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SOME PRINCIPLES FOR A PLURALISTIC APPROACH OF KNOWLEDGE

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Abstract. *As no human knowledge about reality can be perfect, the pluralistic approach, that is using simultaneously more different instruments or theories, instead of a unique one, is a rational choice. The diversity and a rating of human instruments of knowledge are presented. An internal pluralism and an external one can therefore be defined, discussing some of their features, advantages and disadvantages.*

Keywords: knowledge, unic and pluralistic approach, internal, external.

The impossible perfection of knowledge

We will use in this paper the term „reality" and „real world" with the same meaning, even we acknowledge that what we call „real world" is only an image of a reality that remains for us a „black box", an image made by our senses and instruments. Knowledge is useful because it helps us to work more efficiently toward our values on this „box".

Much of human knowledge is expressed by truths. For simplicity, we will agree provisionally that *truth* is a sentence or a mathematical expression, that one who uses it has good reason to regard as consistent with reality. Possibly, we associate a truth with a level of trust (between "total" and "null"). Truths (particularly the scientific ones), as well as *general* and concerning the *reality*, though they aspire to be „universal" and „axiological neutral", are actually components of human models, constructed within particular human cultures and seeking human values.

Any initial knowledge is personal; even then it is transmitted to other entities. Therefore about a certain aspect of reality and in a certain moment we can have a plurality of truths that may be contradictory. A certain truth can be accepted by a smaller or greater group or by all humanity. So there: my truth, your, of us all, but, whatever the scope of acceptance, all truths remain human, fallible and perfectible. Obviously, the truth is more respectable since its scope is larger.

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But the size of the sphere is not a validation criterion of truth. When Copernicus said the earth revolves around the sun, or Einstein that time slows down its pace at high speeds (and there are countless similar examples), their truths were minority, however, the advancement of knowledge gave them right then.

If the „truth" is resulting from its observed or measured adequacy to reality or from its practical effectiveness, we can agree to name it **real truth**. It is different from the theoretical truth as we will show below. If a real truth is more general, its adequacy cannot be made perfect, for more reasons: the complexity of reality, the limits of human senses, of language, of time, of technology, cultural imprinting etc. This means that errors of knowledge are inherent and we never reach a complete, exhaustive, knowledge of reality, unless we live in an artificial world as in "The Matrix" movie, and the programs used for this world are perfectly translatable into a human (or computer) language, which is very unlikely.

All forms of knowledge are human models of reality, interacting with us and seeking human values. No model is perfect; in general, any human knowledge of reality is limited, uncertain, and provisional. The human knowledge is anthropomorphic. Inter alia, everyone is subject to the "imprinting" of his early life, such as common habits of large communities, making him "mentally blind" to certain aspects of reality, through a veritable "cultural hypnosis". We see only what we were taught to see. If we were taught all the same, we all see the same things and others will become invisible to all of us in the same way.

Many people believe that reality can be truly understood only in light of word, logic and mathematics. Each of these three „pillars" of knowledge has undeniable merits but also inherent limitations. As an example: arithmetic seems, at least at first glance, a perfect tool, but Kurt Gödel showed that it cannot be fully described only with an infinite number of axioms. This suggests that, similarly, the phenomena of the universe cannot be exhaustively described with mathematical tools only by an infinite number of laws. Fortunately, word, logic and mathematics are not the only tools of human knowledge. There are aspects of reality that cannot be described by these instruments, but can be by others.

An old stereotype that occasionally reappears is that unclear words can be eliminated (we speak here of course about the words referring to something real and not about ideal abstractions constructed by the human mind). There are at least three reasons for this preference cannot be achieved: A finite number of words name a virtually infinite number of things and phenomena, therefore the words are inherently bearing errors (as Aristotle already said). The words

(e.g. "house", "intelligence", etc.) evoke in the minds of each person a different life experience, so they cannot transmit truths without errors. The third reason is that as the words refer more general concepts, they ignore more details as „insignificant". These details can wreak in another context (see also "The Devil is in the details").

