

# The mathematical and the metaphysical roots of modern technological thought: Reading Heidegger

## ABSTRACT

Heidegger wanted to know the meaning of modern technique connecting its features with a thought's calling forth principle that he named enframing (Gestell). This article aims to show that another factor, more original, also forms the epochal realm in which enframing arises. We call attention to 'the mathematical' and the way this element articulates our historical situation. With this in mind, we intend too understand, in archaeological lines, some conditions of our contemporary technological imperialism.

## RESUMO

Heidegger procurou conhecer o sentido da técnica moderna relacionando suas características com um princípio de interpelação do pensamento a que chamou de armação (Gestell). Este artigo pretende mostrar que um outro elemento, mais original, também forma o solo epocal em que a armação aparece. Chama-se atenção para o "matemático" e a forma como esse elemento articula nossa época histórica. Conservando isso em mente, procura-se ainda entender em bases arqueológicas algumas condições do atual imperialismo tecnológico planetário.

## KEY WORDS (PALAVRAS-CHAVE)

- Heidegger
- Technics (Técnica)
- Technological Imperialism (Imperialismo Tecnológico)

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HEIDEGGER EVER REFUSED himself to be called a cultural critic. Even so, he tried to define the main features of our time. He was interested in the fate of being in an age that sees itself like actuality and designs its figures in a technical enframing. According to him, for instance, "journalistic reports were the main form to deal with historical facts evinced by actuality" (Barash, 1998: 222).

For him, the historical conversion of natural sciences in experimental technology was correlated to the conversion of human sciences in communication technologies. Both were subjected to the living and to the machinical-experience principles of our historical calling, the principles of a calling forth originated with modernity (*Contribuições*, p. 109).

"Planetary journalism" is a sign of a process through which we, humans, spoil all that is traditional, the philosopher argues to Hannah Arendt (*Correspondência*, p. 66). We have to think that technical organization of world opinion by the media may be a kind of historical consummation of historicism in the technological epoch (*Holzwege*, p. 295; cf. Derrida & Stiegler, 1998: 75-124).

Heidegger summarizes in his writings the schemata, fantasies and feelings that are originated from the will of technicity that moves our recent history. Kroker puts the point in the following terms:

"Heidegger's theory of technology assumes the form of a general theory

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of civilization which, beginning with the basic assumption that the technological cannot be understood solely in the language of technological, traces the genealogy of planetary technicity to its ancient roots in a way of being that, expanding from its origins in the mythic legacy of the west, comes to represent human destiny" (Kroker, 2003: 9).

Technology launches the foundations of an era in which things are no more allowed to be things in themselves. Within it, everything tends to be treated like stocks and standing-reserves. Everything tends to be seen in its functional aspect and in its eventual use in any type of exploitation and enterprise. What marks and designs our actuality is deprivation or lack of permanence. The coming to presence of it is the general planning of beings in a way adjusted to the forms of enterprise and exploitation.

Despite critical remarks against it, commentators, defending other kind of views, note that "Heidegger's critique of *autonomous technology* is not without merit. Increasingly, we lose sight of what is sacrificed in the mobilization of human beings and resources for goals that remain ultimately obscure". Despite its ambiguities, Heideggerian approach to the question of technique "warns us that the essence of technology is nothing technological, that is to say, technology cannot be understood through its usefulness, but only through our specifically technological engagements with the world" (Feenberg, 1999: 186).

As Langdon Winner remember us, the philosopher has the singular merit to point out that "we must, first of all respond to the nature of technology, and only afterward ask whether and how man might become its master" (Heidegger apud Winner, 1977: 131).

For Heidegger, technological era is a time in which historical humanity experiences in its most inner thinking an unlimited power sensation but at same time a lack of

meaning or a sense of existential desolation. Doubts and anxieties towards ourselves live side by side with a crude fanaticism and blind faith on technology. Hopes mix with fears, obscurantism with rationalism, powerlessness sentiments with a imperial will to power.

Everywhere, we find "a lack of goals: this is the fundamental condition not only to the moving and ever starving establishment of goals and objectives, but also for its independence in front of things in themselves" (*Nihilismo*, p. 110).

