Being Aware of Rational Animals

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Joyful is the person who finds wisdom,
the one who gains understanding.
King Solomon, Proverbs 3:13

Abstract

Modern science has qualified human beings as *homo sapiens.* Is there a serious scientific theory backing this nomenclature? And can we proclaim ourselves as wise (*sapiens*)? The classical *rational animals* characterization has apparently the same syntactic form (a qualificative applied to a substantive) but it is not working exactly in the same way. Moreover the semantics behind is more appropriate encompassing a pivotal ambiguity. In the second part of the paper we further delve this ambiguity relating rationality with three fundamental features of these creatures: laugh, sexuality and transformation.

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1. The primitive soup

Once upon a time human beings were conceived as *rational animals*. What does this mean exactly? Can we still use this definition? Are there alternative ways to understand what a human being is, to qualify, to describe this entity?

Nowadays "rational animal" looks old fashioned, but what is the new fashion, if any? The common idea is that human beings are animals, but it is not clear what exactly distinguished them from other animals. There is in the air a mixture of different things: physiological (size of the brain, erect posture, hands), cultural (religion, art), sociological and political (cities, states, money).

People are trying to make a connection between these different features but they are not gathered into a single idea characterizing human beings. *La mayonnaise ne prend pas*, as they say in Marseilles, and we are left in a rather chaotic situation, a kind of primitive soup. It is not clear that something will ever emerge from this soup, maybe it will keep boiling and after evaporation we shall return to dust.

Although what prevails to study human beings is a scientific approach - a mix of biology, sociology, anthropology, etc. – paradoxically science is not highlighted at the meta-level, i.e. science is not considered as a critical feature characterizing these creatures. People are not talking of human beings as "scientific animals". This would be an expression close to "rational animals", since "rational" is the Latin translation of "logos", and one of the meanings of "logos" is science. We find this meaning of "logos" in many neologisms like "anthropology", literally the science of humans, or "biology", literally the science of life.

Maybe on the one hand for post-modern philosophers science is considered as a by-product of society and culture while on the other hand for scientists "Rational animals" seems a mythological way to conceive human beings, they would perhaps prefer to talk about "brainy animals".

2. The homo sapiens baptism

Since 1758 *homo sapiens*[2] has been used to talk about human beings, it has become a kind of official name. "Homo sapiens" is a formal expression built according to the binomial nomenclature promoted by Carl Linnaeus. Using this tool Linnaeus and his followers have baptized thousands of creatures.

"Binomial nomenclature" is a rather technical expression, more simply people will say that it is a scientific name. Nomenclature is a system to build names, related to taxonomy. Here is how taxonomy is presented in Wikipedia:[3]

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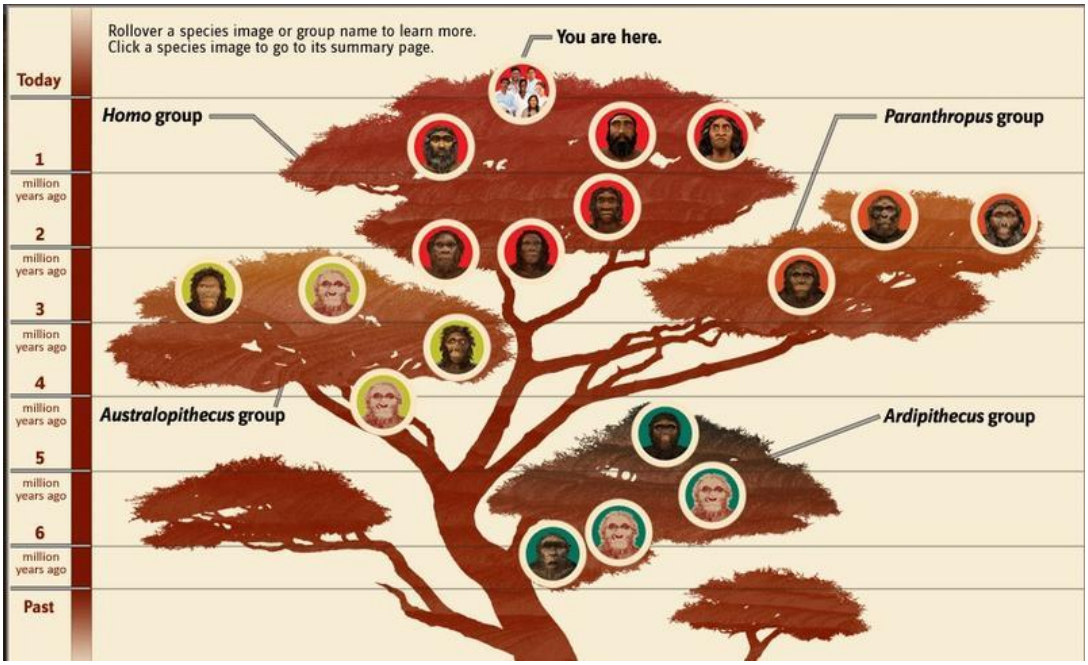
[2] Shall we write "Homo sapiens" or "homo sapiens"? Is it a proper name? This is an open question for philosophers of language.

