combinatorics allows? And be reminded that for a long time there was a competition among the Ptolemaic interpretation, Tycho Brahe's interpretation and Copernicus' one, not considering the previous presocratic ones. We could now introduce a non-contradiction criterion between interpretation and facts confirmed by experience: the creativity that we call scientific does not just find a new combination, but this combination has to stand our attempts to falsify it experimentally.

3. Let's talk now about artistic creativity: we don't expect a new piece of art that we consider novel, and somehow interesting, to match other experiential data nor to match current tastes, because usually a new piece of art questions exactly such criteria and contributes to changing them little by little. One could argue that we consider an art piece beautiful, pleasant, satisfactory or important by majority consensus – but we would be delegated to sociology to give the answer that aesthetics should give.
It seems like a combinatorial definition of creativity could describe the mechanics of it, but does not clarify the reasons behind the common agreement that validates the choice of the single. Which is another way to bring up the question about brainstorming again: why do we stop on a single idea and consider it the solution among a pile of solutions irresponsibly, instinctively, almost randomly proposed by scraping the barrel of all the combinations that the situations allowed?

4. Assuming those points to be solved (and they are not, otherwise there would not be conflicting critical and aesthetic theories, nor would it be possible to consider the result of a brainstorming as a failure), the final question is: if the creation of something new comes from a series of possibilities offered by combinatorics, why is not everyone capable of spinning the the wheel of combinations – in other words, why are not all humans equally creative?

It is as if, given an unknown city made of a totally labyrinthic bundle of streets, the best map could be traced by the one who can walk faster through the highest number of nodes and joints, who can turn faster through the corners and cross through intersections. The city would be exactly the same for everyone, but someone was able to walk through it faster keeping an account of all the steps taken.

But the map example is misleading because it brings us back to those *exploits* of scientific creativity that can be verified by following experiments. The problem with artistic creativity is: after considering all the veins of the slab of marble, and several possibilities of different figures that could be obtained from it, why did Michelangelo choose the Moses?

I'd like to go back to one of the quotes that I used earlier: "Creativity is allowing yourself to make mistakes. Art is knowing which ones to keep." The problem changes then from being able to spin the combinatorial wheel at the full speed to being able to stop, with a deliberate choice, on the solution that appears to be the best. Even if Michelangelo hit with one additional hammer blow with his Moses screaming "why don't you speak?!", he would then repair the damage because he decided that the statue needs to have that shape, and those details, and not others.

The fact that creativity is based on combinatorics seems evident to me, and I tried to show it throughout my speech. But the reasons for the choice, of rejecting unsatisfactory solutions, to stop on the only one that seems perfect, is not yet clear to me. And, finally, if Michelangelo decided the Moses would be it, why has the community decided that the Moses represents the most creative solution?

Qu'on ne dise pas que je n'ai rien dit de nouveau: la disposition des matières est nouvelle. (Let it not be said that I have not said anything new: the arrangement of materials is novel.) Pascal was right, but why does the arrangement he chose match with the best shot he could play – we would say, to follow up on his analogy, to the shot that makes you win the match? In the context of the ball game it's clear, but it is not as clear in the context of moral philosophy. Otherwise Pascal chose that arrangement when he could have chosen other ones that would have seemed even better to us, but we end up considering his choice the better one just because in practice it is the one that survived.

Beware, this question leads us to conclude that the Oedipus Rex or the Medea seem sublime tragedies only because they are the ones that we got a hold of, while others, maybe infinitely more beautiful, disappeared for a variety of reasons (fires, censorship, critics' foolishness). So we should say that what we consider absolutely creative is just something sufficiently novel that survived, but we could have received something else, and we just don't know.
Or we can wait for the combinatorics of creativity, spinning the wheel again for a few millennia, to give it to us one day.