Even if there were an „absolute truth", it's unlikely that one can come into its possession. It is unlikely that a demiurge (the author of this truth) make use of our words, human logic and mathematics, which are mined from the known limits. So scientific theories or metaphysical conjectures are interim human hypotheses, validated by confrontation with reality, and not truths extracted from an absolute and ultimate treasure, established by a superhuman authority.

The verbal-nonverbal tandem

A widespread popular prejudice is that knowledge is valid and justified only if it is expressed in words or, more narrowly, only logically or mathematically. So, many will tend to ignore those features of reality that are not described by these instruments.

Actually, many living beings have a plenty of useful mental models and representations of the real world (their components can be named even „nonverbal truths" – extending the definition given above), appropriate to solve problems, finding the right solution. Man inherits and develops these nonverbal instruments, adding to them the *word*, which only complements them. The human nonverbal knowledge may be innate or acquired, conscious or unconscious, ensuring the achievement of a great majority of our actions, from the simplest to some very sophisticated. From the radiologist to filmmaker, from weaver to the surgeon and from the engineer to the painter or musician, the examples of nonverbal learning and reasoning are countless.

Only a very small part of the knowledge available to a person is (and even can be) spelled out in words. *„We know more than we are able to say"*[*].

When I speak to someone, I „verbalize" my conscious representations on the felt, seen (possibly with my mind's eye) etc. The outcome of this "verbalization" is sometimes a long reply but prepared in a split second. The message receiver will *„recall"* in his mind an appropriate representation consisting of images, sounds, etc. according to his experience. If my nonverbal experience is different than that of the receiver, it is a risk that my message is not interpreted as I wanted. Range of life experience of people being different, the same word will evoke

[*] Michael Polanyi *Personal Knowledge: Towards a Post-Critical Philosophy*. University of Chicago Press 1958.

different nonverbal information in different people, which often leads to a dialogue between deaf.

The knowledge expressed in words is mostly blind and meaningless if not accompanied by the nonverbal knowledge associated. The meaning of words is given, ultimately, by the related nonverbal knowledge. In its absence, the word remains suspended in imposture. In this case, subject „parrot" but not understand what he says. You understand something only if you can play it with „your words". This „something" is „translated" in words from something else, which is not verbal.

Naturally, as the concepts become more abstract, the nonverbal imagery associated departs increasingly common experience. The ability to imagine such nonverbal representations, especially the "generalized" ones, distinguish those who ease "abstract thinking".

The *words* have become a tool for building and hoarding models of reality and of human action on it. Words exalted mankind over the animal kingdom. However, verbal models remain inextricably linked to the nonverbal ones. So a person has, in parallel, an *articulated* knowledge (verbal) and a *tacit* (nonverbal) one. We can conceive them placed on two levels, which have a permanent correspondence. The two form in the human mind a tandem of inseparable and complementary tools, each of them having advantages and disadvantages.

Speech cannot replace or cancel the nonverbal realm in human thinking. Neither words nor the nonverbal are perfect instruments. As each word designates a virtually unlimited number of „non-words" describing reality, the „non-words" are more faithful to reality than the more appropriate word, but the words are stronger landmarks, firmer and less perishable than a „non-word". The latter, through forgetfulness, can „slip" easily in a neighboring class. The nonverbal include global reality, while the words require a linear and sequential way, but the latter allows – in certain conditions – step by step reasoning, until very distant consequences.

Two paradoxes and the need for ideal worlds

Another prejudice is that logic can be used without error on any properly constructed sentences about reality. First of all, logic itself is not perfect. Logic is a human tool for working on human verbal truths and like any tool, has limitations. They turn out inter alia in the logical paradoxes. But even though logic would be perfect, the words and the truths they built, especially the general ones are imperfect, as we have seen; also *logic operations typically increases the inaccuracy of truths.*

An illustrative example is what I name the ***"paradox" of Bierce***. Trying to mock the Logic, he presents the following „syllogism": premises: "60 people do a job 60 times faster than a single man" and "a man digging a post hole in 60 seconds"; result: "60 people digging a hole in a second"[*]. The errors of premises were „acceptable", but they have dramatically boosted by logical operations, resulting in an absurd conclusion. The reader of this paper has pursued obviously in parallel, on the verbal level the logical syllogism, and, on the nonverbal level, the mental image of sixty people troop to dig a hole together. The contrast between the logical correctness of the reasoning and the grotesque picture of the impossible crowding makes us understand that two agents of our minds – one verbal, another nonverbal – have worked alongside, reaching opposite conclusions. The contradiction triggered comic and make us understand how the tandem of the two levels can help us overcome this kind of mistakes.