[3] Certainly we must be cautious citing Wikipedia but it is a rather snobbish academic attitude to systematically reject it. The Wikipedia phenomenon is an important advance in the development of human rationality.

Taxonomy (from Ancient Greek: τάξις taxis, "arrangement," and νομία -nomia, "method") is the science of defining groups of biological organisms on the basis of shared characteristics and giving names to those groups. Organisms are grouped together into taxa (singular: taxon) and given a taxonomic rank; groups of a given rank can be aggregated to form a super group of higher rank and thus create a taxonomic hierarchy. The Swedish botanist Carolus Linnaeus is regarded as the father of taxonomy, as he developed a system known as Linnaean classification for categorization of organisms and binomial nomenclature for naming organisms.

In this presentation, like in the shorter definition of the Cambridge Dictionary (Taxonomy: *a system for naming and organizing things, especially plants and animals, into groups that share similar qualities*), there is a mixture of two things: language and classification. This mixture makes sense in the perspective of establishing a parallel or isomorphism between language and classification. But this can be confused promoting the idea that taxonomy is crucially dependent on nomenclature. This perspective was promoted by Linnaeus himself giving too much emphasize to nomenclature.



The classification used by Linnaeus is based on trees, one of the most popular forms of classification;[4] one could also say one of the most *natural* forms of classification, since it is inspired, as the very name indicated, by trees. The formal definition of tree as a mathematical object is very close to the image that we have of a tree, leaving aside leaves, fruits and other decorations – an abstract tree is completely naked. Human beings as *homo sapiens* are within a tree like other apes but also like cows, dogs, … all the menagerie. *Cada*

[4] About the theory of classification see for example the recent book of Parrochia and Neuville (2013).

macaco no seu galho as they say in Piracicaba. But what kind of understanding of human beings are we getting by placing them in a tree?[5]

Taxonomy has been mainly developed in biology but it has also been exported to other areas. However taxonomy does not play a fundamental role in sciences like physics and mathematics and it is also not a key feature of contemporary biology. Taxonomy is not nowadays the basis of science. It rather appears as a primitive aspect of science going back to Aristotle. Linnaean nomenclature is based on species and genus, the two ultimate ramifications of the tree. If Linnaeus can be considered as the father of taxonomy, Aristotle can be considered as its grandfather. Aristotle had a strong interest in biology and his conception of science is much related with this science for which he promoted the idea of classification. Although the notion of tree does not appear explicitly in the work of Aristotle, he established the distinction between species and genus and the corresponding branching via difference (*diaphora*) – about this topic, see e.g. Granger (1980).

Can we consider classification as the basis of science? In many senses classification is limited. It looks superficial and childish. It can be considered as a first step towards understanding but also it can be misleading, taking us in the wrong direction, obscuring things, especially when it is strongly attached with the naming game of nomenclature, like in the case of the Linnaean methodology. If we want to understand what a giraffe is, and someone tells us that it is a *Giraffa Camelopardalis* what have we learnt? Latin names are good for "épater le bourgeois" but they do not necessarily promote deep understanding.

In "Giraffa Camelopardalis"[6], *Giraffa* is the genus and *Camelopardalis* is the species. This means that what we usually simply called "giraffe" is part of a generic group of similar animals: giraffes have sisters or/and cousins quite similar to them (none of them are still alive). What are the common features of the giraffe genus? It is not given by the name, which is a latinization of the French word "giraffe" itself coming from the Arabic word "zaraffa". This is not by latinizing a word like "hazard", also supposedly from Arabic origin, transforming it into "hazardus" that we will have a better understanding of the idea beyond the word.[7] "Homo sapiens" works in the same way as "Giraffa Camelopardalis". This suggests that human beings are part of a tribe, they are

[5] Wittgenstein wrote the *Tractatus Logico-Philosophicus* using the structure of a tree. Such a process is much more than simple classification; it is an articulation of the thought. A bright idea since the standard linearity is not necessarily the best way to think.