We argue that this understanding is the ground for a famous and very often mentioned excerpt from *Introdução à metafísica* ([1935] 1955). Writing this when he still believes in an Europe renewed by national-socialism [!], Heidegger sustained that::

"From a metaphysical point of view, Russia and America are the same, the same dreary technological frenzy, the same unrestricted organization of the average man. When the farthest corner of the globe has been conquered by technology and opened up to economic exploration;; when any fact becomes accessible to knowledge in a easy and fast way and every-where and at any time [...] - so and only so the following questions will return like ghosts passing through a sabbath: why ? going where? After what ?" ([1935] 1956).

Western civilization originally had reserved to itself an European realm. Americanism is an heir of its legacy, but reveals a new feature. According to it, "truth belongs to what is acted with success". Even more, within it, power aims to possess a planetary scope and in virtue of this virtually all peoples tend to fall in its realm, whose main external aspect is the expansion or development of machinist technology.

Since XVII century we may find traces of a process which the meaning is to define

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technically what man is and to establish the correct way to explore human being in all fields of existence. Underlying that, there is an understanding that comes from ancient Greece. According to it, "man is a kind of living being (*biós*, an animal), that we find among others, be over Earth, be over the Universe" ([1941] 1986: 111).

However, what happens is that this understanding only takes-off with a significant intensity at modern times, with the new emphasis given to technical thought. From then onwards, beings begin to be summoned by a new mode of calling forth, that articulates our way of life in machinical ways and that the philosopher named *das Ge-stell* ('Enframing', according William Lovitt's translation to English. Cf. *The Questioning of technology and other essays*. New York: Harper, 1977, pp. xxix and 19).

Since this time, also happens however that "a large spectrum of sciences will offer information about that living being called man" (p. 111). These sciences we may put into a set, that in another step, due its features, we may call *anthropology*, maintains Heidegger.

According to Heidegger, we must keep on record, technique is a form of thinking, through which being reveals in itself to the man via fabrication of images, tools and situations. Only at second instance and in our time, however, those are seeing like products of a calculation between means and ends or, beyond, as a rational principle of world's construction.

Pre-modern times ignored such understanding. The best they did it was to subject it to other principles of institution. The essence of technique is not technical - it is not the calculation between means and ends. The philosopher thinks this is an idea that applies itself in ancient as much as modern times and even more today, in our contemporary world, when technique tends to reach its consummation epoch.

Technique is a mode of thinking that articulates itself at first time among the ancient Greeks, although it has its originary

essence in human being. For this, technique has a meaning that changes according to the way we are calling forth historically. Originally, the form of knowledge that is technique was a extension of *phisis* - *phisis* was the essence of technique. Even when it separated itself from this understanding, technique did not begin to be seen as calculation or a construction principle of existence.

Thus, the question we have to think is what or who decides or imposes this approach and its futuristic projects to technique. That is the essential question put on us by technique. Only this may respond to the question about what is the essence or effective meaning of modern technique (technology).

Modern technique is calculation, but the embryo of what it is for us is already present in the originary understanding of technique as a knowledge about the ways of coming to presence of beings in which human action is needed to actualizes *phisis* power.

There was another feature of it, notwithstanding, when it arose, at the time in which ontology started its effort to overlap mythological thinking. With thought's effort to understand and master nature begins, still in ancient times, a process by which technique reverts itself in a force employed against nature. Technique converts itself in a mean of control and, so, in the embryo of our modern technology.

Heidegger begins to examine this problem in the 1920's. We may see that in his course seminary about Plato's doctrine of ideas (1926). Since the middle of the 30's, although, he connects that study in a direct way with the question of science. Then, he offered a reflection about its modern character or essence in his course seminary about the thing ([1935]: 1989).

Around this time, he argues in an obscure way that modern thinking appears inside a set of metamorphosis happened to beings at the middle of XVII Century. Heidegger rejects the conceptions according to which that changes, from out of that mo-

dernity did begun, were moral, political, psychic or economical. For him, this process was a product of being in itself ([1936/1937] 1986: 106-107).

Only some years later he will think in another theory or historical proposition to explain this point.

Sure at the time we have mentioning is only that we face a change at the way beings were calling forth to with the birth and growing of modern natural sciences. Modern science is empirical and submits itself to experimental procedures. But first of all it is a science that seeks to put in control its evidences, that aims to calculate or to predict our reality. All this was an effect of the changes happened to production relationships. However, it has to do also with the emergence of a new metaphysical mode to calling forth the things of our worlds.