Does a computer, with appropriate logical programs, can detect this error? *No,* because a computer works only on one level (has no "non-words") and its programs are based on the premise that sentences used are *perfectly* true (or false).

Bierce's paradox draws our attention to a crucial and disturbing fact: *the logic cannot be used, without fearing errors, on statements of some generality about the reality, since any such statement is bearing errors.*

Mathematics has similar problems. It has paradoxes similar to those of logic. To avoid them, scholars proposed more alternative mathematics (logicism, formalism, intuitionism), unable to agree on their fundamentals. Arithmetic seems, at least at first glance, perfect in itself, but Kurt Gödel showed that it cannot be fully described only with an infinite number of axioms.

But even in cases not involving the above limits, mathematics is unable to fully describe reality and is unable to make on it *perfect* predictions (except maybe in artificial cases: money, bricks, screws etc.). An illustrative example is what I name the **Paradox of Apples**. When we are invited to think of an indisputable truth, the first idea that comes to mind is something like „1 + 1 = 2", generally a sign of respect to the rigorous way in which arithmetic deals with the concept of truth. But, is the famous „1 + 1 = 2" just so undeniable?

The sentence: „*An apple and an apple are two apples*" is an excellent example of cultural hypnosis imposed by school and tradition. Who and when will wonder if „a healthy apple plus a rotten apple really are two apples?" or „a big red apple and one crab apple are two apples?" And what would be in this case „two apples"? Apples good to eat? Abstract apples?

[*] Ambrose Bierce *The Devil's Dictionary*

Also at school we were told that we are not allowed to gather apples with pears. But can we collect a crab apple with a healthy apple, or a small apple with a big apple? Or - in general - two different apples? And attention! *Two perfectly identical apples are not anywhere.* So what we are allowed to collect and what not? And what will be the result exactly? Twice what?

Starting with 1+1 = 2, *all mathematical truths are in fact human tools, carriers of human limits and available in fewer situations than we imagine*. Mathematical truths are *almost never perfect in real environment* (being perfect *only in mathematical ideal worlds).* They are nevertheless indispensable, *satisfactorily* close to perfection, and the most efficient and useful forecasting tools available to mankind.

Paradoxes above illustrates that logic and mathematics work properly only with perfect truth, while the real truths, concerning reality are imperfect.

This contradiction was one of the most formidable challenges that the human mind has met along the adventure of knowledge. The solution that scholars have found was that if we want to use logic or mathematics, we must consider *two parallel worlds,* namely:

1. ***Reality*** independent of us, described by **real truths** (also called *empirical truths*): adequate to reality or practically effective. They are bearing *errors,* so the logic may be used on them only prudently and within some limits;

2. ***An ideal world,*** described by abstract words and *perfect* **ideal truths** (also called *theoretical truths*), and as close as possible to the real word considered. On the ideal truths logical and mathematical operations can be performed without fail and without limits (if we avoid some paradoxes).

Few people are aware that school has endowed us with *two vocabularies,* two different groups of words: **names**, not perfect, appropriate to the real world, being devoted to colloquial, metaphorical truths, and **abstractions** suitable for ideal worlds, considered perfect.

As illustrations: in the *real world* there are *names* as “ray of light”, “edge of an object” etc. or “point (punctuation mark)” or “corner of a crystal”, while in the *ideal world* of geometry are *abstractions* as “line” or “point” (with no dimensions) etc.