[6] The original name given by Linnaeus was *Cervus Camelopardalis.*

[7] About the origin of the word "hazard", see the interesting philosophical analysis of Clément Rosset in his book *La logique du pire* (1971).

not isolated beings lost in the universe, but the characteristic of this tribe is not given by the word “homo”.

Maybe we can get understanding with the difference giving birth to the species. In the case of “Giraffa Camelopardalis”, the species is given through “Camelopardalis”, quite a beautiful name. It is a portmanteau name, a combination of “camel” and “leopard”. This name is based on appearances, a phenomenon of approximation and association. In Africa some people call planes “fire birds”. We can transform this primitive conceptualization into a scientific name: *ignis volucress*. This primitive approach also reminds us of fatherless bipeds,” a definition of human beings attributed to Plato based on external features which was mocked by Diogene bringing a plucked chicken to Plato.

This is a funny story but probably not true. Plato was part of a school of people rejecting appearances, himself promoting the appraisal of the true nature of things: the “ideas” which are beyond the illusory appearances and can only be grasped by our reason. The limitation of the primitive approach can be stressed by putting parrots and human beings together in the same species, saying they are speaking animals. Nature itself, with parrots, shows us how appearances can be misleading. If we try to have a conversation with a parrot, instead of answering the question, he will repeat the question.[8]

To what kind of differences is “sapiens” pointing at, the word defining the species of human beings within the genus “homo”? Strangely enough it is nothing like feather, brain or bipedism. “Sapiens” is a Latin word meaning wisdom, translation of the Greek word “Sophia”. Why Linnaeus chose this qualificative? Is it a good description of what human beings are? [9]

The technical biological contemporary characterization of human beings is not at all connected with wisdom: It is difficult to find wisdom among cells, nerves, genomes. At best we can say that biological beings are complex, that there is a kind of intelligence in action (see Narby 2005 about this topic). But wisdom is not part of the biological machinery. What is wisdom?

Today a standard meaning of wisdom is “The ability to use knowledge and experience to make good decisions.” It is not clear that this characterizes human beings. Can we say that destruction of millions of living beings, including human beings is the manifestation of wisdom? It is rather pretentious to claim oneself as wise. This pretention is more typical of sophists by opposition to philosophers. “Sophists” means *the Wise*, “Philosophers” means those who are *fond of wisdom.*

[8] We are exaggerating a bit. Parrots, like Alex the grey, can somewhat answer questions, but also Machines can do.

[9] Human beings are in fact nowadays considered as a subspecies of *homo sapiens* called *homo sapiens sapiens*, they are the wisest among the wise …

Blaise Pascal said: "Je ne discute pas du mot pourvu qu'on m'explique le sens qu'on lui donne" (I never quarrel about a name, provided I am apprised of the sense in which it is understood – *Provincial Letters* 1657). This claim is nice but controversial. On the one hand we can agree with Pascal that words are not so important, we don't want to be lost in wordy discussions. On the other hand to give the right name to the right thing is a wonderful art.

The arbitrariness of naming can be supported by the axiomatic method. In his famous essay *On the geometrical spirit and the art of persuasion* (1657) Pascal has given a new shape to the axiomatic method, articulating clearly its three aspects: axioms, definitions, deductions. But Pascal in this essay claims that it does not make sense to define everything and he gives as a typical example, human beings. It is true that it is easier to define a circle or infinity than a pig or a human being.

From the point of view of modern axiomatic, in principle everything can be defined. Pascal's essay was a source of inspiration for Tarski (see in particular his 1937's essay), one of the main promoters of the modern axiomatic method and the developer of model theory. Tarski, as other people of the movement for the unity of science in the 1930s, had the idea to apply the axiomatic method to any kind of science. This was done mainly in physics despite the fact that Tarski's first love was biology. He did not work himself in that direction but encouraged other people to do so, in particular Woodger (see his 1937's book). However this line of research did not grow and flourish up to give birth to an axiomatic theory of life, which could be the basis of a definition of human beings, and we are left with the chaos of an empirical science.