Traditional metaphysics was essentially poetical and expressed itself in an ontological thinking. Modern metaphysics is essentially mathematical and tries to express itself in an anthropological thinking. Within it, calculus assumes a dominance or a first rank significance over the mundane and/or divine proprieties of the things ([1935] 1989: 113).

When this happens, there is a deep turn in the world and, through it, man begins to reject its former condition of guide of being and axis of the word. From then onwards, man begins to think himself technically and aims to be the master of nature and the lord of the planet. "Nature becomes a gigantic gas station, an energy source for modern technology and industry" (Heidegger apud Fry, 1993: 66).

Heidegger called *the mathematical* to the relationship or way of deal with things that articulates this metamorphosis. Besides numbers, much more belongs to it, to that which is already-known by thought. Mathematical is the form of enframing things by which they are determined from the perspective of its calculation.

The philosopher argues that the first to operate with the mathematical were the

Greeks.

"*Ta mathémata* means among them that which man knows in advance in his observation of whatever is and in his intercourse with things: the corporeality of bodies, the vegetable character of plants, the animality of animals, the humanness of man" (Holzwege, p. 78).

Already in ancient Greece, the mathematical "is that *about* toward things that we already know truly in advance, before our experience of things. Mathematical is that *what* we do not search in things in themselves, but that we carried on with us to them" ([1935] 1989; 80; Zollikon, p. 130-131).

The mathematical is in essence a fundamental presupposition of knowledge about the things and reveals itself altogether with being. It is an eventual way to approach to or to stay with things. Putting in other words, we could say that the mathematical is the human being in itself, it is one of the first possibilities of human thinking.

Originally nature was seen as a matter of calculus and measurability, but this is not the same to say that, by this way, calculus was the first or originary way by which nature expressed itself, at least following Heidegger's view.

The mathematical alters itself its meaning, according to the experience in which it is present changes historically, obeying the calling forth of new principles of thought. As Jean Phillippe Milet notes, "Heidegger identifies two experiences towards the mathematical. Greek experience assigned more importance to the acknowledgement side of that. Modernity assigns more emphasis to its previousness character" (Milet, 2000: 66).

The mathematical thus understood acquires itself dominance in modernity. From then onwards and in an unclear way, it becomes hegemonic in the midst of our relations with world. The representational character of beings, formally ontological, falls

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down in the patterns of the mathematical with the coming of our times. At the same time the world begins to be seen as an image, caught in a machinical way and from a subjective stance or perspective (*Holzwege*, p. 75-94).

Heidegger expresses the point in the following terms:

“In contemporary science, we find a will to explore nature, the will to make useful, the will to calculate in advance. There is a predetermination of how nature must be on because it is by this way that I may act towards it with assurance. Assurance and certainty are important. There is a exigency of control and a certainty in the will to control” (*Zollikon*, p. 47).

Thus we may understand the mathematical as the calculation factor and this, the calculation, as the meaning or principle of reason. According the same token and with justice, this reason may be called a technical reason. Greek people referred to this factor as the proper of a specific relationship to things. For them, things may be seen from a singular point of view they called the mathematical. But they had many others too. Modernity sets up itself with the raise of this presupposition to the front line of intellectual activity.

**From the XVII Century onwards, we may attest that:**

“New passion for thought and spirit of research aim to clarify and to develop in its deep essence a sub-jacent position which, until then, was eclipsed and was endured without enlightenment, a sub-jacent position which, until then, expressed itself in a discontinuous way and, many times, interpreted itself in a wrong way about its own essence” (p. 103).

Curiously, however, that is not all to note. Through this way, traditional metaphysics falls down in the field of subjectivism. Even more, ontology has gained a more anthropological feature. Questioning about being tends to be reduced to the hope to get in possession of a method. Method becomes now the path through which man aims to conquer by himself certainty in knowledge and security about the truths he thinks may possess. “This transformation is the beginning of a new thinking, whereby the old order passes into the new and the ensuing age becomes the modern” (N IV: 97).

A factor that defines calculation, the mathematical conquers supremacy over thinking and begins to impose its features when things no more depends on their thingness. This and not the reverse is that will make mathematics, formerly just a liberal art, the central or most important form of expression of modern science.