As the ideal world (possibly created ad hoc) is *as close as possible* to that part of reality that interests us, the similarities between the two worlds will define a system of bridges, we can gather as *"dictionary"*. By this "dictionary" real world problems are translated into the ideal world, and results of operations are re-translated from the ideal world to the real truth. For example, a chamber volume can be considered equal to that of a rectangular parallelepiped, for this calculation

is without error in the ideal world of geometry. The value found so is not perfect in reality, but is satisfactory for purpose.

Therefore, *is useful to group the instruments of human knowledge into three levels: nonverbal, verbal-colloquial and logical-mathematical*. Many errors arise (as in Bierce's paradox) if we confuse the latter two levels. The main distinction of the logical-mathematical level is that its components (describing not the reality but an ideal world) are always *perfect*. These three levels are mutually complementary and can correct each other, so they should be cultivated and used together. The main characteristic of the first two levels is the *adequacy* to the reality, while *self-consistence* is for the logical-mathematical level.

As a broad conclusion from the above ideas: we can imagine *the mind as a society of agents*[*], with different expertise, different kinds of knowledge: logical and metaphorical, verbal and nonverbal, even conscious and unconscious. But the knowledge of these agents is also practical, symbolic, emotional, and also moral and artistic. Concerning its origins, knowledge could be innate (phylogenetic), acquired by experience, through training or revelation, through rational operations, or even by creation as of new theories. Human brain inherits and improves the instruments of all its ancestors: visual, auditory, tactile, olfactory etc. adding to these human-specific tools: word, logic, mathematics, etc. All these instruments have limitations as well as mutual benefit.

In a certain action, a number of agents of mind will work together, suggesting ways to act, as well as the status of the possible consequences. The agents *cooperate* if their suggestions coincide; they *compete* if the suggestions are different; and the agents of a certain level could be also subordinated to higher agents in a *hierarchical* structure.

This organization of diversity, this ability to use together all these complementing forms and instruments, comparing their suggestions and creating new truths, is the main advantage of human mind over computers or animals. The main mistake in thinking could be to trust only one (e.g. mathematical) way, ignoring all others. The recommendation above could be named **internal pluralism**. An external one will be presented below.

Scientific theories and the ontological drama

A normal *scientific theory* about reality is developed using all the three levels of instruments of human knowledge mentioned above. To establish a theory, a field of interest in the real world is circumscribed and a set of *real truths* about this field are accepted (on the nonverbal and colloquial level, therefore with

[*] see for example in Marvin Minsky, *The Society of Mind*, Schuster & Simon, New York, 1986.

possible negligible errors). Afterwards the author of the theory creates or chooses an ideal world, as similar as possible with field of study considered and describes this word with (perfect) abstractions and (perfect) ideal truths, organized in a more or less *formal* theory (primary and derived notions, non-contradictory axioms, principles, theorems etc.). These are linked (through the "dictionary") with the names for the field of reality, respectively with the real truths considered. Each real truth should be "translatable", on the same way, in an ideal truth, and all ideal truth should have at least one corresponding real truth, excepting the situation that is not possible to verify this truth.

We need theories (and not only disparate truths) because – on the logical-mathematical level – they bring three major advantages: *economy* and *regeneration* (some truths, including lost ones, can be draw from the others), as well as *forecast* (new *predicted* truths can be deduced from the existing ones).

Scientific theories consider as real truths *only* those which are *verifiable*, either by reproducing the *experimental* phenomena involved in an appropriate laboratory, or *by* seeing them often enough. Scientism requires even the *measurability* of the phenomenon. But *not all phenomena of reality are observable and reproducible at will, so not all reality is approachable through scientific theory.*

Given that in an ideal world the mathematical and logic operations are performed almost without error, predictions can sometimes be pushed very far from the premises. These predictions are translated (by "dictionary") in novel real truths, which *in most cases* will be validated in practice. This was, in the last two centuries, the main route of discovery, at least in physics. As it is accepted by leading epistemologists (e.g. Karl Popper[1]), if a theory cannot build predictions, or there is no way of validation or invalidation of their novel real truths, the construction cannot be called scientific theory.