3. The syntax of rational animal

"Rational animal" has the same syntactic appearance as "homo sapiens", but if we have a closer look we can see that it works quite differently. Rational animal is a mixture of two notions, one expressed through a substantive, the other one through a qualificative.[10]

In the same way we can speak about

- round squares
- black cows
- sports cars
- prime numbers
- needled trees
- strange ideas

[10] We are not writing here "rational animals" because our discussion is not about words. And we say that rational, not "rational", is a qualificative because we are talking about the notion expressed by the word.

- big cats

Sometimes it is possible to commute the qualificative with the substantive. For example instead of talking about a round square, we can talk about a squared circle. Both have quite the same meaning, and the same denotation. In the other above examples it is not so easy, perhaps impossible, to commute. Most of the qualificatives have a substantive correspondent. For example to strange corresponds strangeness, but the problem is rather with substantives that cannot so easily be transposed into qualificatives. Idea can drive us to ideal, but to which qualificative can we go with a car?

To rational corresponds rationality, and to animal corresponds, as qualificative, animal or bestial. But rationality is like humanity, it is rather singular than plural, not to speak about gold or other mass terms. There are no rationals (except in mathematics) like there are animals. And if there were, would bestial rationals be synonymous with rational animals? Bestial rationals could be considered as human beings by opposition to computers or other nice machines having no emotions or brutal behaviors.

"Rational animals" looks like "acronymic words": we have a class of things given by the substantive and the qualificative is delimiting a subclass of those things to which it applies, not applying to something outside of the ground class. There are no acronymic beings besides words. There are no rational beings besides animals. At least this was the idea before computers came into existence and if we consider that God does not exist or is an animal or is not rational.[11]

[11] Let us remember here that according to the *Bible*, God=Logos (cf. John 1:1).

Can we say for this reason that the qualificative is dealing with an essential feature? A qualificative which applies to many different substances is necessarily superficial: there are black cats, black holes, black skirts. Acronyms are a specific species of words, but they can be considered as a kind of abbreviations. It means that the idea beyond the notion is not so original; it is a particular aspect of a more general phenomenon from which it is not radically different. In the case of rational animal we have something more essential. Rational is not part of a broader quality.

And considering other groups of animals, is it possible to describe them in a similar way: dogs, snakes, birds? Let us have a look at some standard definitions:

Bird: an animal that has wings and feathers and is usually able to fly

Snake: a long, thin creature with no legs that slides along the ground

Dog: an animal with fur, four legs, and a tail, often kept as a pet.

None is really working like rational animals, maybe the closest we get at is with the definition of birds as flying animals. Flying is a remarkable feature, not as superficial as color or size. However:

(1) some birds are flightless, like penguins

(2) some beings like mosquitos or butterflies are considered animals, but not birds, despite the fact they fly

(3) some things which are not animals, like planes, fly.

If we want to make a parallel between rational animals and flying animals (3) is not necessarily fatal: one may also argue that nowadays there are rational things which are not human beings. In both cases, planes and computers, these are machines built by human beings. But maybe it is more "natural" to say that planes fly than computers reason, even if we are supporting the idea of "artificial" intelligence based on penguins, the mascot of non-monotonicians (see e.g. Ginsberg 1987).

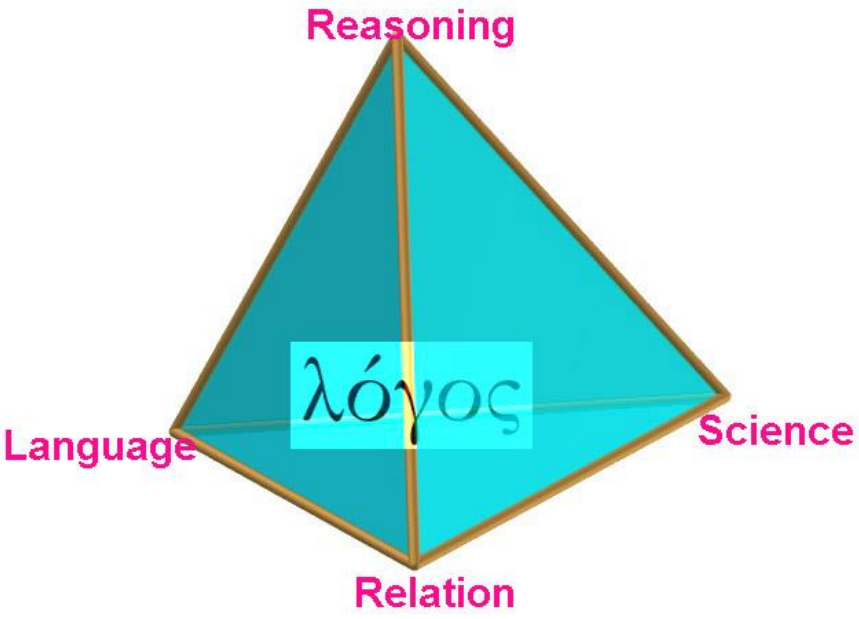
Regarding (2), one may argue that the flight of mosquitos and butterflies is quite different from the flight of swallows, eagles or flamingos, in the same way that monkeys or dolphins are not really reasoning. About (1), one may say that penguins have wings, a potential capacity to fly but that for some reasons they are not using them. We can say that some human beings have some capacity to reason but are not reasoning. It is not clear how we can characterize this subspecies. In any case this is not a breeding class, i.e. a group of animals that can breed among each other and with no others.