“[Since then] nature is no more the inner principle from out emerges body movements. Instead of that, it becomes the form in which we may catch the multiplicity of relationships that positing the bodies. It becomes the form through which they presents themselves in space and time. Being realms of eventual classes of positioning and of types or classes of determination, since then space and time nevertheless reveals themselves without any particular peculiarity” ([1935] 1989: 93).

Heidegger stresses that the mathematical is a “originary ground position”, a factor or “fundamental trace of any thinking”. This way we do not close the question about why there is and what is the essence of this relationship among the mathematical, things, and immediate experiences (p. 97).

The mathematical element is, however, something that needs to be thought with others of the same rank and that may

be even more rooted in our circumstances. The philosopher suggests that this problem may be enlightened better examining the ancient origins of the reason's principle that governs modernity. Anyway, he affirms that only in modern times and its peculiar metaphysics, associated with what he called enframing, the precedence of the mathematical really begins (p. 99).

According to the philosopher thought's, the mathematical will be, in fact, an element underlying or with potential to define modern metaphysics and, by this way, our modern natural science. Mathematical is something that only in our age projects itself to the front stage of our historical background. It is what enframes our metaphysics and supports a new conception of science, a conception that no more accepts truth as disclosure or revelation.

Within this general turn that happened in XVII Century, we may see also that at this moment occurred not only a liberation, but also the structured emergency of a new form of experience and of a new form of freedom itself. Examining this period the philosopher calls our attention to the fact that in its circumstances the figure of the world recedes in front of the figure of the self, world's theory is eclipsed by the subject's theory.

Heidegger argues that modernity begins when what it is underlying, grounding, transfers itself to human beings and those assume the condition of subjects. Modern times transfer the grounding principles of thinking from things that were maintained in themselves to a self that thinks them according the principles of calculation.

Modernity is at stage when subject is positioned in front of world and, more, when things become objects to him via the strange conversion of the mathematical into a calling forth principle of beings in their totality.

"Things are in essence what, in front of the subject, rest as an other, something that is in front of us like an object, because that is the way they

receive for the first time and in a mathematical form its thingness and its grounding relationship according to higher principles and its effective subject (the self)" (p. 108).

While the mathematical may be the ground for this new connection between subject and object and, besides this, the ground for the self in its condition of essential definition of man, the hegemonic role acquired by it comes from the fact that at this time a change in truth's essence happens. The mathematical is not a cause for this historical transformation. Rather, it is this one, a historical change, that opens up a metaphysical field of action for the mathematical. Only this allows it to take science in control and to guide it in the modern patterns we have known since the end of XVII Century.

What converts truth in certainty is what redefines the mathematical and at same time subordinates truth to ego consciousness. Only thus we may see the modern take-off of certainty as "the independent foundation of all possible knowledge in terms of an unitary and unconditional fundament" (*Friburgo*, p. 198).

Conceived as the rational animal since ancient time, man is seen from then onward and ever more as a calculating mind and an impulsive body. The poetical elements that abides in his being have their possibilities restraint.

"With the *cogito sum*, reason is now the first foundation of all knowledge and the guideline of any determination of whatever kind of things in an evident mode and in according with its inner rational exigencies" ([1935] 1989: 109).

During ancient times, the condition of rational animal attributed to man did not carried on in its location inside that being, did not carried on in its characterization as a subject. When modernity takes control, instead, thinking principles begin to be de-

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fined in relation to the subjectivity of the self, to the logical contradiction and to the so-called principle of reason.

“As long as the guideline of the self, the ‘I think’, becomes the main guideline, the self and, with it, man acquire an extraordinary position inside the way we think beings. ‘I think’ does not designate a realm among others only. It designates too that realm from which get out and into which get in all metaphysical propositions [of modern times]” (p. 112).

Protagoras once stated that “man is the measure of all things”, suggesting reasonably with this that “things essence does not become impossible to express but also with no meaning without man’s existence. However, continues the author, this is not to say that things in themselves depend on man” (Heidegger [1931] 1992: 139).

The statement does not mean that man is seen in that epoch as an autonomous subjectivity, that he may represent all things with independence and that, in this sovereignty, he can measure all that by procedural representations, argues Heidegger.