A notorious illustration is the discovery, in 1846, of the planet Neptune. French astronomer Urbain Le Verrier calculated, starting from the disturbances in the motion of Uranus and based on the theory of gravity (a "perfect" law in the *ideal world* of Newtonian mechanics), the position in the sky of a new, undiscovered planet (prediction – a novel *ideal truth*). Le Verrier announced the German astronomer Johann Galle, that having a powerful telescope, discovered the planet visually (i.e. the corresponding *real truth*), close to the location indicated (thus with an *acceptable error*). The amazing coincidence between the ideal truth predicted and the real truth of the actual observed position, strengthened confidence not only in Newton's theory but also in the principles and effectiveness of this scientific discovery procedure. But the history of science talk

[1]Karl R. Popper *The Logic of Scientific Discovery* Eight imp., 1975, Hutchinson &Co, London

less about the fact that Le Verrier predicted, in the same way, the existence, close to the Sun, of another planet, which he called Vulcan; a planet that has never been found, because it does not exist.

The "ideal-real" tandem underlying scientific theories reflect a "paradoxical agreement" (as some called it) between reality and ideal worlds. But this "agreement" is not at all perfect. It is therefore important to stress that *ideal worlds are closely approximates but almost never identical to the real world that they doubles* (except in the cases when the reality is artificial). So even if newly constructed ideal truths translated into real truths are mostly validated in practice, there are situations where this validation does not occur. Ideal worlds do not guarantee for sure anything relative to the real world, as a "rupture" or "divorce" between the ideal world and the real world is always possible. That means that *no theory can guarantee 100% a still undetected phenomenon or feature of reality*. For real truths we must resort only to reality. This ascertainment can be named the **ontological drama**.

Consequently, it is not correct to say: "the theory X shows that in reality Y *should be* so…" or "theory X states/proves that Z *cannot* exist in the real world". In particular, beauty of mathematics is due to the internal *consistency* of the abstract theory (reflecting an ideal world) and not due to the *adequacy* to reality. Simplicity and beauty are not necessarily criteria of a *real* truth.

Plurality of theories

If a "rupture" or "divorce" between the predicted ideal truth and the corresponding real truth occurs and the situation becomes troublesome, it is necessary to create (or choose) a new ideal world and a new abstract theory built on it. That happened, for instance, when Einstein's mechanics replaced Newton's one, which no longer corresponded for speeds close to that of light. In such a situation, scientists usually go through the following steps:

(1) *reject* the real truth which does not confirm the predicted ideal truth, possibly requiring additional evidence;

(2) *restrict the validity* of the theory to the domain in which this theory works satisfactorily;

(3) *"epicyclical" patching* of the "abstract theory", adding new principles and exceptions to its core;

(4) full *reconstruction* of the theory, on a different ideal world and another abstract theory.

The establishment moves to a next step only if a particular step is no more an acceptable solution.

There are fundamental (though frequent) mistakes to confuse, in a particular situation, the real world with the corresponding ideal world, or to imagine that the real world is somehow an unsuccessful copy of *the* ideal one. As an argument: rational knowledge leans on a single *real world*, but human mind can imagine *many ideal worlds*, close to a certain area of interest of the real world. Therefore it happens that the real truths known in this particular area can be explained, equally well, by a theory A and a different theory B. The two theories use and explain the same (already known) real truths, but use different *ideal worlds* and *abstract theories.* Obviously, the two theories contradict each other in at least one prediction, yet unconfirmed in real world. In this case, the scientists will imagine a **crucial experiment**, to validate or invalidate this prediction, thus eliminating the theory which made the wrong prediction. If a new scientific theory does not indicate the crucial experiments to prove that it is the right one, the new theory is likely to be ignored by scientists as an accepted theory will not be changed with a new one than by recourse to the real truth, therefore to an experiment upon reality.