Something which is maybe more similar to "rational animals" than "flying animals" is "prime numbers" if we consider "prime" in its technical sense, but these are abstract entities.

4. The semantic network of logos

"Rational animals" is the translation/adaptation of the Greek expression "logical animals". If "zoion" and "animals" can be considered as semantically equivalent both extensionally and intensionally, this is not exactly the case with "rational" and "logical". "Logical" is connected with **"**logos", a central word of classical Greece. This word has four main meanings: language, science, relation and reason. The linguistical dimension of "logos" appears in particular in "neologism" which means *new word* and "syllogism", which means *sentences put together*. As we have already pointed out, "logos" also means science, as shown in neologisms like "biology" or "psychology". The relational aspect clearly appears in mathematics with the notion of irrational numbers ("a-logical" numbers), numbers which are not relations between natural numbers. The fact that there are such numbers was put forward in the proof of the irrationality of the square root of two. This is considered by some as the starting point of mathematics (cf. Dieudonné 1987), because it is the first non-trivial proof. A mathematical proof is a prototype of reasoning. And reasoning is the fourth aspect of the "logos".

The four dimensional aspect of the "logos" can be presented by the following picture:



Let us emphasize that the above diagram which is centered on a tetrahedron (a 3-dimensional simplex), can be seen as metaphorical or/and "pittoresque", but nevetheeless has an intrinsic value.[12] This is not because many people use diagrams and images in a rather superficial way in business

[12] It is better to use a tetrahedron because here the four corners have the same distance between each other, which is not the case in a square. Such feature was taken in consideration by Alessio Moretti to generalize the square of opposition using simplexes (see e.g. Moretti 2012).

and new age philosophy that they cannot be used in a positive and intelligent way. Mathematics which is considered as the climax of reason is much connected with visual thinking. This has been made clear in the recent decades in many ways, through fractals[13], diagrams as logical tools (Moktefi and Shin, 2013) and proofs without words (R.B.Nelsen, 1993, 2000).

Can we define human beings as "reasoning animals"? It is not obvious that human beings have always reasoned in the strong sense of the word. The reasoning leading to the irrationality of square root of two is a reasoning by absurd. Although it seems that the idea of reasoning by absurd emerged from Eleatic philosophy (cf. Szabó 1969), it is not clear that this kind of reasoning appeared in other parts of the world before, and that in the Western world it really developed and firmly took shape outside of mathematics, although Plato in some sense tried to use it in a broader context.

The understanding of what is the reasoning by absurd took many centuries and was really clarified only at the beginning of the XXth century at the time of modern logic. Modern logic gave birth to computation and a computer can perform reasoning by absurd.

Logical in this sense does not reduce to a biological feature, because on the one hand the birth of the reduction to the absurd is not related to a biological mutation or the size of the brain, and on the other hand a purely physical device, like a computer, can perform it.

We will explore next in which sense rationality in a strong sense is related to other crucial aspects of human beings. First we start with a rather light feature before we go to some more tragic issues.

5. Laughing animals

Laughter is a distinctive feature of human beings. Who has seen a cat, a dog or even a monkey laughing? A computer can laugh. But this is an artificial laugh. Note that sometimes people also laugh rather mechanically.

Can we characterize animals as laughing animals? Or is laughing just a superficial feature of these creatures? We can have a better understanding of this question by examining the relation between laugh and rationality.