“The way Protagoras defines the relationship of man to the being is merely an emphatic restriction of the unconcealment of beings to the respective radius of man’s experience of the world. The restriction presupposes that the unconcealment of beings reigns. Even more, it presupposes that unconcealment was already experienced as such and was long ago taken up into knowledge as the basic character of being” (N IV: 94).

Man becomes such thing, man, with the disclosure of being, and not when he tries to preside over it. Man exists every time that this disclosure happens. Man does not remain intact in a pure subjectivity - he is his changes. Man is not the founder sub-

ject of experience - he is a timely being, something that changes historically.

“For Protagoras, then, the beingness of beings is a coming to presence in the unconcealed” (N IV: 122).

Since Descartes, however, we may note a turn, through which arises the question about what paths may allow man to catch an essential truth with his power alone, only for him and in his own patterns of thinking solely. After him, the historical trend we will see is the being to be reduced to a subjective representation and to the human will to power. But this is not all, as have noted some annalists of our epoch and commentators of the philosopher’s ideas :

“Accordingly with that, the task set for modernity is to fulfill the purpose of self-consciousness by subordinating a fundamentally brutish nature to reason’s laws. But since the reasoning subject recognizes only mathematized representations, the natural world will inevitably be transformed into a *standing reserve*, while the passions and desires are left unmediated and can only be repressed or directed violently against themselves” (Cascardi, 1992: 38).

During Middle Ages, what was important was soul’s salvation. Truth was secure in the Holy Writings. All things were in the hands of God. After this period, man converts himself in a measure of all the things in a specific meaning. People begin to believe that is only for their faculties, plainly calculated and calculable, that man may be in possession of his own life, of his whole existence.

“What is new about the modern period as opposed to the Christian medieval age consists in the fact that man, independently and by his own effort, contrives to become certain and

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sure of his human being in the midst of beings as a whole" (N IV : 89).

Heidegger carefully comments the point, asking us to see that this circumstance does not excuse Greek legacy from its historical responsibilities towards our present situation, because the origins of the metamorphosis he indicates may be traced back to Plato. Modern metaphysics maintains a unity with the metaphysics that preceded it, because, underlying a superficial discontinuity, there is only one, although not identical, being's calling forth principle.

"The current conception of technique establishes a false continuity (the instrumental continuity) and maintains outside of its view a true continuity (the disclosing continuity) between ancient and modern technique. Heidegger points out a true continuity (technique as disclosure) and a false discontinuity (that one inherent to a fundamental modern attitude about nature, that gives to our epoch the title of technical age and that gives to our eyes the conviction that all is technical" (Séris, 2000: 289-290).

During XVII Century, we have seen, a historical project is launched. Its meaning is to define what man is and to fix the better form to explore his properties. Descartes reveals a project whose meaning is to establish the being of beings in general, via the explanation or determination of reason's principle. With him, we begin to follow a project whose meaning, finally, is to establish the knowledge of the world, but whose foundations, design and ordering, well conceived, we may find in the mathematical evocation of thinking.

After Descartes, the founding thinking according to which man exists only for himself, exists without a historical or organic relationship with other things, because via this thinking man begins to seek an absolute and unconditional fundament to his

acts and knowledge. Following him, nature loses its historical condition of a ground in which man was called forth. Nature converts itself into an object of a technical representation, whose unconditional intention is to put it under the control of a mathematically fabricated thinking.

"Descartes obtains his position on the basis of a will to construct something absolutely proper and secure. He avoids to think a fundamental relationship with things in themselves or the question of being. What something really is and may be is determined following the patterns of mathematical evidences only" (*Zollikon*, p. 136).

During Descartes's time, a historical turn occurs, a turn one that was prepared long time ago and that, notwithstanding, gives to technique a new relevance. Consciousness turns itself the basis on which the essence of truth begins to be grounded. This happens however because this change is, in reality, an effect of the appropriation of beings by a will to power in which all of them tend to return themselves and to which all things tend to be submitted, tend to obey unconditionally (N IV: 179).

Since then, "Man finds himself caught in a contradiction that defines technique's age as an age of metaphysics consummation, because this one only fictionally gives to man a domination over being that he cannot reach by himself" (Pansera, 1998:78).