But sometimes such an operation is not possible, now or in a foreseeable future. There are, for example, areas of reality in which phenomena are not observable or repeatable at will, for example: the "Big Bang", the afterlife, or some "paranormal" claims. We can name them "**non-experimental**" areas. Of course, what is non-experimental today could become experimental tomorrow. Some of these areas are addressed by *metaphysics* (as the free will, spirit and matter, nature of divinity etc.) but there is also a "***zone of anyone***" (for example, rare phenomena that cannot be brought to the laboratory), which remain prey to a kind of "*paranoid epistemology*" based on the conviction of discovery of hidden absolute truths. The authors of such "theories" associate to picked suspicious real truths, a phantasmagoric ideal world, being fascinated by its consistency. A normal ideal world should be always consistent, but this grants nothing for the truths of real world.

This "zone of anyone" could be in future a target for **border sciences**, provided the scientific methodology will be expanded. One direction could be the evaluation of testimonies, in terms of credibility and strangeness, and using statistical approach.

The pluralistic principle

If we have two or more theories (scientific, metaphysical, etc.) in a particular area of reality, as long as we cannot perform the crucial experiment to choose the right one, both theories remain "pending" and provisionally plausible (this is especially true of metaphysical theories, for which we cannot perform such experiments). The scholars have in this case three options:

(1) **Monism:** choosing one of the theories, based on a "preference criteria", denying the alternatives, rejecting the arguments of other theories. In monism creation of new truths is limited, as the logical or mathematical way, of generating new ideal truths, only reveals the implacable consequences already accepted inside the abstract theory.

(2) **Synthesis:** finding a new ideal world, in which previous worlds are cases, and a theory which unifies the previous theories. After a successful synthesis we could confront the danger of monism.

(3) **Pluralism:** accepting as valid, at the same time, *all* theories that could not be invalidated (and their ideal worlds).

The rational attitude is to consider all proposed theories that could not be rejected by real truths or by crucial experiments, possibly attaching to each a credibility weight. We can name this **the pluralistic principle**. The pluralistic option is itself a multiple "bet", simultaneously on all or nearly all available alternative theories addressed.

Deciding what to do in a particular situation, a pluralist faces multiple conflicting truths, forecasts and methods. The solution will be, wherever possible, an average truth, a compromise, possibly even a newly created truth, on the basis of those available.

Pluralism has not only advantages. We show in a table some of the main advantages and disadvantages of pluralism compared with monism.

	monism	**pluralism**
advantages	• simplicity • ease of communication • clear rules for the masses • short-term efficiency • routine, minimal responsibility	• creativity • long-term progress • open society • intellectual potential of society • intense exercise of free will
disadvantages	• self-sufficiency • stagnation • isolation • frustration for the creative • intolerance • demagogy • fanaticism	• complicated, intellectual effort • responsibility, existential problems • hesitation and slowness in decision • difficult to accept to the majority • clash between mentalities • accusations of eclecticism, relativism, etc. elitism.

The advantages of the pluralistic option are recognized now in *economics, politics, culture* and *art*, they began to be recognized in *science* and *morality,* but pluralism is still absent in school and not yet accepted in the knowledge of *divinity*, although there were made some steps toward ecumenism.

This **external pluralism**, of different theories, is the second, epistemological, sense of pluralism. It is usual for large human structures where it can be a **competitive pluralism** or **cooperative** one**.** In the first case truths often decant and mature through the sacrifice of millions of individuals, while the second way values the uniqueness of each human being, promote fair competition or synthesis. In the past but also recently, religious matters were the bloodiest example of "competitive pluralism" in knowledge. But the pluralistic principle states that the external pluralism can work *within a single mind* and is recommended for outstanding intelligent or creative persons.

The pluralistic option is difficult to practice but remains the only one open to *progress, diversity* and a *tolerant skepticism.* Since no theory about reality can be perfect, the loss of alternative theories will slow down the development, with all the disadvantages of monism. The solution is **voluntary cultivation of alternative, diverging, theories and visions,** creating conditions so that they can mature, uninfluenced, until they are strong enough to produce and defend their own truths, in competition with traditional ones. If we want progress, we should not only tolerate and encourage the plurality of visions and theories, but we should even seek them, nurture them and strive to create optimum conditions of their continuous generation.

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