There are different connections between laugh and rationality, which have been described by different authors in different ways, in particular Henri Bergson (1900). One of the basic ideas is that laughing is the result of an unusual and surprising mix of concepts. We can therefore qualify laughing as conceptual. And conceptualization is an important feature of rationality.

[13] Let us remember here that fractals were developed by the nephew of the Bourbachic mathematician Szolem Mandelbrojt, Benoît Mandelbrojt.

Desmond Morris (1967) has pointed out that the child first starts to laugh when he is able to recognize his mother. The relation between this recognition and laugh is as follows: the mother is considered by the child as the basis of his security, when she surprises him by jokingly creating fear this appears to him as a contradiction and this contradiction is the cause of his laugh. This can be called "rational laugh". It has many aspects and is related more generally to absurdity of which contradiction is a part.

But there is also a kind of irrational laugh, also proper to human beings. It manifests as fits of laughter. In Paris, people say *fou rire*, literally "crazy laugh". What is crazy in this laugh is not necessarily the object/cause of the laugh but its expression. Someone starts to laugh and cannot stop. It is called "une crise (crisis) de fou rire". This can be contagious and can lead to an epidemic like the one in Tanzania in 1962 (see Hess and Dvorák, 2008). Something lighter is "rire aux éclats", "éclater de rire." (burst of laughter). These are rather irrational features of laughing contrasting with conceptual laughing. But when we are talking about irrationality we are still connected with rationality.

Beyond rational and irrational laughing, there is a third different phenomenon, which is smiling. Smiling is related with a kind of intelligence, expressed by "cleverness" in English, "Metis" in Greek,[14] "ruse" (cunning) or "malin" in French. The fox is the symbol of the *ruse*, a famous character of Aesop's tale *The fox and the crow* and of the medieval *Roman de renart*. This kind of intelligence is quite ambiguous and can sometimes appear as dangerous not to say fiendish, as it appears in the French word "malin" and in English, "devilish".

On the other hand the smile of Mona Lisa seems to escape this perspective, having only a positive aspect, but which is difficult to explain. This smile is indeed qualified as mysterious or enigmatic. "Foxy lady" is a legendary mix of the two.

[14] See the excellent book of Detienne and Vernant, *Les ruses de l'intelligence*, 1974

6. Sexual animals

In 2014 I organized the *5th World Congress on Paraconsistency* with Mihir Chakraborty at the Indian Statistical Institute in Kolkata, India and had the idea to launch the contest "Picturing contradiction". The contest was open to anyone, even to those not able to come to Kolkata. The contenders had to send us a picture of a contradiction with a few words of explanation. Among the proposals, we received the following picture by Sharon Kaye, John Carroll University, USA

The Orgasmic Calculator

This is a picture of contradiction because the woman is both rational and irrational at the same time. Rationality and irrationality are mutually exclusive and jointly exhaustive opposites. So her state is logically impossible. She is rational because she is performing a complex mathematical operation. Complex mathematical operations are instances of pure rationality. She is irrational because she is in the middle of a sexual orgasm. Sexual orgasm is an instance of pure irrationality.

This proposal did not win the contest for two reasons: on the one hand the quality of the picture is rather weak, on the other hand her explanation although interesting is not necessarily convincing. A first point is that it is

possible to operate highly rational activities under emotional circumstances – whether connected to pleasure or pain. Blaise Pascal while having intense physical tooth pain was occupying his mind with abstract reasoning to escape the pain. A second very different point is that the mental state of sexual orgasm may be connected with some intellectual activities. Here is a quotation by the famous Bourbachic mathematician André Weil: "Every mathematician worthy of the name has experienced, if only rarely, the state of exaltation in which one thought succeeds another as if miraculously, and in which the unconscious (however one interprets the word) seems to play a role … Unlike sexual pleasure, this feeling may last for hours at a time, even for days." (Weil 1991, p.91)

This should not be confused with "mental masturbation", an intellectual selfish pleasure. Like orgasm, what Weil is talking about, is the contrary of selfishness, because on the one hand, one loses his self and on the other hand this unification with the whole is related to creation, creation of a new human being or new ideas and understanding.

Human sexuality is much stronger than the sexuality of other animals. This manifests in two ways, one being the intensity and duration of the orgasm, the other one being love. Desmond Morris, in his famous book *The naked ape*, has argued that the sensibility of the skin is strongly sexual and that sexuality takes the dimension of love among human beings because a strong attachment has to be developed between the father and the mother so that they will stay together long enough to take care of the child whose development needs more time than other animals, mainly due to the complexity of his brain, the source of rationality.