Heidegger as much as Adorno have suggested the philosophical suspect or assumed the human wisdom according to which technology may be unable to complete with total success a reconstruction of man following machinical principles. Man is this, man, because there is ever in him a kind of rest, something that continually escapes out from technique, although even he cannot understand and masters sovereignly this mysterious element.

Anyway, another important step in



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this trajectory is made by Leibniz. Leibniz marks out the end of an incubation period, in which calculation waited its time to convert itself in the beings appropriation fundament. For the first time in history appears the fantastic idea according to which “the universal logic calculus could govern computer circuits [of all data and information]” (Heim, 1993: 38).

For Michael Heim, Leibniz was the first to conceive a purely artificial language, that might be manipulated at speed of thinking. Still in the words of this author, “Leibniz believed all problems to be, in principle, soluble. The first step is to create a universal medium in which to communicate. With a universal language, you can translate all human notions into the same basic set of symbols” (p. 37).

Heidegger agrees with this statement, pointing out that the finding of the grounding proposition as a fundamental principle is what specifies Leibniz. In other words, his work marks the historical move of being’s grounding foundation from the world to the being of man. From then onwards, however, meaningful for man is that representation and conduct root themselves in this principle.

“The planet stops to be Earth, in which we might be mortal beings, spatially determinates. The planet becomes a ruled representational space, by means of which reduction of the spatial body to the geometric one accomplishes an old Cartesian dream” (Guery, 1995:112).

We do not have to forget that nothing is without fundament. But if it is so, we could not forget too that by this process and after this moment the typical factor of our era, the will to power, begins to develop itself in an ever more unlimited way. Since then “All acts of representing are correlated to a calling forth that demands from each being an unconditional delivery to that self-sufficient fundament” (*Fundamentos*, p. 98).

As we have seen, thought originally keeps itself in tension with being during Ancient Greece. At that time, thinking tried to conserve in itself what was disclosed in it, i. e., being. For Heidegger, there was a situation in which what was appearing could be kept without manipulation until its achievement. Then, man reveals himself with the pure let it be of things that disclosed in and for itself, believed Heidegger.

During the Middle Ages, as we saw, certainty had soul’s salvation as its main existential goal. Now, man fights for possessing certainty about himself. The goal is to put all beings in front of him, in a way that he may represent them objectively and calculates them without uncertainty. The foundations of human being begin to be searched in man himself.

“The essence of the history of the modern age consists in the full development of these manifold modes of modern freedom. Because such freedom implies man’s developing mastery over his own definition of the essence of mankind, and because such being master needs power in an essential and explicit sense, the empowerment of the essence of power as fundamental reality can therefore become possible only in and as the history of modern age” (N IV: 98).

Descartes suggests that truth’s essence or meaning resides in certainty, and that this certainty may be founded in human knowledge only. *Cogito* is the representational activity which examines and controls a world reduced to images. Fostering this project we may identify the practical conviction that historical events connected to it will be “measurable in advance and, this, while they are happening; there is, in other words, the conviction that they can be subject to controls” (*Zollikon*, p. 160).

In Heidegger’s view, we may find here some roots of this “gloomy development” that animates modernity’s expansion and

inside which “no one questions more about what man is and how is him in his being. Instead of that, man tends to be represented a priori as following rules preaching the complete technical manipulation of the world” (p. 167).

“The consciousness of my self does not accompany the consciousness of things, as if it traveled alongside the consciousness of things as its observer. The consciousness of things and objects is essentially and its ground primarily self-consciousness; only as self-consciousness is consciousness of objects possible. For representation as described, the *self* of man is essential as what lies at the very ground. The self is *sub-iectum*” (N IV: 108).

Greeks relationship with nature was grounded in a kind of a spontaneous disclosure or let it be of things. The Moderns aim to calculate and to assure this process. Only by this way, the conception of human being like a subject and the conception of beings like objects, man included, are possible, as stressed Michel Foucault (1978).

However, with it appears the mathematical, “the main presupposition through which we live or exist in a scientifically technical world” (*Zollikon*, p. 144). According to Heidegger, the mathematical, as anchor, “is the first step through which modern machine technology, and along with it the modern world and modern mankind, become metaphysically possible for the first time” (N IV: 116) •

## Notes

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