Before Morris, Schopenhauer had emphasized the specificity of the sexuality of human beings in a quite similar way, i.e. making an explicit connection between sexuality and love, but also in a much more philosophical way. For Schopenhauer human sexuality is the climax of the Will, the Will being the basis of the manifestation of reality. Human sexuality is therefore the symbol of being. But in a strange dialectical reversal, Schopenhauer then promotes an asceticism strongly attached to the rejection of sexuality, since according to him the negation of the Will is the negation of the illusory reality, leading to nirvana.

Sexuality, for Schopenhauer, like for Freud later on[15], is a profound unconscious power. One can argue that rejection of the will is intelligence. To tame this power, human being has to be highly intelligent. But there is a less dramatic way to see the situation. Sexuality leads to orgasm which is a fruitful

[15] About the relations between Schopenhauer and Freud, see e.g. Gupta, 1975.

and creative state of mind related to the outmost form of rationality, wisdom. Without wisdom human beings are at best transforming animal.

7. Transforming animals

Human beings can be considered as transforming animals. Transformation is a striking feature of these animals. These creatures have the capacity to transform nearly everything: themselves and their surrounding reality. Transforming matter into a space rocket, a computer, a movie ... Transforming ideas into reality. The earth has been seriously transformed by human beings. This is completely different from what happens with other animals. Although in nature everything is changing all the time, standard animals are evolving in rather stable ecological systems.

Human beings are transforming not only one ecological system but the whole ecological system in particular through global warming. Even before global warning, they had destroyed thousands of species, hunting without survival necessity. “Reasons” ranging from pleasure, business or simplification. Systematically killing wolves or other animals big or small which could have ben dangerous for them. The word “reason” is used here in a general sense. When someone says “the reason of X is Y”, she is trying to explain the relation between X and Y, sometimes saying that X is the *cause* of Y. We find back here one of the four aspects of the logos, *relation,* but mixed in a quite ambiguous way with another aspect, the *rational* aspect. This mixing can lead to a justification of everything: a war has a cause, so it makes sense…

Extinction of species is a natural phenomenon, but the quality and quantity of species extinction caused by human beings has no equivalent in the animal world. It has an equivalent maybe only at a pure physical level, considering for example the supposed extinction of dinosaurs as the result of the shaking of the earth by a meteorite. But an absurd blind force projecting a meteorite on the earth, or an earthquake like Lisbon earthquake in 1755 destroying one of the most important cities of that time, is not the same as this destructive transformation by human beings against nature or/and themselves.

Transformation is certainly connected with destruction, as expressed by the figure of Shiva considered as the transformer-destroyer, in the classical Hinduist *trimurti*, by opposition to Brahma, the creator, and Vishnu, the preserver.[16] Human beings can transform reality for better or for worse through creation and destruction. This capacity for transformation is amplified by science based on rationality and in modern times, with the creation of the

[16] About this triangle of opposition and other figures of opposition see our paper “The Power of the hexagon” (2012).

atomic bomb, humanity has reached a crucial level, the level of auto-destruction.

If humanity is annihilated by the atomic bomb, this could be interpreted as a kind of suicide. Suicide is also a striking feature of human beings, other animals don't commit suicide. "Managing" death is a fundamental aspect of human beings, and rationality can be a pivotal tool for suicide, for individuals: just like taking pills or using a revolver makes suicide much easier, at the general level, science with its atomic bombs allows humanity to commit suicide.

Now that science has made life much easier, eliminating dangerous wolves, cold winter, the need to fight for food and shelter, people find themselves in a much more comfortable situation and then boredom appears and the main cause of death is suicide.

A striking characteristic of rationality as it appears in science is that it is disconnected with moral issues. On the one hand someone may be a bad guy and be very "intelligent", for example a very good mathematician – the proof of the theorem by X will be true forever even if X's behavior is not politically correct. On the other hand products of science and technology can be used in good or bad ways. The father of aviation, Santos Dumont committed suicide when he saw that planes were used for war (see Wykeha, 1962).

Can we rationally use rationality? That is a difficult question. This is directly related with philosophy (cf. Plato's cave) and religion. The ultimate science would be the science of distinguishing the bad from the good, but it is not clear that it is a human science, cf. *Genesis* (Basset 2014).

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